

Arachnofauna of the Velká Kotlina Cirque (Hrubý Jeseník Mountains)

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Abstract

Arachnofauna of the Velká Kotlina Cirque (Hrubý Jeseník region in Northern Moravia; Sudeten Mountains, Czech Republic) was studied in relationship to a set of environmental factors. Ordination methods revealed that the major factors determining the species diversity and distribution of the spider assemblages at the site were altitude and shading. Cluster analysis led to the discrimination of 3 groups of spider assemblages, corresponding to the 3 groups of biocoenoses. From the zoogeographic point of view, arcto-alpine as well as thermophilic and lowland species were identified.

Key words: Czech Republic, distribution, mountain arachnofauna

INTRODUCTION

The investigated area is situated in the Velká Kotlina Cirque in the Hrubý Jeseník Mountains (50°03' N, 17°12' E). It is a mighty glacial cirque, open to the east, with steep, partly rocky slopes. This locality is part of the Praděd National Natural Reserve. This range forms the northern border of the Bohemian Massif. During the post-glacial development, heavy snow-drifts and avalanche action played a major role in the succession of the ecosystems. Never, not even in warmer and wetter periods, was the cirque invaded by a dense forest. This saved the alpine and arctic flora from extinction. The mean annual temperature is 1.1 °C, mean yearly precipitation is 1225 mm. The climate of this region is comparable to that of the Alpine zone of the highest mountains in central Europe or with subarctic regions such as Iceland and northern Norway.

During the examination of Velká Kotlina's flora which started in the mid-19th century, 485 higher plant species, forming specific communities, were identified there. In this respect

Velká Kotlina is the most diverse area in the Czech Republic (Jeník 1971). The fauna at Velká Kotlina encompasses diverse species as well. Existing investigations of Invertebrates (Nematoda, Mollusca, Oribatida, Diplopoda, Collembola) revealed that, in addition to the common (montane and subalpine) species, arcto-alpine species, as well as thermophilic and lowland species are present.

This diversity also attests to the fact that this site is very special and of high value. Among small mammals, the northern birch mouse *Sicista betulina* and alpine shrew *Sorex alpinus* are noteworthy. In addition, the birds, black grouse *Lyrurus tetrix* and hazel hen *Tetrastes bonasia* are present at the site.

MATERIALS AND METHODS

A total of 5883 specimens of spiders were collected from pitfall traps (10 different habitats, always 5 pitfall traps in line on an isohypse, 5 m spacing) from the Velká Kotlina Cirque (Hrubý Jeseník region, Northern Moravia, Sudeten Mountains, Czech Republic) during

the years 1993–1995. The site covered an area of about 1 km² with altitudes ranging from 1110 m to 1464 m above sea level.

The locality has a diverse environment and a large species pool, which has resulted in the development of a great variety of plant communities. Montane beech and climax spruce forests are characteristic of the forest zone. Subalpine grassland and low shrub communities with predominating *Vaccinium myrtillus* L. are characteristic of the subalpine zone (Jeník et al. 1980).

The pitfall traps were placed in habitats characterised by the following plant communities, arranged from the bottom of the Velká Kotlina Cirque to the northern plateau:

- 1 *Calamagrostio arundinaceae-Fagetum* Hartmann 1959 – Montane acidophilous beech forest on the western slope with *Fagus sylvatica* L. predominating the overstory and *Anthyrium* spp., in the undergrowth. 1155 m above sea level (a.s.l.)
- 2 *Laserpitio-Dactylidetum glomeratae* Jeník et al. 1980 – Grassland on a mild western slope, with *Dactylis glomerata* L. predominating. 1180 m a.s.l.
- 3 *Daphno mezerei-Aceretum pseudoplatani* Jeník et al. 1980 – *Acer pseudoplatanus* L., *Salix silesiaca* Willd. Predominating in the overstory with a rich undergrowth of *Lunaria rediviva* L., *Rubus idaeus* L., *Calamagrostis arundinacea* (L.) Roth, *Daphne mezereum* L., etc. – Forest on a mild western slope, above No. 2, 1190 m a.s.l.
- 4 *Calamagrostio villosae-Piceetum* (Tx. 1937) Hartmann 1953 – Spruce forest on the western slope, 1220 m a.s.l.
- 5 *Adenostyletum alliariae* Pawl. et al. 1928 – Grassland on the eastern slope, herb community of wet sites with *Adenostyles alliariae* (Goun) Kern predominating. 1230 m a.s.l.
- 6 *Poo chaixii-Deschampsietum caespitosae* Jeník et al. 1980 – Grassland stand on the eastern slope, 1290 m a.s.l.
- 7 *Thesio alpini-Nardetum* Jeník et al. 1980 – grassland community on the western slope, 1350 m a.s.l.

