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The wolf spiders (Araneae, Lycosidae) of the eastern part of the Hustopeče bioregion

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Košulič O. & Hula V. 2011: The wolf spiders (Araneae, Lycosidae) of the eastern part of the Hustopeče bioregion. *Acta Musei Moraviae, Scientiae Biologicae* (Brno) **96(1):** 29–40. – This publication makes a contribution to knowledge of the species composition of wolf spiders in the eastern Hustopeče region. The spiders were collected by means of pitfall traps and individual collection in the years 2007 and 2009. Four protected areas of the Hustopeče region were selected the research: the Kamenný vrch u Kurdějova Nature Reserve, the Louky pod Kumstátem Nature Reserve, the Hrádek Nature Reserve and the Jesličky Natural Monument. Also evaluated were two anthropogenically affected sites: the terraces of the vineyard known as Vinice and a reclaimed landfill near the village of Morkůvky. A total of 1320 specimens were captured, including 530 juveniles and 790 adult spiders, which were determined as belonging to 23 species. The most significant findings, both in terms of rarity and bioindication, were *Alopecosa aculeata*, *A. solitaria*, *A. striatipes*, *Arctosa figurata* and *Pardosa bifasciata*.

Keywords: Araneida, Lycosidae, xerotherm, faunistics, South Moravia

Introduction

In 2007 and 2009, research was conducted on the species distribution of wolf spiders at selected sites in the Hustopeče region. There are some valuable xerotherm habitats in this area that have not yet been fully explored in arachnological terms. Kamenný vrch u Kurdějova Nature Reserve is a relatively well-known and popular location, where regular discoveries of rare and endangered species of wolf spiders have already been reported (Hula 2006). However, no findings have been published from the typical south Moravian steppes, such as those characterising Louky pod Kumstátem Nature Reserve, Hrádek Nature Reserve, Jesličky "Natural Monument", and others. Our research centres, therefore, on these sites, with particular regard to interesting biotopes around the village of Morkůvky. All the sites surveyed are representative habitat samples typical of the Pannonian region of South Moravia, which is rich in discoveries of rare thermophilous wolf spiders. These spiders are a major ground-living component of our arachnofauna. Among such epigeic species, nearly 50% of the species are bound to their original habitats. Many species are common over a wide area, but remain closely associated with their environment and are relatively easily monitored by pitfall traps and individual collection methods. Because of these attributes, they constitute a good indicator group among animals that may be surveyed to help in the assessment of the natural situation and changes occurring in the locations (Buchar 1983).

Research area (monitored localities)

The research area falls within the region of South Moravia and the district of Břeclav, which lies in the southernmost part of Moravia. This territory is part of the Pannonian biogeographical province, which hosts the best examples of thermophilic fauna and flora in the Czech Republic. The Pannonian province is represented by four bioregions – Dyjskomoravský, Mikulov, Lechovice, and Hustopeče (Culek 1995). The area in which the wolf spider research took place is part of the bioregion around Hustopeče, particularly the eastern part lying between the villages of Kurdějov and Klobouky u Brna. This region is characterized by patchy and discontinuous thermophilous oak woods and oak-hornbeam woods. Apart from the forests, it is a typical agricultural landscape. There are several fragments of steppe-like wasteland, host to many communities of xerotherm plant and animal species.

The following sites were selected for arachnological research:

Kamenný vrch u Kurdějova Nature Reserve. An important steppe site located about 1.5 km to the north-west of Kurdějov, created to protect its characteristic cover of turf grass steppe and thermophilous grasslands, which support rich populations of steppe plants and animals.

- Top of the hill (GPS 48°57′57″N, 16°45′56″E). South-east-facing slope at the top of the hill, including biotopes of former mining pits, characterized by its loose, bare and calorific substrate. The site is under active management (mowing and pasture for sheep).
- Černá hora (GPS 48°57′55″N, 16°45′12″E). South-facing meadow which forms the border of the nature reserve, to the east consisting of Černá hora Hill, a major landscape feature. Rich vegetation of prairie grasses with solitary bushes. The site is under active management (mowing).

Louky pod Kumstátem nature reserve. Xerothermic slope meadows on deep topsoil, 0.5 km north-east of the village of Krumvíř. The reserve consists of two parts separated from one another by a gap of about 200 metres.

