

## The Spiders of Pirin Mountain (Bulgaria). Taxonomic, Faunistic and Zoogeographical Analysis (Araneae)

by

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**Synopsis:** 321 species (Atypidae 1, Scytodidae 1, Pholcidae 2, Segestriidae 1, Dysderidae 3, Mimetidae 1, Eresidae 1, Theridiidae 21, Linyphiidae 80, Tetragnathidae 9, Araneidae 23, Lycosidae 33, Pisauridae 1, Agelenidae 18, Hahniidae 3, Dictynidae 5, Amaurobiidae 3, Titanocidae 1, Oxyopidae 2, Anyphaenidae 1, Liocranidae 4, Clubionidae 16, Zodariidae 2, Gnaphosidae 26, Heteropodidae 1, Philodromidae 15, Thomisidae 22, Salticidae 25) have been found on Pirin mountain. They are best represented in the forest (montane coniferous belt – 269, 83.8%, montane-deciduous belt – 232, 72.3%) and in the subalpine belt (101, 31.5%). In the other belts spiders are present in roughly equal proportions (submediterranean – 38, 11.8%, alpine – 35, 10.9%, submontane – 33, 10.3%). Most characteristic is the high mountain species complex, which comprises most endemics and ancient elements, some of which are also distributed in the montane zone. Most of these elements can be regarded as neoendemics and derivatives of their respective Holarctic, Palaearctic and European sister species, which have speciated due to disjunction of ranges during the Pleistocene. A few species can be considered as remnants of an ancient mediterranean mountain fauna. So Pirin mountain can be considered as a possible centre of speciation.

### 1. Introduction:

The first reports about the spider fauna of Pirin mountain came from DRENSKY (1921, 1936), who recorded about 90 species. A new analysis of the diversity of the spider fauna on Pirin mountain is made possible by intensive research in recent years (BUCHAR 1968, DELTSHEV 1980, 1983a, 1983b, 1983c, 1984, 1985, 1987a, 1987b, 1988a, 1988b, 1990, 1992, 1993, 1995, 1996).

### 2. Study area and materials:

Pirin mountain is situated in Southwest Bulgaria between the valleys of the rivers Struma and Mesta, and is part of the Rila-Rhodope massif. Morphologically, the mountain is divided into three parts: Northern, Middle and Southern Pirin Mountain. The highest relief is exposed on the northern part of the mountain, with the peaks Vihren (2914 m), Kutelo I (2908 m), Kutelo II (2907 m), Banski Suhodol (2884 m) and 6 other peaks exceeding 2800 m of altitude. The mean and maximum altitudes gradually decrease towards the South: the highest peak in Central Pirin is Orelek (2099 m), and in Southern Pirin, Swestnik (1975 m). More than 170 mountain lakes of glacial origin are situated on the high parts of the mountain. The Pleistocene boundary of permanent snow on Pirin Mountain was at an altitude of 2250 m on Northern Pirin and at 2300 m on Southern Pirin (LOUIS 1930). The length of the glaciers reached 12 km, along the rivers Banderit-

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sa and Demyanitsa, with moraine deposits situated at 110 - 120 m above the recent river beds (KLEBELSBERG 1949). The lowest altitude of moraine deposits in these valleys is at ca. 1500 m, but fluvio-glacial deposits continue further downstream to an altitude of 1200 m. The age of these deposits corresponds to the Riss and Wurm glaciations. Pirin Mountain belongs in the continental-mediterranean climate region (TISHKOV 1982). Six vegetation belts have been distinguished (BONDEV 1991): I submediterranean (*Quercetum*, 0 - 700 m); II submontane (*Quercetum, Carpinetum*, 600 - 1000 m); III montane-deciduous (*Fagetum*, 900 - 1500 m); IV montane coniferous (*Picetum, Pinetum*, 1500 to 2200 m); V subalpine (*Pinetum, Juniperetum*, 2000 - 2500 m); VI alpine (*Caricetum, Seslerietum*, 2500 - 2915 m) (table 1). In zoogeographical respects, Pirin Mountain belongs to Rila-Rhodope subregion (GUEORGUEV 1092).

The material treated herein can be divided into three major parts. The first part comprises collections made in 1990 - 1996 during a field survey, the second a revision of Drensky's collection. The third is the critical incorporation of all available literature records concerning the distribution of spiders on Pirin Mountain. The spiders have been collected by hand (under stones and screens, on patches of moss and grass between stones), by sweepnetting (meadows), and beating (bushes).

Geographical areas and abbreviations used in the text are: N Northern Pirin Mountain, N1 limestone part, southwestern slope, N2 limestone part, northeastern slope, N3 silicate part, southwestern slope, N4 silicate part, northeastern slope, M Middle Pirin Mountain, S Southern Pirin Mountain (table 1).

The data concerning general distribution are taken from MAURER & HÄNGGI (1992) and PLATNICK (1993). Zoogeographical categories and abbreviations are (table 1): COS Cosmopolitan; PPT Palaeartic Palaeotropical; PAT Palaeartic Afrotropical; H Holarctic; P Palaeartic; TP Trans-palaeartic; WP West Palaeartic; ES Eurosiberian; ECA Euro Central Asian; E European; MSE Middle South European; MSEE Middle South East European; SEE South East European; EBK Endemic in Balkan peninsula; EBG Endemic in Bulgaria; EPI Endemic to Pirin mt.; MED Mediterranean; NME North Mediterranean; NEM North East Mediterranean; MME Montane Mediterranean.