8 *Festuco supinae-Vaccinietum myrtilli calamagrostietosum* Jeník et al. 1980 – Subalpine stand on the southern slope, 1390 m a.s.l.

9 *Festuco supinae-Vaccinietum myrtilli vaccinietosum* Jeník et al. 1980 – Subalpine stand on the southern slope, with *Vaccinium myrtillus* predominating. 1400 m a.s.l.

10 *Cetrario-Festucetum supinae* Jeník 1961 – Alpine tundra on the summit plateau above the cirque with *Cetraria islandica* (L.) Ach., *Festuca supina* Schur., *Deschampsia flexuosa* (L.) predominating. 1455 m a.s.l.

Cluster analysis was performed by using a data set encompassing all of the spider species (119 species in total) from all the sampling sites as well as a set of environmental factors that characterised the phytocoenoses – vegetation communities in which the pitfall trap had been placed (Bureš in litt.). Cluster analysis was conducted in order to evaluate the mutual similarity of the species composition at the sites examined. Detrended correspondence analysis (DCA) employing the Canoco program (Ter Braak 1987) was also conducted in order to assess the role of the relevant environmental factors (plant community type, soil moisture, herb layer structure, shading, altitude, soil structure) in determining the spider community. Species abundance is expressed as described in the Catalogue of Spiders of the Czech Republic (Buchar & Růžička 2002). The complete names of the spider species are given in the Appendix.

RESULTS

A total of 5883 specimens belonging to 14 families and 119 species were collected and identified from pitfall traps in the 10 different habitats (see Appendix).

Cluster analysis

Cluster analysis of the spider fauna divided the 10 sites into 3 groups. The distribution of the groups was directly related to the 3 different biotope groups at Velká Kotlina (Fig. 1). An overview of the remarkable spider species along with a description of the decisive envi-

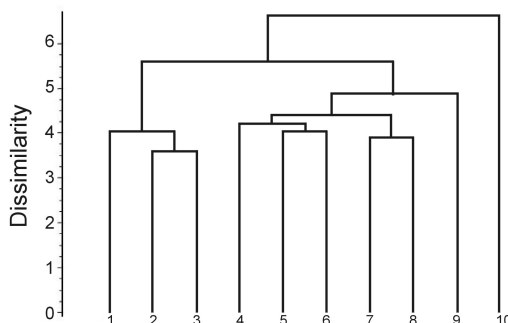


Fig. 1. Similarity of species composition of spiders from 10 different habitats (1-10) in the Hrubý Jeseník Mountains, Velká Kotlina Cirque. Cluster analysis using UPGMA method (group average linkage). The examined 10 sites were divided into 3 groups by their spider assemblages, whose distribution along an altitudinal gradient agreed with the differences among the 3 different biotopes at Velká Kotlina.

ronmental factors for each individual group is given below.

Sampling site Group 1 (Nos 1, 3, 4)

shrub to tree stands at 1155–1220 m altitudes with the following environmental factors:

- normal (common) duration of the snow cover (rather thick snow cover at site No. 4)
- thin, and highly permeable herb layer (somewhat thicker and less permeable at site No. 4)
- high stability of all the 3 sites
- soil depth 25–34 cm, roughly the same at the 3 sites
- soil: stony (fine stones – site No. 4) to medium rocky (No. 1) to highly rocky (No. 3)
- global shading of the surface: medium (30–60% at site No. 4) to strong (60–100% at sites No. 1 and 3)
- soil at sites No.1 and 3 is permanently dry, fully dependent on precipitation; at site No. 4 soil dries out only rarely, is connected to ground water and is only slightly wet during most of the year.

