

**Biogeographical and ecological relations of wolf spiders
in Czechoslovakia and in Central Europe**

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RIASSUNTO

Viene presentata l'analisi della distribuzione geografica dei Licosidi cecoslovacchi.

La mappatura in quadrati dei Licosidi di Boemia ha consentito la separazione di 4 tipi di distribuzione con qualità ecologiche distinte e 3 tipi di abbondanza.

Viene anche discussa la presenza dei Licosidi boemi in Gran Bretagna.

Parole chiave: Europa centrale, Reperti di contea, Cecoslovacchia, Distribuzione, Ecologia, Gran Bretagna, Lycosidae, Mappatura a quadrati.

ABSTRACT

The analysis of the geographical distribution of Czechoslovakian Lycosids is presented.

The square mapping of Bohemian Lycosids has enabled the Author to separate four types of distribution with distinct ecological quality and three types of abundance.

The occurrence of Bohemian Lycosids in Great Britain is discussed.

Key words: Central Europe, County records, Czechoslovakia, Distribution, Ecology, Great Britain, Lycosidae, Square mapping.

Introduction

Since 1951 sixty-nine species of wolf spiders have been collected in Czechoslovakia. They are not distributed uniformly throughout all parts of this territory. Most species (62) live in Slovakia. Eleven of these do not live in certain other parts of Czechoslovakia, namely Bohemia and Moravia. Five species of wolf spiders live only in Bohemia: *A. norvegica*, *A. alpigena lamperti*, *H. rubrofasciata*, *P. evelinae* and *P. hyperborea*. One male and several immature specimens of *Pardosa maisa* HIPPA et MANNILA 1982 have been collected in Moravia only. This species is described from Northern Finland, but the similar shape of the tegular apophysis and the terminal apophysis, enable use to maintain that the males of both populations are conspecific.

Methods

In order to establish a basis for discussing the geographical and ecological relationships between the lycosids of Czechoslovakia, it is first necessary to describe briefly the present state of knowledge of the wolf spider fauna of Bohemia (Western Czechoslovakia). The spatial distribution of wolf spiders in 200 squares was studied during the period 1951-1985 (BUCHAR, 1992). Each square is 6 minutes (Longitude) by 10 minutes (Latitude), i.e. it occupies about 130 km². Four types of distribution enable us to separate the 54 taxa which have been collected in Bohemia. The first type of taxa distribution is provided by the thermophilous species. They live mostly in the territory of the western part of the Thermophytikum (Fig. 1). The Thermophytikum results from the grid mapping of plants (SLAVIK, 1984). For instance the most rare thermophilous species live only in the Thermophytikum; *A. schmidtii*, *A. cursor*. The more common thermophilous species live in isolated xerothermal biotopes outside of the Thermophytikum: *A. sulzeri* is recorded in one such square in S. Bohemia and *P. bifasciata* in several such squares. The distribution of thermophilous species of wolf spiders becomes most dense in the territory of the western Thermophytikum.

The second type of taxa distribution is provided by the psychrophilous species. They live mostly in the Oreophytikum (Fig. 1). The rare psychrophilous species live only in the Oreophytikum. Other psychrophilous species can occupy various habitats which occur outside of the Oreophytikum. Six of the commonest species (*Alopecosa aculeata*,

Pardosa amentata, *P. prativaga*, *Pirata hygrophilus*, *P. piraticus*, *Trochosa spinipalpis*) are also recorded from the squares of the Thermophytikum, but never in the thermophilous associations.

The third type of taxa distribution is provided by the mesothermic species. These species do not occur either in Oreophytikum or in the thermophilous associations, e.g. *P. paludicola* and *P. nigriceps*. A total of some 6 to 9 mesothermic species occurs outside the accumulations of thermophilous and psychrophilous species in the Thermophytikum and in the Oreophytikum.

The fourth type of taxa distribution is provided by generalist species. These are common in the Oreophytikum and also in the thermophilous associations, e.g. *P. riparia* and *P. lugubris*.