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Table 1: Horizontal and vertical distribution of the spiders of Pirin mt. N1 - 4, M, S Geographic subdivisions (see Fig. 1); I - VI Altitudinal belts; ZOOG Zoogeographical type (see Fig. 5). I Submediterranean; II Submontane; III Montane-deciduous; IV Montane coniferous; V Subalpine; VI Alpine belt. \* Species new for Bulgaria.

Taxa	N1	N2	N3	N4	M	S	I	II	III	IV	V	VI	ZOOG
<i>Atypidae</i>													
<i>Atypus piceus</i> (SULZER)	-	+	-	+	-	-	-	-	+	+	-	-	MSE
<i>Scytodidae</i>													
<i>Scytodes thoracica</i> (LATREILLE)	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>Pholcidae</i>													
<i>Holocnemus pluchei</i> (SCOPOLI)	-	+	-	-	-	-	-	-	+	+	-	-	MED
<i>Pholcus opilionoides</i> (SCHRANK)	-	+	+	+	-	-	+	+	+	+	-	-	H
<i>Segestriidae</i>													
<i>Segestria senoculata</i> (LINNAEUS)	-	+	-	+	+	-	-	-	+	+	+	-	P
<i>Dysderidae</i>													
<i>Dysdera erythrina</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	-	-	MSE

Taxa	N1	N2	N3	N4	M	S	I	II	III	IV	V	VI	ZOOG
<i>Harpactea hombergi</i> (SCOPOLI)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>H. lepida</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	E
Mimetidae													
* <i>Ero furcata</i> (VILLERS)	-	-	+	-	-	-	-	-	-	-	+	-	P
Eresidae													
<i>Eresus cinnaberinus</i> (OLIVIER)	-	+	-	+	-	-	-	-	+	+	-	-	P
Theridiidae													
<i>Achaearanea lunata</i> (CLERCK)	-	+	+	+	-	-	-	-	+	+	+	-	P
<i>A. ohlerti</i> (THORELL)	-	-	+	+	-	-	-	-	-	+	+	-	H
<i>Crustulina guttata</i> (WIDER)	-	-	-	-	-	+	+	+	+	-	-	-	P
<i>Dipoena melanogaster</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	WP
<i>Enoplognatha latimana</i> HIPPA et OKSALA	-	+	-	+	-	-	-	-	+	+	+	-	H
<i>E. ovata</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>E. thoracica</i> (HAHN)	-	-	+	-	-	-	+	-	-	-	-	-	H
<i>Episinus truncatus</i> LATREILLE	-	+	-	+	-	-	+	+	+	+	-	-	P
<i>Euryopis flavomaculata</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Robertus mediterraneus</i> ESKOV	-	+	-	+	-	-	-	-	-	+	+	-	NME
<i>Seatoda bipunctata</i> (LINNAEUS)	-	-	-	+	-	-	-	-	-	+	+	-	H
<i>St. phalerata</i> (PANZER)	+	+	+	+	-	-	-	-	+	+	+	-	P
<i>St. triangulosa</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	-	-	COS
<i>Theridion beteni</i> WIEHLE	-	+	+	+	-	-	-	-	-	+	+	-	P
<i>Th. bimaculatum</i> (LINNAEUS)	-	+	+	+	-	-	-	-	+	+	+	-	H
<i>Th. impressum</i> L. KOCH	-	+	+	+	-	-	-	-	+	+	+	-	H
<i>Th. melanurum</i> HAHN	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>Th. nigrovariegatum</i> SIMON	-	+	-	+	-	-	-	-	+	+	+	-	P
<i>Th. petraeum</i> L. KOCH	+	+	+	+	-	-	-	-	-	-	+	+	H
<i>Th. sisyphium</i> (CLERCK)	+	+	+	+	-	-	-	-	+	+	+	-	P
<i>Th. tinctum</i> (WALCKENAER)	-	+	+	+	-	-	+	-	+	+	-	-	H
Linyphiidae													
<i>Acartauchenius scurrilis</i> (O.P.-CAMBRIDGE)	-	-	-	-	-	+	-	+	+	-	-	-	E
<i>Antrohyphantes rhodopensis</i> (DRENSKY)	-	+	-	+	-	-	-	-	-	+	+	+	EBG
<i>Araeoncus anguineus</i> (L. KOCH)	+	+	+	+	-	-	-	-	-	+	+	+	E
<i>A. clivifrons</i> DELTSHEV	-	-	+	+	-	-	-	-	-	-	+	+	EBG
<i>A. humilis</i> (BLACKWALL)	-	-	+	+	-	-	-	-	-	+	+	+	WP
<i>Bathyphantes gracilis</i> (BLACKWALL)	-	+	-	+	-	-	-	-	-	+	+	-	H
<i>B. nigrinus</i> (WESTRING)	-	+	-	-	-	-	-	-	+	+	-	-	E
<i>Bolyphantes alticeps</i> (SUNDEVALL)	-	+	+	+	-	-	-	-	-	+	+	-	P