A total of 1564 spider specimens were col-

lected at sites associated with Group 1. Very rare species associated with this group included *Meioneta milleri* Thaler, Buchar & Kúrka, 1997 (2 specimens), *Xysticus gallicus* Simon, 1875 (1 specimen), and *Talavera thorelli* Kulczyński, 1891 (2 specimens).

Rare spider species identified associated with the Group 1 phytocoenoses included *Robertus truncorum* (L. Koch, 1872) (23 specimens), *Centromerus pabulator* (O.P.-Cambridge, 1871) (274 specimens), *Hilaira tatrica* Kulczyński, 1915 (2 specimens), *Semljicola faustus* (O.P.-Cambridge, 1900) (1 specimen), *Lepthyphantes mughi* (Fickert, 1875) (15 specimens), *Lepthyphantes nodifer* Simon, 1884 (5 specimens), *Zygiella montana* (C.L. Koch, 1834) (1 specimen) and *Pardosa sordidata* (Thorell, 1875) (1 specimen).

The boreo-montane species: *Hilaira tatrica*.

Coelotes terrestris (Wider, 1834), *Diplocephalus latifrons* (O.P. Cambridge, 1863) and *Centromerus pabulator* were the dominant spider species associated with Group 1.

Sampling site Group 2 (Nos 2, 5, 6, 7, 8, 9)

mostly grassland communities (1180–1350 m altitude) and subalpine sites with *Vaccinietum myrtilli* (1390–1400 m), characterised by the following environmental factors:

- thick, long-lasting snow cover to snow beds (No. 9)
- herb layers mostly medium thick at sites No. 2, 5 and 6, thick and nearly impermeable at sites No. 8 and 9, and thin, highly permeable for the arachnofauna at site No. 7
- sites No. 2, 7 and 8 highly stable, sites No. 5, 6 and 9 not stable (disturbance by creeping snow)
- soil depth 0–24 cm at site No. 5, 35–44 cm at sites No. 6 and 7, 45–54 cm at sites No. 8 and 9, and 55–64 cm at site No.2
- soil without rocks (sites No. 2, 5, 6, 7) or contains small stones (sites No. 8 and 9)
- surface shading very low – up to 30%, only site No. 5 exhibits shading up to 60%
- soil moisture is very different within this group: soil is dry and fully dependent on pre-

cipitation at sites No. 8 and 9, slightly wet during most of the year at site No. 2 (connection to ground water), wet at sites No. 6 and 7 (contact with a spring), and very wet at site No. 5.

A total of 3294 spider specimens were collected at sites associated with Group 2.

Very rare species associated with Group 2 included *Asthenargus perforatus* Schenkel, 1929 (1 specimen), *Bolyphantes index* (Thorell, 1856) (3 specimens), *Meioneta milleri* (17 specimens), *Xysticus gallicus* (1 specimen) and *Talavera thorelli* (19 specimens).

Rare species found associated with the Group 2 phytocoenoses included *Robertus truncorum*, *Centromerus capucinus* (Simon, 1884), *C. pabulator*, *Lepthyphantes mughi*, *L. nodifer*, *L. zimmermanni* Bertkau, 1890, *Centromerita concinna* (Thorell, 1875), *Porhomma convexum* (Westring, 1851), *Pardosa sordidata* and *Bolyphantes luteolus* (Blackwall, 1833).

The boreo-montane species found in Group 2 were: *Bolyphantes index*, lowland species: *Centromerus capucinus*, *Panamomops mengei* Simon, 1926 and *Walckenaeria furcillata* (Menge, 1869).

The dominant spider species associated with Group 2 phytocoenoses included *Coelotes terrestris*, *Centromerus pabulator*, *Gonatium rubellum* (Blackwall, 1841), *Bolyphantes alticeps* (Sundevall, 1833), *Robertus lividus* (Blackwall, 1836), *Centromerita bicolor* (Blackwall, 1833) and *Alopecosa taeniata* (C.L. Koch, 1835).