Results

All 11 Bohemian thermophilous species also occur in South Slovakia. The 19 thermophilous species decrease in number from S. Slovakia to the North and to the North-West. Fourteen species live in Moravia, whilst in Bohemia all 11 thermophilous species live only in the Western Thermophytikum. In the xerothermic locality in South Bohemia two species are absent, namely *A. schmidti* and *A. cursor*. In other Bohemian territories, outside Thermophytikum, 6 species at most, occur in the best biotopes.

When we look at a map of Central Europe, most lycosids occur in Austria (75) and the least in Britain (38: 37 in LOCKET, MILLIDGE & MERRETT, 1974; 38th in KRONESTEDT, 1980). Most of the Bohemian lycosids occur in Poland (52), in Bavaria and in Austria (51). In Czechoslovakia, outside Bohemia, live 49 of the Bohemian lycosids. In Britain there are only 29. All 11 Bohemian thermophilous species occur in Poland, in Bavaria, in Austria and also in Slovakia. But in Sweden and Britain this number decreases considerably. Furthermore the number of non-Bohemian thermophilous species decreases in both westerly and northerly directions (Fig. 2).

In Bohemia we recognize two groups of psychrophilous lycosids: 6 species (see above) live in all Central-European countries (of these only *A. aculeata* is absent in Britain); the 10 remaining species have a much more restricted distribution, much like thermophilous species. Their number decreases in all direction (Fig. 3). Only in Poland are all 10 Bohemian psychrophilous species present. In Slovakia 4 of these species

are absent, but 4 different psychrophilous species are present (*Pardosa albātula*, *P. nigra*, *P. saltuaria* and *P. wagleri*). All of this 4 different Slovakian species are absent in Britain, in Sweden and in Hungary.

The Bohemian mesothermic species and the generalist species particularly, show a reasonably uniform distribution (Fig. 4).

Discussion

As an application of the square-mapping of lycosids of Bohemia, we can compare our results with the county records given in LOCKETT, MILLIDGE & MERRETT, 1974. In the two cases (Table 1), the maximum number of counties per species amounts to 123 (GB) compared with the maximum number of squares per species of 155 (B). Of the common Bohemian species (1st - 17th) all, with the exception of *A. aculeata*, occur in G.B. Ten of these species have been recorded in more than 44 counties. In Bohemia 8 species are reckoned to be generalist species, 3 to be mesothermic species and 5 to be psychrophilous species, but all from the broad subgroup of widespread species which occur in all countries of Central Europe.

From the 17 Bohemian species of moderate occurrence (18th - 34th), 10 occur in Britain. In Bohemia 5 of them were rated as mesothermic, 1 as generalist, 1 as a true psychrophilous species and 3 as thermophilous species.

From the rare Bohemian species only 3 occur in Britain, namely *A. perita*, *A. cinerea* and *H. rubrofasciata*, which were all reckoned to be mesothermic species.

It is very remarkable that 10 true psychrophilous and 8 thermophilous Bohemian lycosids are entirely absent in Britain.

Conclusion

Wolf spiders in each type of distribution in Bohemia appear in distributions of different character in other parts of Czechoslovakia and elsewhere in Europe.

It follows that the results of the grid mapping of wolf spiders in Bohemia are very useful for the comparison with the analogous county records in Britain.

Tab. 1 - List of Bohemian wolf spiders in relation to their occurrence in Britain: B = number of squares where lycosids occur in Bohemia, GB = number of county records in Britain.

Types of distribution of lycosids in Bohemia: M = mesothermic, N = generalist, P = rare psychrophilous, T = thermophilous, W = widespread psychrophilous.

