THE ENDEMIC SPIDERS (ARANEAE) OF THE BALKAN PENINSULA

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Abstract


The endemic taxa of spiders (Araneae) in the Balkan peninsula are represented by 348 species included in 30 families. Countries with the highest number of recorded endemic species are Greece (115), Croatia (68), Bulgaria (55), Bosnia (41), Crete (46). The distribution of the endemic spiders in the main geographic systems of the Balkan peninsula shows that they are best represented in the Pindus region – 150, Dinaric region – 145, Tracian-Macedonic region – 52, Balkanid region – 14, Danubian region – 4 and North Dobrudzha with 4 species. The largest proportion of endemics was encountered mainly in the mountains and islands, where they inhabit caves – 159, woodlands – 139, coastal sites – 48 and high altitude zones – 20 species. The extreme richness of troglobitic spiders in the Dinaric region (96) leads to the assumption that this was a major center of speciation and evolution of species. The same can be said for the forest of the Pindus region (74) and for the highest mountains (Rila, Pirin) of the Tracian-Macedonic region, where are found the greatest number of high altitude elements (15). The phenomenon can be regarded as a result of the relative isolation of the mountains compared with the lowland areas, in the context of paleo-environmental changes since the Pliocene. The high percentage of endemic spiders (25%) suggests an important process of autochthonous speciation. So the Balkan Peninsula can be considered as a main center of speciation in Europe.

Introduction

Fig. 1. Geographic division of the Balkan peninsula. I- Dinaric region, II- Pindus region, III- Tracian-Macedonian region, IV- Balkanid region, V- Danubian plain region, VI- North-Dobroudzha region, AL- Albania, BG- Bulgaria, BS- Bosnia, CR- Croatia, CT- Crete, GR- Greece, MA- Macedonia, MNG- Montenegro, RO- Romania, SB- Serbia, SL- Slovenia, TR- Turkey.

Study Area

The Balkan Peninsula is situated in the southeastern part of Europe. The northern border follows the rivers Danube (including its delta), Sava and Soca, and through Gorizia and Monfalcone reaches (the line of) the Gulf of Trieste. Its western border follows the (line of) Adriatic and Ionian coast including the islands. The eastern border passes to the east of the Aegean Islands Sirina, Astipalea, Amorgos, Miconos, Tinos, Andros, Skiros, continues along the Dardanelles, goes across the Marmara Sea and through the Bosphorus and then reaches the Black Sea coast. The southernmost point of the Balkan Peninsula region is Crete and the islands of Gavdos, Aiduronisi and Kufonisi (Fig. 1).

The question about the status and distribution of endemic spiders found in the Balkan peninsula is complicated. Some of them are found only in restricted areas (even in a single cave) while the others show wider distributions, sometimes even over the whole peninsula. Certainly, some of the widespread Balkan peninsula endemics can be found in neighbouring territories as well and can be placed in the Balkan, Asia Minor or to Southeast European spider fauna.

The geographical areas and their abbreviations used in the text, are as follows: AL – Albania; BG – Bulgaria; CT – Crete; CR – Croatia; GR – Greece; BS – Bosnia; MA – Macedonia; MNG – Montenegro; RO – Romania; SB – Serbia; SL – Slovenia; TR – Turkey.

Results and discussion

This contribution is the result of a critical revision of all data available for the endemic spiders of the Balkan peninsula territory and comprises 348 species from 30 families: Ctenizidae 5, Nemesiidae 4, Pholcidae 21, Segestriidae 2, Dysderidae 73, Oonopidae 1, Palpimanidae 1, Uloboridae 1, Nesticidae 6, Theridiidae 5, Anapidae 1, Linyphiidae 109, Tetragnathidae 2, Araneidae 1, Lycosidae 1, Agelenidae 29, Cybaeidae 1, Hahniidae 5, Dictynidae 1, Amaurobiidae 17, Liocranidae 4, Clubionidae 3, Zodariidae 8, Gnaphosidae 18, Zoridae 1, Philodromidae 2, Thomisidae 4, Salticidae 12. The established number is high and represents 25% of all spiders of the Balkan peninsula. The most characteristic families are: Linyphiidae s. l. (31.3%), Dysderidae (21%) and Agelenidae (8.3%). The genus Troglohyphantes is the most numerous and can be regarded as a faunistic phenomenon since from all 53 species established in the territory of the Balkans, 52 are endemics, distributed mainly in caves. DEELEMAN-REINHOLD (1978) concluded that
Fig. 2. Distribution of the endemic spiders into different countries and main geographic regions.