Sampling site Group 3 (No. 10)

This group includes a single sampling site with a vegetation community of Iceland moss and fescue at 1455 m altitude. Its environmental characteristics are as follows:

- snow cover very thin, snow is blown away by wind
- herb layer very thin, ground well passable
- stable site
- shallow soil (0–24 cm)
- soil medium to very rocky
- shading very low (partly no shade at all)

– soil connected to ground water, dries out only rarely, slightly wet throughout most of the year

The pitfall trap indicated that this group had the highest spider activity with a total of 1025 specimens were collected at the site.

Very rare species associated with Group 3 included *Xysticus gallicus* (2 specimens) and *X. obscurus* Collett, 1877 (9 specimens).

Rare species associated with Group 3 included *Centromerus pabulator*, *Centromerita concinna*, *Lepthyphantes nodifer* and *Pardosa sordidata*.

The *Xysticus obscurus* was the boreo-montane species associated with this high altitude site.

The dominant species associated with Group 3 included *Pelecopsis radicolica* (L. Koch, 1872), *Pardosa riparia* (C.L. Koch, 1833), *Pardosa palustris* (Linné, 1758) and *Steatoda phalerata* (Panzer, 1801).

Detrended correspondence analysis (DCA)

The results of DCA revealed that the altitude of the site and degree of shading were the environmental factors determining the structure and distribution of the spider communities in this area (Fig. 2).

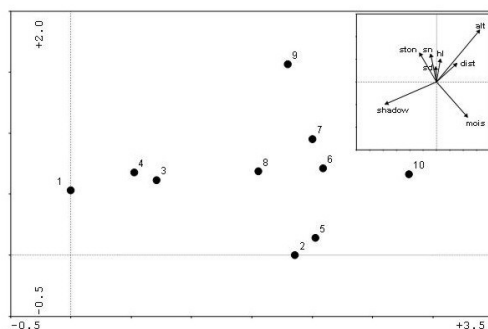


Fig. 2. Detrended correspondence analysis (DCA) of spider composition in the Hrubý Jeseník Mountains, Velká Kotlina Cirque. The arrangement of habitats in the diagram reflects the strength of individual environmental factors indicated by the length of corresponding arrows. The major environmental factors determining the structure and distribution of the spider communities in this locality were the site altitude and shading.

DISCUSSION

The results of the ordination methods led to the discrimination of three major biocoenosis groups at Velká Kotlina. In addition there were marked differences evident among the dominant spider species collected.

The typical forest species *Coelotes terrestris* penetrated from the shaded biotopes of Group 1 into the unshaded biotopes of Group 2. The species *Centromerus pabulator*, which is also abundant in the two groups, is known to be a species of open sites as it has dominant species status at Pančavská louka (Buchar 1967). Its observed dominance in both types of coenoses is in agreement with Muster's description: "It is dominant in the litter of subalpine coniferous forest...penetrates to alpine heatherland as well" (Muster 2001).

Most of the dominant species were members of the family Linyphiidae. In the forest biotopes and quite shaded biotopes (Group 1) *Centromerus pabulator* and *Diplocephalus latifrons* were found. The species *Bolyphantes alticeps* and *Centromerita bicolor*, both with a very broad ecological tolerance, were present in biotopes of Group 2. The species *Gonatium rubellum* seemed to specialise as the dominant forest species (Buchar & Růžička 2002) in the non-forest biotopes. A similar situation has been reported by Muster (2001) from mosaicly arranged grassland patches interspersed with dwarf pine areas in the Bavarian Alps. The highest-altitude site at Velká Kotlina (Group 3) contains a single dominant species from the family Linyphiidae, *Pelecopsis radicola*, which is in agreement with Thaler's description: " Verbreitungsschwerpunkt subalpin" (Thaler 1999).

Three dominant species of the family Lycosidae were present at the two unshaded biotopes. Two of them, *Alopecosa taeniata* (Group 2) and *Pardosa palustris* (Group 3), are rather abundant in the Czech Republic. The occurrence of the third species, *Pardosa riparia*, is quite remarkable. This species usually occupies sites undisturbed by humans in mountains or in lowlands (Kratochvíl 1931).

Among the epigeic dominant species, the family Theridiidae is represented by two euryzonal species: *Robertus lividus* and *Steatoda phalerata*.