- Eastern part (GPS 48°59′46″N, 16°55′16″E). Steep slope facing south-west with a rich understory of dry broad-leaf *Bromion erecti* alliance grasslands. The site is under active management (mowing).
- Western part (48°59′36″N, 16°55′20″E). Separated meadow with southern exposure surrounded by forest and shrubs and bordered at the bottom by a field (in 2009 sown to wheat). Understory of steppe vegetation is involved less than in the previous area, turf disturbed in some places.

NR Jesličky (GPS 48°56′33″N, 16°50′21″E). Location near the village of Němčičky u Hustopečí. This is a valley slope facing due south-east, with undulating downs where the thermophilic turf steppe becomes pubescent oak woods (*Quercus pubescens*) on the northern edge of the site. Active management in the form of autumn mowing of individual parts of the site.

NR Hrádek (GPS 48°57′19″N, 16°50′59″E). A complex of thermophilic oak woods between the villages of Morkůvky, Boleradice and Němčičky, where characteristic

"steppe sites" on steep south-facing slopes occur, areas that have never hosted forest of steppe to forest-steppe character. No active management.

Vinice (GPS 48°58′20″N, 16°52′17″E). Vineyard terraces located near the village of Morkůvky, about 1 km towards the village of Brumovice. Very steep slopes facing south, excellent calorific qualities with the occurrence of ruderal as well as rare xerothermal plants *(Nonea pulla*, *Inula* sp.). Vineyard management is incorporated with the integrated protection of grapevines.

Rýny – landfill (GPS 48°57′44″N, 16°51′12″E). Site located about 1 km south-west of Morkůvky village in the centre of about 50 ha of agricultural land. Originally a natural ravine inaccessible to cultivation, it has been used as an illegal dump for household refuse in recent years. In 1993, a partial recovery operation was undertaken and the rubbish covered with topsoil. The vegetation of the neighbouring areas of landfill is typical of disturbed and ruderal sites.

Methods

Collection of spiders at Vinice, Rýny, and Hrádek (March-October 2007) was performed by individual transect, a method of collecting wolf spiders that was assessed as very inefficient. In the light of this, formalin pitfall traps were the method of choice for the remaining nature reserves of Kamenný vrch u Kurdějova, Louky pod Kumstátem and the "natural monument" of Jesličky (during April-October 2009); this method covers largely the epigeic component of the arachnofauna, i.e. that which contains the majority of conservation-important species (Řezáč 2004). The traps were placed on April 18, 2009 and specimen collections made once a month from May to October. At Louky pod Kumstátem and Kamenný vrch, two lines of three pitfall traps were placed 5 metres apart. Three lines were placed at Jesličky in order to make an inventory of the spiders on the steep and arid slope. All spider material was determined to species level by means of specialist literature: Miller (1971), Roberts (1995), Heimer & Nentwig (1991), Almquist (2005). They were also evaluated in terms of the relict status of species after Buchar (1983), who classified spider species into groups according to their relationship to the originality (disturbance) of their habitats into three groups: RI, first class relict; RII, second class relict; E, expansive species). Nomenclature and arrangement of families, genera and species follow that employed in *Catalogue of Spiders of the Czech Republic* (Buchar & Růžička 2002) and the most recent version of *The World Spider Catalogue* (Platnick 2011), applying the Clerck name extension in accordance with Art. 3.1 of ICZN (1999).

Results

A total of 1320 specimens of wolf spiders were collected, of which 790 adults were determined and categorized into six genera: *Alopecosa, Arctosa, Aulonia, Pardosa, Trochosa* and *Xerolycosa*. There was a total of 23 species, constituting a third of the number of species of wolf spiders that occur in the Czech Republic.

The most numerous species identified were of the genus *Alopecosa*, abundant on drier grasslands and non-afforested habitats, *Alopecosa accentuata* and *Alopecosa cuneata* in particular. High numbers of the rare relict species *Alocosa sulzeri*, *Alopecosa striatipes* and *Alopecosa solitaria* were also recorded. Of its genus *Pardosa alacris* is the most numerous species typically populating forest-steppe slopes and the edges of deciduous forest groves. More minor findings included *Xerolycosa* species (*X. miniata* and *X. nemoralis*) and abundant species of the genus *Trochosa*, detected in almost all the locations surveyed.