Taxa	N1	N2	N3	N4	M	S	I	II	III	IV	V	VI	ZOOG
<i>B. luteolus</i> (BLACKWALL)	+	+	+	+	-	-	-	-	-	+	+	-	P
<i>Centromerita bicolor</i> (BLACKWALL)	-	+	-	+	-	-	-	-	-	+	+	-	E
<i>Centromerus lakatnikensis</i> (DRENSKY)	-	+	-	-	-	-	-	+	+	-	-	-	EBG
<i>C. paucidentatus</i> DELTSHEV	-	+	-	+	-	-	-	-	-	+	+	+	EBG
* <i>C. serratus</i> (O.P.-CAMBRIDGE)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>Ceratinella brevis</i> (WIDER)	-	-	-	+	-	-	-	-	-	+	+	-	P
<i>Cinetata gradata</i> (SIMON)	-	+	-	-	-	-	-	-	-	+	+	-	E
<i>Diplocephalus altimontanus</i> DELTSHEV	-	+	-	+	-	-	-	-	-	-	-	+	EPI
<i>D. foraminifer</i> (O.P.-CAMBRIDGE)	-	+	+	+	-	-	-	-	-	+	+	+	E
<i>D. latifrons</i> (O.P.-CAMBRIDGE)	-	+	-	-	-	-	-	-	+	+	-	-	E
<i>Diplostyla concolor</i> (WIDER)	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>Drapetisca socialis</i> (SUNDEVALL)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Drepanotylus pirinicus</i> DELTSHEV	-	+	-	+	-	-	-	-	-	-	-	+	EPI
<i>Entelecara media</i> KULCZYNSKI	-	-	+	+	-	-	-	-	-	-	-	+	H
<i>Erigone dentipalpis</i> (WIDER)	+	+	+	+	+	+	-	-	+	+	+	-	H
<i>E. pirini</i> DELTSHEV	-	+	+	+	-	-	-	-	-	-	+	+	EBG
<i>Evansia merens</i> O.P.-CAMBRIDGE	-	+	-	+	-	-	-	-	-	-	+	+	P
<i>Frontinellina frutetorum</i> (C.L. KOCH)	+	+	+	+	-	-	-	+	+	+	-	-	WP
<i>Gonatum orientale</i> FAGE	-	+	-	+	-	-	-	-	-	+	+	-	SEE
* <i>G. rubellum</i> (BLACKWALL)	-	-	-	+	-	-	-	-	+	+	-	-	E
<i>G. rubens</i> (BLACKWALL)	-	+	-	+	-	-	-	-	+	+	+	-	H
<i>Gongylidiellum latebricola</i> (O.P.-CAMBRIDGE)	-	-	-	+	-	-	-	-	-	+	+	-	E
<i>Lepthyphantes alacris</i> (BLACKWALL)	-	-	-	+	-	-	-	-	-	+	+	-	E
<i>L. centromeroides</i> KULCZYNSKI	-	-	-	+	-	-	-	-	-	-	+	+	SEE
<i>L. collinus</i> (L. KOCH)	-	-	+	-	-	-	+	-	-	-	-	-	WP
<i>L. flavipes</i> (BLACKWALL)	-	+	-	+	-	-	-	-	-	+	+	-	P
<i>L. improbulus</i> SIMON	-	-	+	+	-	-	-	-	-	-	-	+	E
<i>L. leprosus</i> (OHLERT)	-	-	+	+	-	-	-	-	+	+	+	-	P
<i>L. lithoclasticolus</i> DELTSHEV	+	+	+	+	-	-	-	-	-	-	-	+	EBG
<i>L. mansuetus</i> (THORELL)	-	-	-	+	-	-	-	-	-	+	+	-	E
<i>L. mengei</i> KULCZYNSKI	-	-	+	+	-	-	-	-	-	+	+	-	P
<i>L. obscurus</i> (BLACKWALL)	-	-	+	+	-	-	-	-	-	+	+	-	P
* <i>L. pallidus</i> (O. P.-CAMBRIDGE)	-	+	-	-	-	-	-	-	+	+	-	-	E
<i>L. pinicola</i> SIMON	-	+	-	+	-	-	-	-	-	+	+	-	P
<i>L. pulcher</i> (KULCZYNSKI)	-	-	+	+	-	-	-	-	-	-	+	+	MSEE
<i>L. quadrimaculatus</i> KULCZYNSKI	-	+	-	+	-	-	-	-	-	-	-	+	E
<i>L. rectilamellus</i> DELTSHEV	-	-	-	+	-	-	-	-	-	-	+	+	EPI
<i>L. tenebricola</i> (WIDER)	-	+	-	+	-	-	-	-	-	+	+	-	P
<i>L. tenuis</i> BLACKWALL	-	-	-	+	-	-	-	-	-	+	+	-	WP
<i>L. zimmermanni</i> BERTKAU	-	-	+	-	-	-	-	-	-	+	+	-	E
<i>Linyphia hortensis</i> SUNDEVALL	-	+	-	+	-	-	-	-	-	+	+	-	E