The collection of species found at Velká Kotlina includes 11 species which are remarkable from the faunistic point of view (see Introduction). Only one of them, *Centromerus pabulator*, is also a dominant species, whereas the remaining species are rather rare at all of the sites. Relatively abundant are *Meioneta milleri* (19 specimens found at several sites at lower altitudes) and *Talavera thorelli* (21 specimens found mostly at Group 2 sites). The occurrence of the latter at Velká Kotlina is the first finding of this species in the Czech Republic (see Chvátalová & Buchar 2002), whereas the former, *Meioneta milleri* has been observed before in the Jizerské Hory Mts., in the Giant Mountains (Krkonoše), and in the West Tatras (Západné Tatry) (Thaler et al. 1997). From the remaining species, those with boreo-montane associations are of importance. These include especially *Bolyphantes index* (Group 2), which resembles the drawings published as a description of the species *Bolyphantes caucasicus* (Tanasevitch 1990). Nevertheless, current reviews of this species take a rather sceptic stance to this association (Helsdingen et al. 2001). In central Europe, *Xysticus obscurus* is only known from the Giant Mountains (Krkonoše) (Buchar & Růžička 2002), in the Alps (Thaler & Knoflach 1995), and in the High Tatras (Vysoké Tatry) sub *X. alpicus* Kulczyński (Prószyński 1971; Gajdoš et al. 1999). The third boreo-montane species is *Hilaira tatrica*, whose occurrence in central Europe is very similar to *X. obscurus* (Thaler 1995).

Another closely related boreo-montane species is *Alopecosa aculeata* (Clerk, 1757), which has been mistaken for *A. taeniata* in the past (Kronestedt 1990). As a result we know little about its occurrence in central Europe. However, this species is abundant in Siberia, including the eastern parts (Mikhailov 1997).

Xysticus gallicus assumes a special position among the remarkable species of this site. In the Czech Republic, it has only been found in four map quadrates in the nearest vicinity of the Velká Kotlina site (Buchar & Růžička 2002).

The last species, among the rarest in the Czech Republic, is *Asthenargus perforatus* (Group 2), has only been found in the Alps and in some other mountains in Europe until now (Thaler 1999).

The presence of the montane wandering spider *Pardosa sordidata*, described so far from the Giant Mountains, is also noteworthy. It is much more abundant in the Czech Republic (Buchar & Růžička 2002) and in the Carpathians (Gajdoš et al. 1999) than in the Alps (Thaler & Buchar 1996).

Among the species present at Velká Kotlina three thermophilic species: *Centromerus capucinus*, *Walckenaeria furcillata* and *Panamomops mengei* are also of interest. According to the spider catalogue (Buchar & Růžička 2002), none of them has been collected from altitudes higher than 600 m above sea level. The occurrence of thermophilic species in xerothermic habitats at high altitudes in the Alps were reported by Thaler (1985). Except for *P. mengei*, only individual specimens of these species were collected.

All the facts presented above bear out the significance of the Velká Kotlina cirque for the accumulation of a large number of species which makes this area remarkable from both the faunistic and zoogeographic aspects.

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Appendix. List of collected species of spiders and number of specimens.

Theridiidae	
<i>Enoplognatha</i> sp.	1
<i>Neottiura bimaculata</i> (Linné, 1767)	3
<i>Robertus arundineti</i> (O. P.-Cambridge, 1871)	6
<i>Robertus lividus</i> (Blackwall, 1836)	199
<i>Robertus truncorum</i> (L. Koch, 1872)	35
<i>Steatoda phalerata</i> (Panzer, 1801)	128
Linyphiidae	
<i>Agyneta cauta</i> (O. P.-Cambridge, 1902)	1
<i>Agyneta conigera</i> (O. P.-Cambridge, 1863)	9
<i>Allomengea scopigera</i> (Grube, 1859)	3
<i>Araeoncus humilis</i> (Blackwall, 1841)	3
<i>Asthenargus helveticus</i> Schenkel, 1936	2
<i>Asthenargus perforatus</i> Schenkel, 1929	1
<i>Bathypantes gracilis</i> (Blackwall, 1841)	1
<i>Bathypantes parvulus</i> (Westring, 1851)	4
<i>Bolyphantes alticeps</i> (Sundevall, 1833)	324
<i>Bolyphantes index</i> (Thorell, 1856)	3
<i>Bolyphantes luteolus</i> (Blackwall, 1833)	24
<i>Centromerita bicolor</i> (Blackwall, 1833)	225
<i>Centromerita concinna</i> (Thorell, 1875)	106
<i>Centromerus arcanus</i> (O. P.-Cambridge, 1873)	12
<i>Centromerus capucinus</i> (Simon, 1884)	1
<i>Centromerus pabulator</i> (O. P.-Cambridge, 1875)	743
<i>Centromerus sellarius</i> (Simon, 1884)	2
<i>Centromerus sylvaticus</i> (Blackwall, 1841)	34
<i>Cnephalocotes obscurus</i> (Blackwall, 1834)	8
<i>Dicymbium nigrum</i> (Blackwall, 1834)	27