In terms of relict status, the material consists of 35% (eight species) of 1st class relicts (RI). These largely rare and less abundant species inhabit only undistorted natural habitats. Species inhabiting semi-natural, slightly disturbed habitats, the 2nd-class relicts, were represented by six species, constituting 30% of the total recorded. The remainder of the material (8 species, 35%) were of the expansive category. These wolf spiders include species of wide ecological valence, so they are to be found in undistorted climax locations from whence they enter anthropogenically semi-developed and developed environments, as well as habitats with a high degree of disturbance. Most of the relict species were found in nature reserves, where they even formed a predominant component of the total identified (Hrádek and NM Jesličky NR – *Alopecosa sulzeri*, Louky pod Kumstátem NR – *Alopecosa solitaria*, Kamenný vrch NRR – *Alopecosa solitaria* together with *Alopecosa striatipes*). In contrast, the representation of species in the Vinice and Rýny habitats consisted primarily of the expansive component, with the occurrence of a single relict species, *Alopecosa aculeate*, which was found at both sites.

All species are listed below, in alphabetical order. Names of the determining authors are listed as abbreviations: OK (Ondřej Košulič) and VH (Vladimír Hula). Distribution and ecology of species follow Buchar & Růžička (2002) and other literature cited below.

Annotated list of species

Alopecosa accentuata (Latreille, 1817)

Material: NR Hrádek (14/4/2007, 1♂, leg. OK, det. VH); Vinice (10/3/2007, 4♂ 8♀; 14/4/2007, 1♀; 6/10/2007, 4♀, leg. OK, det. VH); NM Jesličky (16/5/2009, 5♂ 6♀; 21/6/2009, 12♂ 8♀; 23/7/2009, 2♂; 25/8/2009, 1♀; 25/9/2009, 3♀; 25/10/2009, 1♀, leg. et det. OK); NR Kamenný vrch A (14/14/2007, 3♀; 2/6/2007, 1♀; 16/5/2009, 25♂ 10♀; 21/6/2009, 5♂ 5♀; 23/7/2009, 2♀ leg. et det. OK); NR Kamenný vrch B (16/5/2009, 2♀; 23/7/2009 1♂ 1♀; 25/8/2009, 1♀ leg. et det. OK); NR Louky pod Kumstátem A (16/5/2009, 1♂ 1♀; leg. et det. OK); Louky pod Kumstátem B (16/5/2009, 2♂ 6♀; 21/6/2009, 4♂ 2♀; 23/7/2009, 3♂ 4♀; 25/10/2009, 1♀, leg. et det. OK)

Remarks: Abundant, occurring in sunny, dry-to-very-dry, non-forested habitats, rock steppes to forest-steppe areas; species characteristic of the thermophyticum.

Alopecosa aculeata (Clerck, 1758)

Material: Vinice (10/3/2007, 1♂, leg. OK, det. VH); Rýny (10/3/2007, 1♂; 14/4/2007, 1♀, leg. OK, det. VH); NM Jesličky (21/6/2009, 1♂ 2♀, leg. OK, det. VH)

Remarks: Rarer species of open habitats and edges of pine forests, until recently confused with the similar and much more common *Alopecosa taeniata* C. L. Koch, 1835 (Kronestedt, 1990), a wolf spider of higher elevations.

Alopecosa cuneata (Clerck, 1758)

Material: NM Jesličky (16/5/2009, 2♂; 21/6/2009, 3♀; 25/9/2009, 3♀, leg. et det. OK); NR Kamenný vrch A (16/5/2009, 11♂; 21/6/2009, 1♂ 1♀; 25/10/2009, 1♂, leg. et det. OK); NR Kamenný vrch B (16/5/2009, 8♂ 22♀; 21/6/2009, 1♂ 5♀; 25/8/2009, 3♀, leg. et det. OK); NR Louky pod Kumstátem A (16/5/2009, 31♂ 10♀; 21/6/2009, 5♂ 3♀, leg. et det. OK); NR Louky pod Kumstátem B (16/5/2009, 7♂ 3♀; 21/6/2009 2♂ 4♀, leg. et det. OK)

Remarks: Very common in drier meadows and warm, non-forested slopes, often in anthropogenically disturbed habitats. The male has a characteristically thickened part on the first pair of legs.

Alopecosa pulverulenta (Clerck, 1758)

Material: Kamenný vrch B (16/5/2009, 8♂ 1♀, leg. et det. OK); NR Louky pod Kumstátem A (16/5/2009, 13♂ 6♀; 21/6/2009, 6♀, leg. et det. OK); NR Louky pod Kumstátem B (16/5/2009, 8♂ 1♀; 21/6/2009, 1♂ 1♀, leg. et det. OK)

Remarks: Euryvalent species inhabiting many different habitats from the lowlands to the mountains to an altitude of 1500 metres. Very similar to *Alopecosa cuneata* (above), but occurs in wetter and more ruderal habitats.