	B	GB	
1. <i>Pardosa amentata</i>	155	116	W
2. <i>Pardosa lugubris</i>	147	72	N
3. <i>Pardosa pullata</i>	136	123	N
4. <i>Xerolycosa nemoralis</i>	110	8	N
5. <i>Pardosa palustris</i>	106	91	N
6. <i>Trochosa terricola</i>	100	117	N
7. <i>Alopecosa pulverulenta</i>	80	102	N
8. <i>Pirata hygrophilous</i>	79	58	W
9. <i>Aulonia albimana</i>	76	1	N
10. <i>Alopecosa cuneata</i>	75	20	N
11. <i>Pirata latitans</i>	74	40	M
12. <i>Alopecosa aculeata</i>	71	--	W
13. <i>Pirata piraticus</i>	65	116	W
14. <i>Trochosa ruricola</i>	63	96	M
15. <i>Pardosa prativaga</i>	55	48	W
16. <i>Trochosa spinipalpis</i>	48	20	W
17. <i>Pardosa agrestis</i>	44	10	M
18. <i>Alopecosa accentuata</i>	43	--	T
19. <i>Pirata piscatorius</i>	39	24	M
20. <i>Pardosa monticola</i>	36	74	H
21. <i>Pardosa riparia</i>	36	--	N
22. <i>Trochosa robusta</i>	32	11	T
23. <i>Alopecosa trabalis</i>	31	--	T
24. <i>Xerolycosa miniata</i>	31	20	T
25. <i>Pirata tenuitarsis</i>	28	1	M
26. <i>Pardosa bifasciata</i>	27	--	T
27. <i>Pirata knorri</i>	24	--	M
28. <i>Pirata uliginosus</i>	21	22	P
29. <i>Pardosa hortensis</i>	21	23	T
30. <i>Arctosa figurata</i>	20	--	T
31. <i>Arctosa leopardus</i>	20	49	M
32. <i>Pardosa nigricipes</i>	20	104	M
33. <i>Alopecosa inquilina</i>	19	--	M
34. <i>Pardosa paludicola</i>	19	6	M
35. <i>Pardosa sphagnicola</i>	12	--	P
36. <i>Alopecosa schmidti</i>	11	--	T

Cont. Tab.1

	B	GB	
37. <i>Tricca lutetiana</i>	11	--	T
38. <i>Alopecosa sulzeri</i>	10	--	T
39. <i>Acantholycosa norvegica</i>	8	--	P
40. <i>Pardosa morosa</i>	8	--	P
41. <i>Hygrolycosa rubrofasciata</i>	7	6	M
42. <i>Arctosa perita</i>	5	73	M
43. <i>Acantholycosa lignaria</i>	5	--	P
44. <i>Pardosa sordidata</i>	5	--	P
45. <i>Arctosa alpigena lamperti</i>	3	--	P
46. <i>Alopecosa cursor</i>	3	--	T
47. <i>Pardosa hyperborea</i>	3	--	P
48. <i>Arctosa cinerea</i>	3	15	--
49. <i>Pardosa evelinae</i>	2	--	P
50. <i>Pardosa ferruginea</i>	1	--	P
51. <i>Arctosa maculata</i>	1	--	M

Fig. 1 - Phytogeographical territories in Bohemia (western part of Czechoslovakia). From SLAVIK 1984.

Thermophytikum (stippled), western part more xerotherm than the eastern.
Oreophytikum (black).