Taxa	N1	N2	N3	N4	M	S	I	II	III	IV	V	VI	ZOOG
<i>L. triangularis</i> (CLERCK)	-	+	-	+	-	-	-	+	+	+	-	-	P
<i>Macrargus rufus</i> (WIDER)	-	-	-	+	-	-	-	-	+	+	-	-	P
<i>Maso gallicus</i> SIMON	-	-	+	+	-	-	-	-	-	+	+	-	MSEE
<i>Mecynargus paetulus</i> (O.P.-CAMBRIDGE)	-	+	+	+	-	-	-	-	-	-	+	+	H
<i>Meioneta fuscipalpis</i> (C.L. KOCH)	-	-	+	-	-	-	-	-	-	-	+	-	WP
<i>M. gulosa</i> (L. KOCH)	-	-	+	-	-	-	-	-	-	-	+	-	P
<i>M. rurestris</i> (C.L. KOCH)	+	+	+	+	-	-	-	+	+	+	+	+	P
<i>Metopobactrus orbelicus</i> DELTSHEV	-	+	+	+	-	-	-	-	-	-	-	+	EBG
<i>Micrargus herbigradus</i> (BLACKWALL)	-	-	-	+	-	-	-	-	-	-	+	+	P
<i>M. subaequalis</i> (WESTRING)	-	+	-	+	-	-	-	-	-	+	+	-	E
<i>Microlinyphia pusilla</i> (SUNDEWALL)	-	+		+	-	-	-	-	+	+	+	-	H
<i>Microctenonyx subitanea</i> (O.P.-CAMBRIDGE)	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>Neriemontana</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>N. peltata</i> (WIDER)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>N. radiata</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>Oedothorax agrestis</i> (BLACKWALL)	+	+	-	+	-	-	-	-	-	+	+	-	E
<i>O. apicatus</i> (BLACKWALL)	+	-	+	-	-	-	-	-	-	-	+	-	P
<i>O. fuscus</i> (BLACKWALL)	-	-	+	+	-	-	-	-	-	+	+	-	WP
* <i>O. gibbifer</i> (KULCZYNSKI)	-	-	+	-	-	-	-	-	+	+	-	-	SEE
* <i>Ostearius melanopygius</i> (O.P.-CAMBRIDGE)	-	-	+	-	-	-	-	-	-	-	+	-	COS
<i>Pelecopsis elongata</i> (WIDER)	-	+	-	+	-	-	-	-	-	+	+	-	E
<i>Pityohyphantes phrygianus</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	-	+	+	-	P
<i>Poecilometes variegata</i> (BLACKWALL)	-	+	-	+	-	-	-	-	-	-	+	+	P
<i>Porrhomma convexum</i> (WESTRING)	-	+	+	+	-	-	-	-	-	+	+	-	E
<i>Prinerigone vagans</i> (AUDOUIN)	-	+	+	+	-	-	-	-	+	+	+	-	PPT
<i>Sintula retroversus</i> (O.P.-CAMBRIDGE)	-	-	+	-	-	-	+	-	-	-	-	-	E
<i>Stemonyphantes lineatus</i> (LINNE)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Tapinopa longidens</i> (WIDER)	-	+	-	-	-	-	-	-	-	+	-	-	P
<i>Tiso vagans</i> (BLACKWALL)	-	-	+	-	-	-	-	-	-	-	+	-	E
<i>Walckenaeria capito</i> (WESTRING)	-	-	-	+	-	-	-	-	-	-	+	+	E
<i>W. vigilax</i> (BLACKWALL)	-	-	-	+	-	-	-	-	-	-	+	-	H
Tetragnathidae													
<i>Metellina mengei</i> (BLACKWALL)	-	+	-	+	-	-	+	+	+	+	-	-	E
<i>M. merianae</i> (SCOPOLI)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>M. segmentata</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Pachygnatha clercki</i> SUNDEVALL	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>P. degeeri</i> SUNDEVALL	-	+	-	+	-	-	-	-	+	+	-	-	P

Taxa	N1	N2	N3	N4	M	S	I	II	III	IV	V	VI	ZOOG
<i>Tetragnatha extensa</i> (LINNAEUS)	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>T. montana</i> SIMON	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Zygiella montana</i> (C.L. KOCH)	-	-	-	+	-	-	-	-	+	+	-	-	P
<i>Z. thorelli</i> (AUSSERER)	-	+	-	+	-	-	-	-	+	+	-	-	E
Araneidae													
<i>Aculepeira ceropegia</i> (WALCKENAER)	-	+	+	+	-	-	-	-	+	+	-	-	P
<i>A. talishia</i> (ZAWADSKI)	-	+	+	+	-	-	-	-	-	-	+	+	MME
<i>Agalenatea redii</i> (SCOPOLI)	-	+	+	+	-	-	+	+	+	+	-	-	P
<i>Araneus angulatus</i> CLERCK	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>A. circe</i> (AUDOUIN)	-	-	-	+	-	-	-	-	+	+	-	-	P
<i>A. diadematus</i> CLERCK	-	+	+	+	-	-	-	-	+	+	-	-	H
<i>A. marmoreus</i> CLERCK	-	-	-	+	-	-	-	-	+	+	-	-	H
<i>A. quadratus</i> CLERCK	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>A. sturmi</i> (HAHN)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Araniella alpica</i> (L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>A. cucurbitina</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>A. opisthographa</i> (KULCZYNSKI)	-	+	-	+	-	-	-	-	+	+	-	-	NME
<i>Cyclosa conica</i> (PALLAS)	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>C. sierrae</i> SIMON	-	+	-	+	-	-	-	-	+	+	-	-	NME
<i>Gibbaranea biuberculata</i> (WALCKENAER)	-	+	+	+	-	-	+	+	+	+	-	-	P
<i>G. gibbosa</i> (WALCKENAER)	-	-	-	+	-	-	-	-	+	+	-	-	E
<i>G. ulrichi</i> (HAHN)	-	-	+	-	-	-	+	-	-	-	-	-	E
<i>Larinioides folium</i> (SCHRANK)	-	+	-	+	-	-	-	-	+	+	-	-	MED
<i>L. patagiatus</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	+	-	H
<i>Mangora acalypha</i> (WALCKENAER)	-	+	+	+	-	-	+	+	+	+	-	-	P
<i>Neoscona adianta</i> (WALCKENAER)	-	+	+	+	-	-	+	+	+	+	-	-	P
<i>Nuctenea umbratica</i> (CLERCK)	-	+	-	+	+	+	-	-	+	+	-	-	E
<i>Zilla diodia</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	-	-	WP
Lycosidae													
<i>Alopecosa accentuata</i> (LATREILLE)	-	+	-	+	-	-	-	-	-	+	-	-	P
<i>A. albofasciata</i> (BRULLE)	-	-	+	-	-	-	+	-	-	-	-	-	MED
<i>A. cuneata</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>A. cursor</i> (HAHN)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>A. inquilina</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	-	-	ES
<i>A. pentheri</i> (NOSEK)	-	+	-	+	-	-	-	-	+	+	-	-	NEM
<i>A. pulverulenta</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Arctosa cinerea</i> (FABRICIUS)	-	+	-	+	-	-	-	-	+	+	-	-	TP
<i>A. maculata</i> (HAHN)	-	+	-	+	-	-	-	-	+	+	-	-	MSE
<i>Aulonia albimana</i> (WALCKENAER)	-	+	+	+	-	-	+	+	+	-	-	-	P
<i>Lycosa vultuosa</i> C.L. KOCH	-	+	-	+	-	-	-	-	+	+	-	-	NEM
<i>Pardosa agricola</i> (THORELL)	-	+	-	+	-	-	-	-	+	+	-	-	ES