Alopecosa solitaria (Herman, 1879)

Material: Kamenný vrch A (25/8/2009, 6♂; 25/9/2009, 28♂ 4♀; 25/10/2009, 11♂ 2♀, leg. et det. OK); NR Louky pod Kumstátem B (25/8/2009, 2♀; 25/9/2009, 7♂ 2♀, leg. OK, det. VH);

Remarks: A rare relict species of stony steppes. It prefers xerothermic habitats without trees and with scanty vegetation. Only very few findings recorded (Bryja *et al*. 2005); however, higher abundance in suitable xerothermic habitats in South Moravia may be assumed. It is one the largest species in the genus *Alopecosa,* with the female body reaching up to 15 mm.

Alopecosa striatipes (C. L. Koch, 1837)

Material: Kamenný vrch A (6/10/2007, 4♀; 21/6/2009, 1♂ 3♀; 23/7/2009, 3♀; 25/8/2009, 1♂ 2♀; 25/9/2009, 20♂ 2♀; 25/10/2009, 8♂, leg. OK, det. VH); Kamenný vrch B (25/8/2009, 1♀; 25/9/2009, 2♂; 25/10/2009, 3♂, leg. et det. OK)

Remarks: Very rare, occurring on rock steppes and at the edges of open forests. Like the previous species, it prefers xerothermic habitats without trees and with open vegetation. An important element for the presence of *A. striatipes* is discontinuous (disrupted) grass turf, in which it digs burrows, highly important components of its development. Quite

rare on Czech territory, with only a few records from southern Moravia Buchar (1997), Bryja *et al*. (2005), Hula (2006).

Alopecosa sulzeri (Pavesi, 1873)

Material: NR Hrádek (6/10/2007, 4♀, leg. OK, det. VH); NM Jesličky (16/5/2009, 38♂ 4♀; 21/6/2009, 15♂ 2♀; 23/7/2009, 2♀; 25/8/2009, 1♂; 25/9/2009, 1♂ 1♀; 25/10/2009, 2♂, leg. et det. OK)

Remarks: Typical inhabitant of surviving forest-steppe areas. Larger numbers mainly in the vicinity of deciduous trees, preferably oaks. Unlike some other types of wolf spider, this one achieves greater size and is of a distinctive rusty-brown to reddish body colour.

Alopecosa trabalis (Clerck, 1758)

Material: NR Hrádek (14/4/2007, 1♂ 1♀, leg. OK, det. VH); NM Jesličky (21/6/2009, 1♂ 3♀, leg. OK, det. VH); NR Kamenný vrch A (25/9/2009, 3♂, leg. et det. OK)

Remarks: Typical among thermophytics occurring on xerothermic rock steppes, in steppe-forest areas, and at bright forest edges, in bushy clearings, etc. It is relatively widespread in central Europe and in the Alps occurs at an altitude of up to 1000 metres (Bellman 2006).

Arctosa figurata (Simon, 1876)

Material: NR Louky pod Kumstátem A (16/5/2009, 1♂, leg. OK, det. VH); NR Louky pod Kumstátem B (21/6/2009, 1♂ 1♀, leg. OK, det. VH)

Remarks: Rare xerothermic species of stony steppes, forest-steppe communities and open forest edges. Like the genus *Alopecosa*, it requires bare soil between disturbed turf. In South Moravia, the only findings are one from the sandbars of the open site of Boří les (Bryja *et al*. 2005) and another from the serpentinite steppes in the Mohelenská hadcová step National Nature Reserve (Buchar 1997).

Aulonia albimana (Walckenaer, 1805)

Material: Rýny (29/7/2007, 1♂, leg. OK, det. VH); NM Jesličky (25/8/2009, 2♂, leg. et det. OK); Kamenný vrch B (16/5/2009, 1♂, 1♀; 21/6/2009, 7♂ 3♀; 23/7/2009, 2♂, leg. OK, det. VH); NR Louky pod Kumstátem A (21/6/2009, 10♂; 23/7/2009, 2♂, 1♀, leg. et det. OK); NR Louky pod Kumstátem B (21/6/2009, 9♂; 23/7/2009, 3♂; 25/8/2009, 2♂ 1♀, leg. et det. OK)

Remarks: The smallest wolf spider in the Czech Republic, it lives in various open habitats from the lowlands to the mountains, more frequently occurring on wet sites and north-facing slopes. It is active by night, hiding in various kinds of shelter during the day.