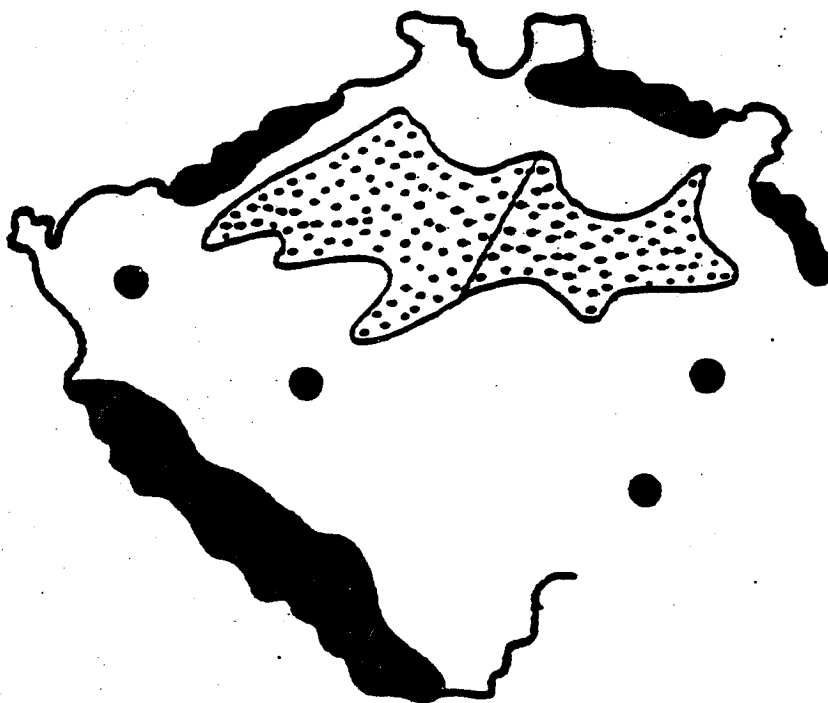


Fig. 2 - Occurrence of Czechoslovakian thermophilous wolf spiders in Central Europe and in Britain (territory of Bohemia is limited by a double line, territory of Bavaria by a stippled line).

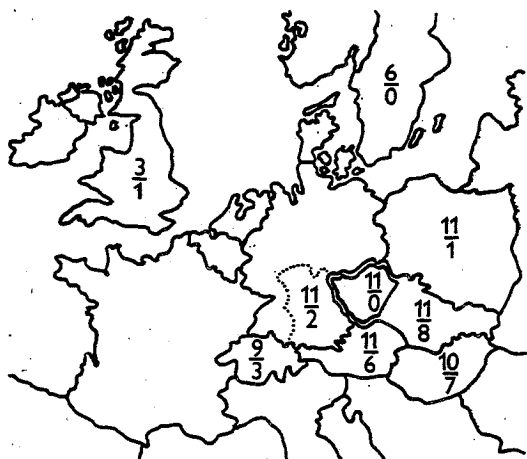


Fig. 3 - Occurrence of Czechoslovakian psychrophilous wolf spiders in Central Europe and in Britain. Denominator: number of Bohemian psychrophilous species. Numerator: number of non-Bohemian (Moravian and Slovakian) species.

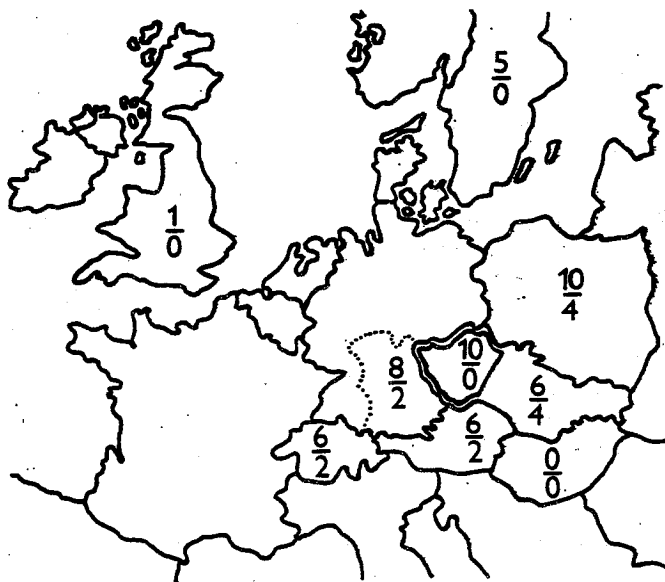
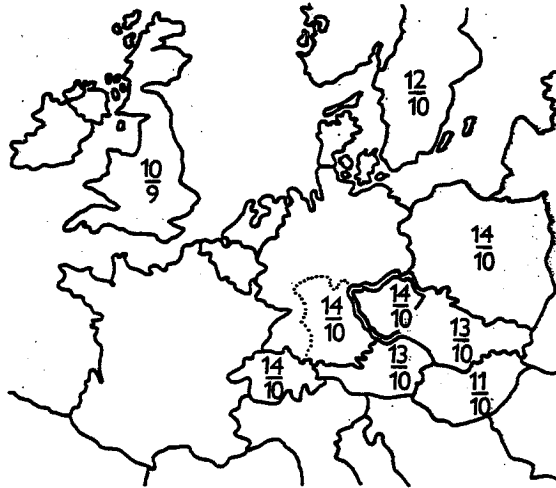


Fig. 4 - Occurrence of Bohemian mesothermic (denominator) and generalist (numerator) species of wolf spiders in Central Europe and in Britain.



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