Taxa	N1	N2	N3	N4	M	S	I	II	III	IV	V	VI	ZOOG
<i>P. albatula</i> (L. KOCH)	-	+	-	+	-	-	-	-	-	+	+	+	MSE
<i>P. amentata</i> (CLERCK)	-	+	+	+	-	-	-	-	+	+	+	-	WP
<i>P. blanda</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	+	+	+	-	MSE
<i>P. drenskii</i> BUCCHAR	-	+	-	+	-	-	-	-	-	-	+	+	EBG
<i>P. ferruginea</i> (L. KOCH)	-	+	+	+	-	-	-	-	-	+	+	-	E
<i>P. hortensis</i> (THORELL)	-	-	+	-	-	-	+	-	-	-	-	-	P
<i>P. incerta</i> NOSEK	-	+	-	+	-	-	-	-	-	-	+	+	MME
<i>P. lugubris</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	+	-	TP
<i>P. mixta</i> (KULCZYNSKI)	-	+	+	+	-	-	-	-	-	-	+	+	MSE
<i>P. morosa</i> (L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	MSE
<i>P. nigra</i> (C.L. KOCH)	-	-	+	+	-	-	-	-	-	-	-	+	MSE
<i>P. palustris</i> (LINNAEUS)	-	+	-	+	-	-	-	-	+	+	+	-	H
<i>P. prativaga</i> (L. KOCH)	-	+	+	+	-	-	-	-	+	+	+	-	ES
<i>P. proxima</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	WP
<i>P. pullata</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	-	-	ECA
<i>Pirata hygrophilus</i> (THORELL)	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>P. laitians</i> (BLACKWALL)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>Trochosa ruficola</i> (DEGEER)	-	+	-	+	-	-	-	-	+	+	-	-	ES
<i>T. terricola</i> THORELL	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>Xerolycosa miniata</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>X. nemoralis</i> (WESTRING)	-	-	-	+	-	-	-	-	+	+	-	-	P
Pisauridae													
<i>Pisaura mirabilis</i> (CLERCK)	+	+	+	+	+	+	+	+	+	+	-	-	P
Agelenidae													
<i>Agelena gracilens</i> C.L. KOCH	-	+	-	+	-	-	-	-	+	+	-	-	MSE
<i>A. labyrinthica</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Cicurina cicur</i> (FABRICIUS)	-	+	-	+	-	-	-	-	-	+	+	-	E
<i>Coelotes atropos</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>C. jurinitschi</i> (DRENSKY)	-	+	-	+	-	-	-	-	+	+	-	-	EBG
<i>C. karlinskii</i> KULCZYNSKI	-	+	-	+	-	-	-	-	+	+	-	-	EBG
<i>C. kulczynskii</i> (DRENSKY)	-	+	+	+	-	-	-	-	+	+	+	-	EBG
<i>Cybaeus angustiarum</i> L. KOCH	-	-	-	+	-	-	-	-	+	+	-	-	MSEE
<i>Histopona torpida</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	MSEE
<i>Lycosoides coarctata</i> (DUFOUR)	-	+	-	+	-	-	-	-	+	+	-	-	MED
<i>Mastigusa macrophthalma</i> (KULCZYNSKI)	-	-	-	+	-	-	-	-	-	+	+	-	MSE
<i>Tegenaria agrestis</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	-	-	MSE
<i>T. campestris</i> (C.L. KOCH)	-	-	+	-	-	-	+	-	-	-	-	-	E
<i>T. domestica</i> (CLERCK)	-	+	+	+	+	+	+	+	+	+	-	-	COS
<i>T. ferruginea</i> (PANZER)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>T. montana</i> DELTSHEV	-	+	-	+	-	-	-	-	+	+	+	-	EPI
<i>T. parietina</i> (FOURCROY)	-	+	-	+	-	-	+	+	+	+	-	-	WP
<i>Textrix denticulata</i> (OLIVIER)	-	+	-	+	-	-	-	-	+	+	-	-	P