***Pardosa agrestis* (Westring, 1861)**

Material: Rýny (14/4/2007, 3♂; 2/6/2007, 2♂ 2♀; 29/7/2007, 2♂ 1♀; 31/8/2007, 2♀; 6/10/2007, 3♀, leg. OK, det. VH)

Remarks: Very abundant non-forest species in disturbed ruderal biotopes – ploughed areas, meadows, water-meadows, etc.

***Pardosa alacris* (C. L. Koch, 1833)**

Material: NM Jesličky (16/5/2009, 3♂; 21/6/2009, 15♂ 2♀; 23/7/2009, leg. et det. OK); NR Louky pod Kumstátem A (16/5/2009, 5♂ 2♀; 23/7/2009, 1♂, leg. et det. OK); Louky pod Kumstátem B (16/5/2009, 1♂ 1♀; 21/6/2009, 2♂ 3♀; 23/7/2009, 3♂ ,1♀, leg. et det. OK); NR Kamenný vrch A (23/7/2009, 1♂, leg. et det. OK); NR Kamenný vrch B (21/6/2009, 4♂ 1♀; 23/7/2009, 2♂, leg. et det. OK)

Remarks: *P. alacris* is typical of the forest-steppe and occurs in most xerothermic meadow habitats and forest edges. Superficially very similar to related *P. lugubris*, adult males are distinguishable by colour differences of the cymbium (Kronestedt 1992).

***Pardosa amentata* (Clerck, 1758)**

Material: NR Hrádek (29/7/2007, 1♀, leg. OK, det. VH); Rýny (14/4/2007, 2♂ 1♀; 2/6/2007, 2♂ 3♀, leg. OK, det. VH)

Remarks: One of the most common spiders in the Czech Republic, it occupies a variety of wet and damp habitats, such as the edges of rivers, wetlands and degraded peat bogs, where it tends to move very near the edge of the water.

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

Material: NR Kamenný vrch A (21/6/2009, 1♂; 23/7/2009, 1♂ 2♀, leg. OK, det. VH); NR Kamenný vrch B (25/8/2009, 1♂ 1♀, leg. OK, det. VH)

Remarks: Small wolf spider that occurs on rock steppes and in preserved meadow habitats. Rare in the Czech Republic, only locally common in central Bohemia and southern Moravia Bryja *et al*. (2005), Kůrka (1998). It was recorded in the material from both parts of Kamenný vrch.

***Pardosa hortensis* (Thorell, 1872)**

Material: Vinice (14/4/2007, 1♂; 29/7/2007, 1♂ 3♀, leg. OK, det. VH); NM Jesličky (21/6/2009, 8♂ 12♀; 23/7/2009, 1♀; 25/8/2009, 4♀; 25/9/2009, 2♂ 1♀; 25/10/2009, 1♀, leg. et det. OK); NR Kamenný vrch A (25/8/2009, 1♂ 2♀, leg. et det. OK); NR Kamenný vrch B (23/7/2009, 1♂; 25/8/2009, 1♂ 1♀, leg. et det. OK); NR Louky pod Kumstátem A (21/6/2009, 3♂ 1♀, leg. et det. OK)

Remarks: Moderately common, occurring in gardens, plantations, and in vineyards, as well as on dry hills shielded by trees and shrubs (Miller 1971). According to Buchar & Růžička (2002), it occurs on steppes, xerothermic slopes, at the warm edges of forests, etc.

***Pardosa lugubris* (Walckenaer, 1802)**

Material: NR Hrádek (2/6/2007, 5♂; 29/7/2007, 1♂ 3♀; 31/8/2007, 3♀, leg. OK, det. VH); Rýny (2/6/2007, 2♂ 1♀; 31/8/2007, 1♀; 6/10/2007, 1♀, leg. OK, det. VH); NM Jesličky (16/5/2009, 2♂; 21/6/2009, 3♂ 7♀; 23/7/2009, 4♀; 25/8/2009, 2♂ 5♀; 25/9/2009, 2♀, leg. et det. OK); NR Kamenný vrch B (23/7/2009, 2♂; 25/9/2009, 1♀, leg. et det. OK); NR Louky pod Kumstátem A (21/6/2009, 3♂, leg. et det. OK); NR Louky pod Kumstátem B (21/6/2009, 3♂ 1♀, leg. et det. OK)

Remarks: Very common, occurring in open, bright sites and sunlit areas in forests and at forest edges. It prefers damp sites. Along with *P. amentata*, one of the most abundant wolf spiders in the Czech Republic.