<i>Dicymbium tibiale</i> (Blackwall, 1836)	96	Araneidae	
<i>Diplocephalus cristatus</i> (Blackwall, 1833)	2	<i>Aculepeira ceropegia</i> (Walckenaer, 1802)	2
<i>Diplocephalus latifrons</i> (O. P.-Cambridge, 1863)	435	<i>Araneus diadematus</i> Clerck, 1757	1
<i>Diplocephalus picinus</i> (Blackwall, 1841)	2	<i>Zygiella montana</i> (C. L. Koch, 1834)	1
<i>Diplostyla concolor</i> (Wider, 1834)	3	Lycosidae	
<i>Drapetisca socialis</i> (Sundevall, 1833)	1	<i>Alopecosa aculeata</i> (Clerck, 1757)	8
<i>Erigone atra</i> Blackwall, 1833	42	<i>Alopecosa cuneata</i> (Clerck, 1757)	23
<i>Erigone dentipalpis</i> (Wider, 1834)	7	<i>Alopecosa pulverulenta</i> (Clerck, 1757)	63
<i>Gonatium rubellum</i> (Blackwall, 1841)	204	<i>Alopecosa taeniata</i> (C. L. Koch, 1835)	187
<i>Hilaira excisa</i> (O. P.-Cambridge, 1871)	1	<i>Pardosa lugubris</i> (Walckenaer, 1802)	22
<i>Hilaira tatrica</i> Kulczyński, 1915	2	<i>Pardosa palustris</i> (Linné, 1758)	186
<i>Lepthyphantes alacris</i> (Blackwall, 1853)	19	<i>Pardosa pullata</i> (Clerck, 1757)	75
<i>Lepthyphantes alutatus</i> Simon, 1884	1	<i>Pardosa riparia</i> (C. L. Koch, 1833)	314
<i>Lepthyphantes cristatus</i> (Menge, 1866)	26	<i>Pardosa sordidata</i> (Thorell, 1875)	88
<i>Lepthyphantes flavipes</i> (Blackwall, 1854)	4	<i>Pirata hygrophilus</i> Thorell, 1872	2
<i>Lepthyphantes mansuetus</i> (Thorell, 1875)	2	<i>Trochosa terricola</i> Thorell, 1856	20
<i>Lepthyphantes mengei</i> Kulczyński, 1887	2	<i>Xerolycosa nemoralis</i> (Westring, 1861)	1
<i>Lepthyphantes mughi</i> (Fickert, 1875)	26	Agelenidae	
<i>Lepthyphantes nodifer</i> Simon, 1884	11	<i>Agelena</i> sp.	3
<i>Lepthyphantes pallidus</i> (O. P.-Cambridge, 1871)	22	Cybaeidae	
<i>Lepthyphantes tenebricola</i> (Wider, 1834)	53	<i>Cybaeus angustiarum</i> L. Koch, 1868	116
<i>Lepthyphantes tenuis</i> (Blackwall, 1852)	1	Hahniidae	
<i>Lepthyphantes tripartitus</i> Miller & Svatoň, 1978	15	<i>Cryphoea silvicola</i> (C. L. Koch, 1834)	36
<i>Lepthyphantes zimmermanni</i> Bertkau, 1890	3	Amaurobiidae	
<i>Leptorhoptrum robustum</i> (Westring, 1851)	18	<i>Amaurobius fenestralis</i> (Ström, 1768)	4
<i>Macrargus rufus</i> (Wider, 1834)	20	<i>Coelotes terrestris</i> (Wider, 1834)	777
<i>Maso sundevalli</i> (Westring, 1851)	33	Liocranidae	