Taxa	N1	N2	N3	N4	M	S	I	II	III	IV	V	VI	ZOOG
<b>Hahniidae</b>													
<i>Antistea elegans</i> (BLACKWALL)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>Cryphoea pirini</i> (DRENSKY)	-	+	+	+	-	-	-	-	-	-	+	+	EBG
<i>C. silvicola</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	P
<b>Dictynidae</b>													
<i>Dictyna arundinacea</i> (LINNE)	-	+	+	+	-	-	+	+	+	+	-	-	H
<i>D. latens</i> (FABRICIUS)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>D. pusilla</i> THORELL	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>D. uncinata</i> THORELL	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Nigma flavescens</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	-	-	P
<b>Amaurobiidae</b>													
<i>Amaurobius fenestralis</i> (STROEM)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>A. pallidus</i> L. KOCH	-	+	-	+	-	-	-	-	+	+	-	-	MSEE
<i>Callobius balcanicus</i> (DRENSKY)	-	+	-	+	-	-	-	-	+	+	-	-	EBG
<b>Titanoecidae</b>													
<i>Titanoeca quadriguttata</i> (HAHN)	-	+	-	+	-	-	-	-	+	+	-	-	P
<b>Oxyopidae</b>													
<i>Oxyopes heterophthalmus</i> LATREILLE	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>O. lineatus</i> LATREILLE	-	+	-	+	-	-	-	-	+	+	-	-	P
<b>Anyphaenidae</b>													
<i>Anyphaena accentuata</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	-	-	E
<b>Liocranidae</b>													
<i>Agroeca brunnea</i> (BLACKWALL)	-	-	-	-	+	-	-	-	+	+	-	-	E
<i>A. cuprea</i> MENGE	-	-	+	-	-	-	+	-	-	-	-	-	E
<i>Phrurolithus festivus</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>P. szilyi</i> HERMAN	-	-	-	-	-	+	+	+	-	-	-	-	E
<b>Clubionidae</b>													
<i>Cheiracanthium erraticum</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Ch. macedonicum</i> DRENSKY	-	+	+	-	-	+	+	+	+	+	-	-	EPI
<i>Ch. mildei</i> (L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>Ch. oncognathum</i> THORELL	-	-	+	-	-	-	-	+	+	-	-	-	E
<i>Ch. pennyi</i> O.P.-CAMBRIDGE	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Ch. punctorium</i> (VILERS)	-	-	+	-	-	-	+	-	-	-	-	-	E
<i>Ch. virescens</i> (SUNDEVALL)	-	-	-	-	-	+	+	+	+	-	-	-	P
<i>Clubiona alpicola</i> KULCZYNSKI	-	+	+	+	-	-	-	-	-	+	+	+	E
<i>C. corticalis</i> (WALCKENAER)	-	+	-	+	-	+	-	-	+	+	-	-	E
<i>C. genevensis</i> L. KOCH	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>C. neglecta</i> O.P.-CAMBRIDGE	-	-	-	+	-	-	-	-	+	+	-	-	P



Taxa	N1	N2	N3	N4	M	S	I	II	III	IV	V	VI	ZOOG
<i>C. pallidula</i> (CLERCK)	-	+	-	+	-	+	+	+	+	+	-	-	H
* <i>C. saxatilis</i> L. KOCH	-	-	+	-	-	-	-	-	-	-	+	-	E
* <i>C. similis</i> L. KOCH	-	-	-	+	-	-	-	-	+	+	-	-	P
<i>C. terrestris</i> WESTRING	-	-	-	+	-	-	-	-	+	+	-	-	E
<i>C. trivialis</i> C.L. KOCH	-	+	-	+	-	-	-	-	+	+	-	-	H
Zodariidae													
<i>Zodarion morosum</i> DENIS	-	-	+	-	-	-	+	-	-	-	-	-	SEE
<i>Z. pirini</i> DRENSKY	+	+	+	+	+	+	-	-	+	+	+	-	EBG
Gnaphosidae													
* <i>Callilepis cretica</i> (ROEWER)	-	-	+	-	-	-	+	-	-	-	-	-	NEM
<i>C. nocturna</i> (LINNE)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Drassodes lapidosus</i> (WALCKENAER)	-	+	+	+	-	-	+	+	+	+	-	-	P
<i>D. pubescens</i> (THORELL)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Gnaphosa lucifuga</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>G. lugubris</i> (C.L. KOCH)	-	+	-	+	-	-	+	+	+	-	-	-	E
<i>Haplodrassus signifer</i> (C.L. KOCH)	-	+	+	+	-	-	+	+	+	+	+	+	H
<i>Micaria aenea</i> THORELL	-	+	-	+	-	-	-	-	-	+	+	-	H
<i>M. funerea</i> SIMON	-	+	-	+	-	-	-	-	-	-	+	+	SEE
<i>M. guttulata</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>M. pulicaria</i> (SUNDEVALL)	-	+	-	+	-	-	-	-	+	+	+	-	H
<i>M. romana</i> (L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Nomisia exornata</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>Poecilochroa conspicua</i> (L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>Scotophaeus quadripunctatus</i> (LINNE)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>S. scutulatus</i> (L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>Trachyzelotes pedestris</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>Zelotes aeneus</i> (SIMON)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>Z. apricorum</i> (L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>Z. clivicola</i> (L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Z. hermani</i> (CHYZER)	-	+	-	+	-	-	-	-	+	+	-	-	SEE
<i>Z. oblongus</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	E
* <i>Zelotes</i> sp. cf. <i>olympi</i> (KULCZYNSKI)	-	+	-	+	-	-	-	-	+	+	-	-	NEM
<i>Z. praeficus</i> (L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>Z. similis</i> (KULCZYNSKI)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>Z. talpinus</i> (L. KOCH)	-	-	-	+	-	-	-	-	+	+	-	-	E
Heteropodidae													
<i>Micrommata virescens</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	-	-	P
Philodromidae													
<i>Philodromus aureolus</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	+	+	P