***Pardosa pullata* (Clerck, 1758)**

Material: NR Louky pod Kumstátem A (16/5/2009, 2♂; 25/8/2009, 1♂ 5♀, leg. et det. OK); Louky pod Kumstátem B (16/5/2009, 1♀; 21/6/2009, 3♀, leg. et det. OK)

Remarks: Smaller common wolf spider living in both damp and dry meadows, at forest edges, and in gardens. Euryvalent species that occurs in high numbers in suitable habitats.

***Pardosa riparia* (C.L. Koch, 1833)**

Material: NR Kamenný vrch B (21/6/2009, 4♂ 1♀, leg. OK, det. VH); NR Louky pod Kumstátem A (23/7/2009, 2♀, leg. OK, det. VH); NR Louky pod Kumstátem B (2♂ 1♀, leg. OK, det. VH)

Remarks: Fairly common epigeic species on rock steppes, in forest clearings and at the edges of fields. It prefers preserved, non-anthropogenically disrupted biotopes.

***Trochosa robusta* (Simon, 1876)**

Material: NR Kamenný vrch A (25/8/2009, 1♀, leg. OK, det. VH); NR Louky pod Kumstátem A (23/7/2009, 1♀, leg. OK, det. VH); NR Louky pod Kumstátem B (16/5/2009, 1♂ 2♀; 25/8/2009, 2♂ 1♀, leg. OK, det. VH);

Remarks: The largest and least common representative of the genus *Trochosa*, occurring mainly in xerothermic and sunny habitats: rock steppes, preserved meadow habitats, forests debris, etc. Very common in old quarries and those abandoned to natural succession.

***Trochosa ruricola* (De Geer, 1778)**

Material: NM Jesličky (16/5/2009, 1♂; 23/7/2009, 2♂ 4♀; 25/9/2009, 1♀, leg. et det. OK); NR Louky pod Kumstátem A (16/5/2009, 1♀; 21/6/2009, 2♂ 1♀, leg. et det. OK); NR Louky pod Kumstátem B (23/7/2009, 2♀; 25/8/2009, 1♂ 1♀; 25/9/2009, 2♀; 25/10/2009, 3♀, leg. et det. OK)

Material: Widespread, inhabiting various types of open environment. It occurs in meadows, at forest edges, in gardens, and on the banks of streams; also present in ploughed areas and other anthropogenically affected habitats.

***Trochosa terricola* (Thorell, 1856)**

Material: NM Jesličky (21/6/2009, 3♂ 2♀; 25/8/2009, 3♀; 25/9/2009, 1♂ 1♀, leg. et det. OK); NR Kamenný vrch B (16/5/2009, 1♂ 2♀; 23/7/2009, 1♂; 25/9/2009, 2♀, leg. et det. OK) Louky pod Kumstátem A (16/5/2009, 2♀; 25/8/2009, 1♀; 25/9/2009, 2♂ 1♀, leg. et det. OK); NR Louky pod Kumstátem B (16/5/2009, 2♂ 3♀; 21/6/2009, 1♂ 1♀, leg. et det. OK)

Remarks: The most common species of its genus, living on xerothermic rock forest-steppes and at forest edges, in various types of grassland habitats, and even spreading to wheat fields, ploughed areas, and other anthropogenically disturbed habitats.

***Xerolycosa miniata* (C.L. Koch, 1834)**

Material: NR Louky pod Kumstátem B (21/6/2009, 1♂; leg. OK, det. VH)

Remarks: Rare xerothermic species of grassland habitats and localities with short grass cover. It prefers sunny biotopes and often occurs in places with sandy and less fertile ground (Bellmann 2006).

***Xerolycosa nemoralis* (Westring, 1861)**

Material: NR Louky pod Kumstátem A (21/6/2009, 2♂, leg. OK, det. VH); NR Jesličky (16/5/2009, 1♀; 23/7/2009, 1♂ 2♀, leg. OK, det. VH)

Remarks: Very common, preferring open and sunny habitats. It occurs mainly in bright situations, mostly in pine forests or at their edges, in grassland habitats and rock steppes.

Discussion

Significant among the findings at the sites investigated were *Alopecosa solitaria* and *A. striatipes*, both included in the Red List of endangered species in the Czech Republic (Růžička 2005), as well as records of *Arctosa figurata* and *Alopecosa aculeata*, both rare species for southern Moravia.