<i>Meioneta milleri</i> Thaler, Buchar & Kúrka 1997	19	<i>Agroeca proxima</i> (O. P.-Cambridge, 1871)	5
<i>Meioneta rurestris</i> (C. L. Koch, 1836)	142	<i>Phrurolithus festivus</i> (C. L. Koch, 1835)	1
<i>Micrargus herbigradus</i> (Blackwall, 1854)	1	Clubionidae	
<i>Microlinyphia pusilla</i> (Sundevall, 1830)	1	<i>Clubiona diversa</i> O. P.-Cambridge, 1862	10
<i>Microneta variata</i> (Blackwall, 1841)	39	<i>Clubiona reclusa</i> O. P.-Cambridge, 1863	11
<i>Oedothorax apicatus</i> (Blackwall, 1850)	3	Gnaphosidae	
<i>Oedothorax fuscus</i> (Blackwall, 1834)	1	<i>Drassodes</i> sp.	3
<i>Panamomops mengei</i> Simon, 1926	39	<i>Drassyllus pusillus</i> (C. L. Koch, 1833)	1
<i>Pelecopsis radicola</i> (L. Koch, 1872)	321	<i>Gnaphosa montana</i> (L. Koch, 1866)	5
<i>Porhomma convexum</i> (Westring, 1851)	2	<i>Haplodrassus signifer</i> (C. L. Koch, 1839)	103
<i>Porhomma egeria</i> Simon, 1884	14	<i>Haplodrassus silvestris</i> (Blackwall, 1833)	3
<i>Porhomma microphtalmum</i> (O. P.-Cambridge, 1871)	4	<i>Micaria pulicaria</i> (Sundevall, 1831)	5
<i>Porhomma pallidum</i> Jackson, 1913	5	<i>Zelotes divicola</i> (C. L. Koch, 1870)	3
<i>Porhomma pygmaeum</i> (Blackwall, 1834)	1	<i>Zelotes subterraneus</i> (C. L. Koch, 1833)	4
<i>Saloca diceros</i> (O. P.-Cambridge, 1871)	21	Thomisidae	
<i>Semljicola faustus</i> (O. P.-Cambridge, 1900)	1	<i>Ozyptila atomaria</i> (Panzer, 1801)	1
<i>Stemonyphantes lineatus</i> (Linné, 1758)	1	<i>Ozyptila trux</i> (Blackwall, 1846)	9
<i>Tapinocyba affinis</i> (Lessert, 1907)	8	<i>Xysticus audax</i> (Schränk, 1803)	1
<i>Tiso vagans</i> (Blackwall, 1834)	4	<i>Xysticus bifasciatus</i> C. L. Koch, 1837	2
<i>Walckenaeria antica</i> (Wider, 1834)	76	<i>Xysticus cristatus</i> (Clerck, 1757)	4
<i>Walckenaeria atrotibialis</i> (O. P.-Cambridge, 1878)	58	<i>Xysticus gallicus</i> Simon, 1875	6
<i>Walckenaeria cucullata</i> (C. L. Koch) 4		<i>Xysticus obscurus</i> Collett, 1877	9
<i>Walckenaeria dysderoides</i> (Wider, 1834)	1	Salticidae	
<i>Walckenaeria furcillata</i> (Menge, 1869)	2	<i>Euophrys frontalis</i> (Walckenaer, 1802)	1
<i>Walckenaeria nudipalpis</i> (Westring, 1851)	2	<i>Neon</i> sp.	1
<i>Walckenaeria obtusa</i> Blackwall, 1836	14	<i>Talavera thorelli</i> (Kulczyński, 1891)	21
Tetragnathidae			
<i>Pachygnatha degeeri</i> Sundevall, 1830	3		
<i>Pachygnatha listeri</i> Sundevall, 1830	1		