Taxa	N1	N2	N3	N4	M	S	I	II	III	IV	V	VI	ZOOG
<i>P. cespitum</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>P. collinus</i> C.L. KOCH	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>P. dispar</i> WALCKENAER	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>P. emarginatus</i> (SCHRANK)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>P. fuscomarginatus</i> (DEGEER)	-	-	+	-	-	-	-	-	+	+	-	-	P
<i>P. margaritatus</i> (CLERCK)	-	-	+	-	-	-	-	-	+	+	-	-	P
<i>P. poecilus</i> (THORELL)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>P. rufus</i> WALCKENAER	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>P. vagulus</i> SIMON	-	+	+	+	-	-	-	-	+	+	+	-	E
<i>Thanatus arenarius</i> THORELL	-	+	-	+	-	-	-	-	+	+	+	-	E
<i>T. formicinus</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	+	-	H
<i>T. lineatipes</i> SIMON	-	+	-	+	-	-	-	-	+	+	+	-	MED
<i>T. sabulosus</i> (MENGE)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Tibellus macellus</i> SIMON	-	+	-	+	-	-	-	-	+	+	-	-	E
Thomisidae													
<i>Diaea dorsata</i> (FABRICIUS)	-	+	-	+	+	+	-	-	+	+	-	-	P
<i>Herieus graminicola</i> (DOLESCHALL)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>H. mellottei</i> SIMON	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Misomenops tricuspidatus</i> (FABRICIUS)	-	+	-	+	+	+	-	-	+	+	-	-	P
<i>Misumena vatia</i> (CLERCK)	-	+	+	+	+	+	+	+	+	+	-	-	H
<i>Ozyptila blackwalli</i> SIMON	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>O. praticola</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>O. sanctuaria</i> (CAMBRIDGE)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>Pistius truncatus</i> (PALLAS)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Runcinia grammica</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	+	+	-	-	PAT
<i>Synaema globosum</i> (FABRICIUS)	-	+	+	+	+	+	+	+	+	+	-	-	P
<i>Thomisus onustus</i> WALCKENAER	-	+	+	+	+	+	+	+	+	+	-	-	P
<i>Tmarus piger</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Xysticus acerbus</i> THORELL	-	+	+	+	-	-	+	+	+	+	-	-	P
<i>X. audax</i> (SCHRANK)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>X. bonneti</i> DENIS	-	+	-	+	-	-	-	-	-	-	-	+	E
<i>X. cristatus</i> (CLERCK)	-	+	-	+	+	+	-	-	+	+	-	-	P
<i>X. gallicus</i> SIMON	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>X. kochi</i> THORELL	-	+	+	+	+	+	+	+	+	+	-	-	P
<i>X. luctuosus</i> (BLACKWALL)	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>X. macedonicus</i> SILHAVI	-	+	-	+	-	-	-	-	-	+	+	-	EBK
<i>X. ninnii</i> THORELL	-	+	-	+	-	-	-	-	+	+	-	-	P
Salticidae													
<i>Aelurillus v-insignitus</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Ballus chalybeius</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	-	-	WP
<i>Dendryphantes rudis</i> (SUNDEVALL)	-	+	-	+	-	-	-	-	+	+	-	-	P

Taxa	N1	N2	N3	N4	M	S	I	II	III	IV	V	VI	ZOOG
<i>Euophrys aequipes</i> (O.P.-CAMBRIDGE)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>E. frontalis</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>E. herbigrada</i> (SIMON)	-	-	+	-	-	-	-	+	+	+	-	-	E
<i>E. obsoleta</i> (SIMON)	-	-	+	-	-	-	+	+	+	+	-	-	P
<i>E. petrensis</i> L. KOCH	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>Evarcha flammata</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>E. laetabunda</i> (C.L. KOCH)	-	-	-	+	-	+	-	-	+	+	-	-	P
<i>Heliophanus aeneus</i> (HAHN)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>H. auratus</i> C.L. KOCH	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>H. cupreus</i> WALCKENAER	-	+	+	+	-	-	-	-	+	+	+	-	P
<i>H. dubius</i> C.L. KOCH	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>H. flavipes</i> HAHN	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>H. patagiatus</i> THORELL	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Marpissa muscosa</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Pellenes tripunctatus</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Phlegra fasciata</i> (HAHN)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>Pseudicius encarpatus</i> (WALCKENAER)	-	+	-	+	-	-	-	-	+	+	-	-	E
<i>Salticus cingulatus</i> (PANZER)	-	+	-	+	-	-	-	-	+	+	-	-	P
<i>S. scenicus</i> (CLERCK)	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>Sitticus floricola</i> (C.L. KOCH)	-	+	-	+	-	-	-	-	+	+	+	-	P
<i>S. pubescens</i> (FABRICIUS)	-	+	-	+	-	-	-	-	+	+	-	-	H
<i>S. zimmermanni</i> (SIMON)	-	+	-	+	-	-	-	-	+	+	+	-	P