Arctosa figurata was found in both parts of the Louky pod Kumstátem location. Buchar & Růžička (2002) note findings of this species at 26 mapped squares of which the vast majority are located in the western part of the Czech thermophyticum. Růžička (2000) reports findings from the border area of the thermo- and mesophyticum of central Bohemia, in Nezabudické skály Nature Reserve. From South Moravia, only one finding has been recorded, in the location of Boří les Wood, lying in the wooded part of Lednice-Valtice complex (Bryja *et al*. 2005). The record of of *Arctosa figurata* at Louky pod Kumstátem is an important contribution to faunistic knowledge of this rare thermophilic species.

Another interesting contribution to faunistics is the indication of *Alopecosa aculeata* in anthropogenically-disturbed habitats in Rýny and Vinice and in Jesličky Nature Reserve. This rare species of the mesophyticum is, according to Buchar & Růžička

(2002), mapped mainly in Bohemia, where it has been recorded in 14 squares. An interesting finding is reported by Kůrka (1997), who determined this wolf spider in a preserved peat bog in Břehyně National Nature Reserve. Buchar (1999) confirms findings of *Alopecosa aculeata* at quite a high altitudes in the mountain valley of Obří důl at the foot of Sněžka Mountain. From South Moravia, Bryja *et al*. (2005) report only a single finding in the Slanisko u Nesytu National "Nature Monument". Findings at the Rýny and Vinice sites may confirm its spread to habitats that are anthropogenically disturbed to a greater or lesser extent.

Among the most important findings was the presence of *Alopecosa solitaria* and *Alopecosa striatipes* at the Louky pod Kumstátem and Kamenný vrch sites, both listed endangered species. The former is, according to Buchar & Růžička (2002) mapped only in 5 squares of which 2 squares are pre-1951 with no subsequent findings. Bryja *et al*. (2005) report somewhat more numerous findings, primarily in the nature reserves of Dunajovické kopce and Svatý kopeček. In this material, it had a predominant presence in the second line of Louky pod Kumstátem and the second line of Kamenný vrch u Kurdějova.

Alopecosa striatipes is, according to Buchar & Růžička (2002), mapped only 3 faunistic squares (Velké Meziříčí, Mohelenská hadcová step and Brtnice-Střížov). From South Moravia, it has been reported only in Dunajovické kopce Nature Reserve (Bryja *et al*. 2005). In the area surveyed in Kamenný vrch, this species had a strong position near the biotope of the former mining pits. Here, the findings were confirmed through inventory (Hula 2006) and our research in 2007 and 2009. It is very surprising that the distribution of *A. striatipes* also extends to the xerothermic grasslands and shrubs in the western margins of the reserve (the border area with Černá hora Hill, a significant landscape feature), where the presence of this wolf spider had not been previously confirmed.

Conclusion

In 2007 and 2009 wolf spiders were collected by trapping in selected locations in the eastern part of the Hustopeče region. A total of 1320 specimens were taken (of which 530 were juveniles and 790 were adult spiders). They were categorized into the six genera *Alopecosa, Arctosa, Aulonia, Pardosa, Trochosa* and *Xerolycosa*. A wide range of wolf spider species occurring in xerothermic steppe biotopes, an important element in the natural history of South Moravia, was recorded. In total there were 23 species, more than one third of the number of all wolf spider species occurring in the Czech Republic. In terms of bioindication, the material contained a total of 70% relict species of the first and second classes, indicating high natural value and irreplaceability of undisturbed biotopes for spider populations in natural steppes. Relatively rare species, occurring mainly in Bohemia with very few previously found in Moravia, were recorded, primarily *Alopecosa aculeata* and *Arctosa figurata*. The most striking faunistic feature is the finding of rare and endangered species – *Alopecosa striatipes* and *Alopecosa solitaria* in the of Kamenný vrch u Kurdějova and Louky pod Kumstátem nature reserves. Both

species occurred in dominant numbers, and this is the first evidence of their presence at the these national reserves. These species are, quite apart from their rarity, very important bioindication elements of preservation and originality of the steppe communities in which they live.

All these findings extend knowledge of such species' distribution and clearly demonstrate the irreplaceability of intact steppe biotopes in southern Moravia for wolf spider populations.

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References

Almquist S. 2005: Swedish Araneae, part 1 families Atypidae to Hahnidae (Linyphiidae excluded). *Insect Systematic & Evolution* **62 (Suppl.):** 1–284 (in English).