Fig. 3. Distribution of the endemic spiders into different altitude zones of the main geographic regions.
the present distribution and morphological diversity of Troglohyphantes in the Balkan Peninsula represents a repeated processes of expansion and contraction of its range. The representation of the genera Dysdera (28 endemics from 38 species), Leptyphantes (18 endemics from 49 species) and Tegenaria (17 endemics from 31 species) is also due to expansion in caves, woodlands and highlands. Present day examples of cave penetration are the species Leptyphantes centromeroides KULCZYŃSKI and L. spelaeorum KULCZYŃSKI, widespread in the Balkan peninsula. They occur in caves but also in the humus and ground detritus and indicate active subterranean colonisation (DEELEMAN-REINHOLD, 1978). It should be emphasised that from the established 14 endemic genera (Anthrohyphantes, Barusia, Crypthecina, Fageiella, Folkia, Icariella, Lasconia, Macedoniella, Minotauria, Protoleptoneta, Parastalita, Rhodera, Stalagtia, Sulcia) for the Balkan Peninsula, only three (Anthrohyphantes, Macedoniella, Protoleptoneta) occur in the east of the Balkan Peninsula. Especially interesting is the distribution of the genera Anthrohyphantes and Fageiella. The genus Anthrohyphantes is found only at high altitude zones and caves of the eastern part of the region (Bulgaria). The genus Fageiella is endemic to the caves of the western part of the Balkan Peninsula (Bosnia, Montenegro). The two genera are closely related – their allopatric distribution indicates that they had been already separated before the establishment of the Vardar tectonic zone (DELTSEV, 1996). This suggests that these two genera are paleoendemics.

The highest number of endemic species is recorded for the territories of Greece (115), Croatia (68), Bulgaria (55) and Crete (46) (Fig. 2). The picture concerning the distribution of the endemics in the main geographic systems of the Balkan peninsula, shows that they are best represented in the Pindus region – 150, Dinaric region – 145, Tracian-Macedonic region – 52, Balkanid region – 14, Danubian region – 4 and North Dobrudgha with 4 species (Figs 2, 3). The largest fraction of endemics was encountered mainly in mountains and islands, where they inhabit the caves – 159, woodlands – 139, coastal sites – 48 and high altitude zones – 20 species (Fig. 3). In the group of cave spiders, 51 are troglobites (blind or semi-blind) with the most numerous genera: Troglohyphantes – 15, Folkia – 6, Stalagtia – 5, Leptonetella, Nesticus and Stalita – 3 species. The recent cave spider fauna is formed after gradual changes in the fauna of the ancient humid Mediterranean forests. However, due to the lack of knowledge, it is difficult to determine with certainty which cave spider endemics of the Balkans are Tertiary and which are Quaternary elements. The extreme richness of endemic cave spiders in the Dinaric region (96) leads to the assumption that this was a major center of speciation and evolution of species. The same can be considered for the woodlands of the Pindus region (74) and for the highest mountains (Rila, Pirin) of the Tracian-Macedonic region, where the greatest number of high altitude elements (15) is found.

As a conclusion it should be noted that, according to their ranges, the endemic spiders of the Balkan peninsula belong to two different faunal complexes: Mediterranean and European. The Mediterranean elements are distributed in caves, forests, coastal sites and single species at high altitudes, while the European elements are distributed mainly in forests and high altitude sites. This phenomenon can be regarded as a result of the relative isolation of
the mountains compared with the lowlands, in the context of paleo-environmental changes since the Pliocene (DELTSHEV, 1996). The high percentage of endemic spiders (25%) suggests an important process of autochthonous speciation. So the Balkan Peninsula can be considered as a main center of speciation in Europe.

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References

DELTSHEV, C., 1985: New Data concerning Cave spiders (Araneae) in Greece with description of a New Leptone-
DELTSHEV, C., 1993: The genus Tegenaria Latreille in Bulgaria: A critical review with description of two sibling
DELTSHEV, C., 1996: The origin, formation and zoogeography of endemic spiders of Bulgaria (Araneae). MAH-
Zool., hors serie, p. 141-151.
DELTSHEV, C., 1997b: Cryptophoca deelemanae g.n., sp. n., a remarkable spider from the mountains of Mont-
DELTSHEV, C., CURCIC, B.P.M., 1997: Contribution to the knowledge of the group europaeus Centromerus Dahl
DELTSHEV, C., PARASCHI, L., 1990: A contribution to the study of Spiders (Araneae) in Greece, with a description
of a New species (Malthonica spinipalpis Deltshev, sp. n., Agelenidae). Biol. Gallo-hellenica, 17, p. 3-12.
1-223.
THALER, K., 1996: Three Walckenaeria species from Peloponese, Greece (Araneae: Linyphiidae). Bull. Br. arach-
THALER, K., KNOFLACH, B., 1991: Eine neue Amaurobius-Art aus Griechenland (Arachnida: Araneae, Amauro-
Senckenbergiana biol., 65, p. 325-328.
WUNDERLICH, J. 1994a: Zwei bisher unbekannte Mediterrane Arten der Gattung Pholcus Walckenaer 1805 (Arach-
WUNDERLICH, J. 1994b: Beschreibung bisher unbekannter Arten der Baldachinspinnen aus der Oestlichen Medi-
WUNDERLICH, J. 1994c: Beschreibung einer bisher unbekannten Art der Gattung Amaurobius C. L. Koch 1837 von