Bellmann H. 2006: Kosmos Atlas Spinnentiere Europas. Kosmos, Stuttgart, 304 pp (in German).

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 Musei Moraviae, Scientiae biologicae* **90:** 13–184 (in Englisch, Czech summary).

Buchar J. 1983: Klasifikace druhů pavoučí zvířeny Čech, jako pomůcka k bioindikaci kvality životního prostředí. (Die Klassifikation der Spinnenarten Böhmens als ein Hilfsmittel für die Bioindikation der Umwelt). *Fauna Bohemia septentrionalis* **8:** 119–135. (in Czech, German summary).

Buchar J. 1997: Změny ve složení arachnofauny Mohelenské hadcové stepi v letech 1942 až 1995. [Changes of arachnofauna of the Mohelenská hadcová step NNR in years 1942 and 1995]. *Přírodovědný sborník západomoravského muzea v Třebíči* **28:** 1–28 (in Czech).

Buchar J. 1999: Supplement to wolf-spider (Araneae: Lycosidae) grid mapping in Bohemia. *Acta Universitatis Carolinae, Biologica* **43:** 135–154 (in English).

Buchar J. Růžička V. 2002: Catalogue of Spiders of the Czech Republic. Peres, Praha, 351 pp (in English and Czech).

Culek M. 1995: Biogeografické členění České republiky. [Biogeographical zoning of the Czech Republic]. Enigma, Praha, 347 pp (in Czech).

Hula V. 2006: Výsledky inventarizačního průzkumu arachnofauny a fauny denních motýlů PR Kamenný vrch u Kurdějova. [Results of investigation of fauna of arachnofauna and butterflies Kamenný vrch u Kurdějova Natural Reserve]. Final Report, deposited with the Department of the Environment, Kr.Ú. Jihomoravského kraje, 23 pp (in Czech).

ICZN 1999: International code of Zoological Nomenclature. Fourth Edition. International Trust for Zoological Nomenclature, London, 306 pp (in English).

Kronestedt T. 1990: Separation of two species standing as *Alopecosa aculeata* by morphological, behavioural and ecological characters, with remarks on related species in the *pulverulenta* group (Aranea, Lycosidae). *Zoologica Skripta* **19:** 203–225 (in English).

Kronestedt T. 1992: The identify of *Pardosa alacris* (Arachnida: Araneae: Lycosidae). *Seckenbergiana biologica* **72:** 179–782 (in English).

Kůrka A. 1997: Arachnofauna vojenského výcvikového prostoru Ralsko. [Arachnofauna of Ralsko military area]. *Vlastivědný sborník Českolipska, Bezděz* **5:** 237–265 (in Czech).

Kůrka A. 1998: A survey of spider species (Araneida) in Prof. F. Miller's collection , part IV: Lycosidae. *Časopis Národního Muzea, Řada přírodovědná* **167**: 35–42 (in English).

Miller F. 1971: Řád Pavouci – Araneida, s. 51-306. In: Daniel M. & Černý V. (eds.) 1971: Klíč zvířeny ČSSR IV. ČSAV, Praha, 603 pp (in Czech).

Heimer S. & Nentwig W. 1991: Spinnen Mitteleuropas: ein Bestimmungbusch. Verlag Paul Parey, Berlin und Hamburg, 544 pp (in German).

Platnick, N.I. 2011: The world spider catalog, version 11.5. American Museum of Natural History. Available online: http://research.amnh.org/iz/spiders/catalog/INTRO1.html (accessed: 7.2.2011)

Roberts M. 1995: Spiders of Britain & Northern Europe. Harper Collins Publishers, London, 383 pp (in English).

Růžička V. 2000: Spiders in rocky habitats in Central Bohemia. Journal of Arachnology **28:** 217–222 (in English).

Růžička V. 2005: Araneae (pavouci), 76-82. In: Farkač J., Král D. & Škorpík M. (eds.): Červený seznam ohrožených druhů České republiky. Bezobratlí. Red list of threatened species in the Czech Republic. Invertebrates, AOPK ČR, Praha, 760 pp (nn Czech, in English).

Řezáč M. 2004: Nástin standardizované metodiky sběru epigeických skupin pavouků (Araneae) pomocí zemních pastí. [Draft of standardized methodology of collecting of the epigeic groups of spider (Araneae) by using of pifall-traps]. Manuscript, AOPK ČR, Praha, 185-190 (in Czech).