### 3. Results and discussion:

#### 3.1. Species composition:

This study comprises collections from all parts of Pirin mountain (figs. 1, 2). It comprises 321 species from 28 families: Atypidae 1, Scytodidae 1, Pholcidae 2, Segestriidae 1, Dysderidae 3, Mimetidae 1, Eresidae 1, Theridiidae 21, Linyphiidae 80, Tetragnathidae 9, Araneidae 23, Lycosidae 33, Pisauridae 1, Agelenida 18, Hahniidae 3, Dictynidae 5, Amaurobiidae 3, Titanocidae 1, Oxyopidae 2, Anyphaenidae 1, Liocranidae 4, Clubionidae 16, Zodariidae 2, Gnaphosidae 26, Heteropodidae 1, Philodromidae 15, Thomisidae 22, Salticidae 26 (tab. 1). 39 species are new for the spider fauna of Pirin mountain und 10 are new for the Bulgarian fauna (marked in the list with \*). The number of species is high and represents about 43% of all Bulgarian spiders. Compared with the number of spiders recorded from the Alps (about 1000 species, THALER 1980), the number of spiders on Pirin is not high, but the territory of the Alps is much larger and better investigated than Pirin mt. Best represented are the families Linyphiidae s.l. 80, 25% (161 species in Caucasus, TANASEVITCH 1990), Lycosidae 33, 10.3%, Gnaphosidae 26, 8%, Salticidae 25, 8%. Genera with many species are *Lepthyphantes* (18 spp., 23 in Caucasus, TANASEVITCH 1990), *Pardosa* (16), *Philodromus* (10) and *Clubiona*, *Zelotes* and *Xysticus* each with 9 species. Some interesting new records are:

*Ostearius melanopygius* (O.P.-CAMBRIDGE): cosmopolitan, first record from Southeast Europe.

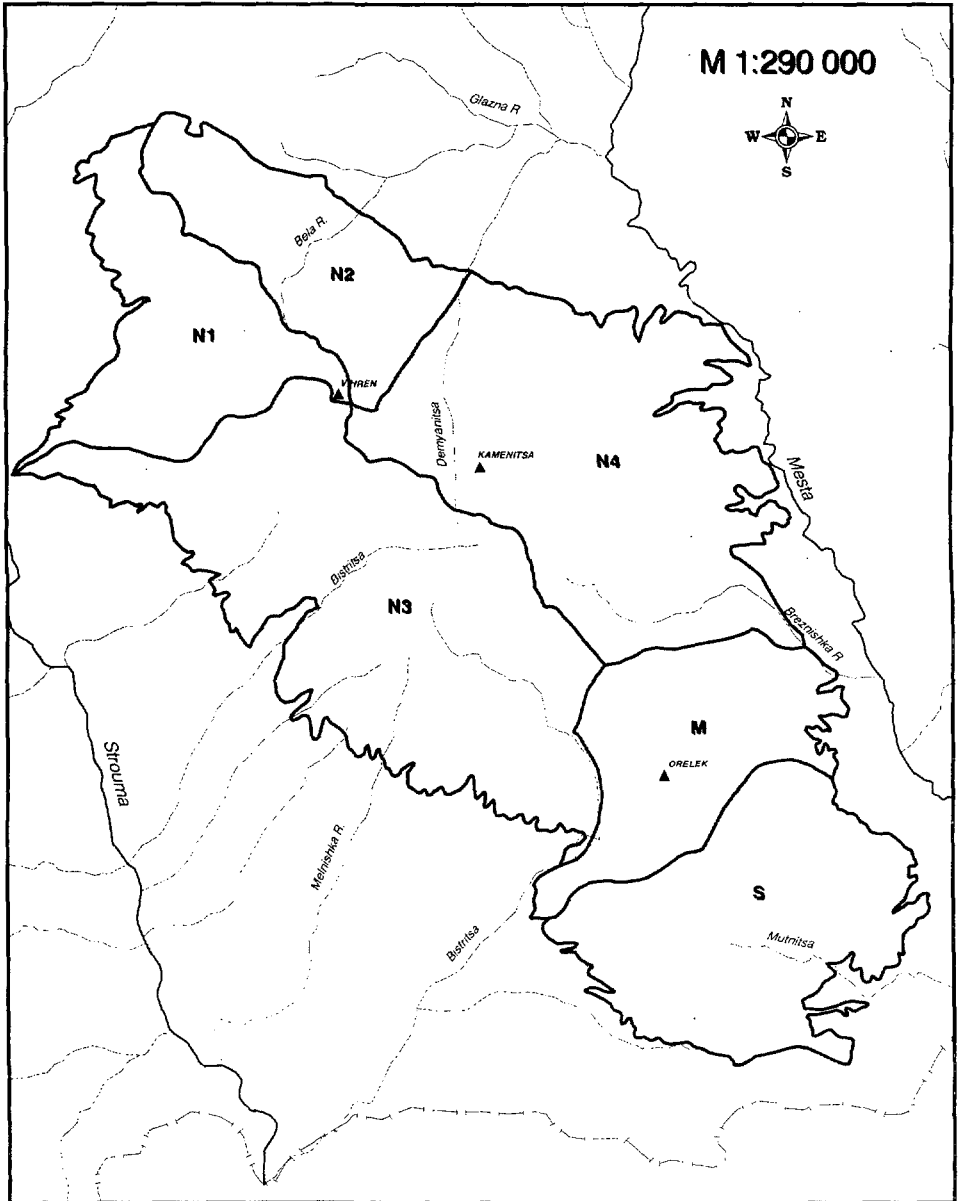


Fig. 1: Geographic subdivision of Pirin mt.

*Callilepis cretica* (BRISTOWE): hitherto known only from Crete.

*Zelotes prope olympi* KULCZYNSKI: the material examined is either identical with, or closely related to the species of KULCZYNSKI (1903). A revision is needed.

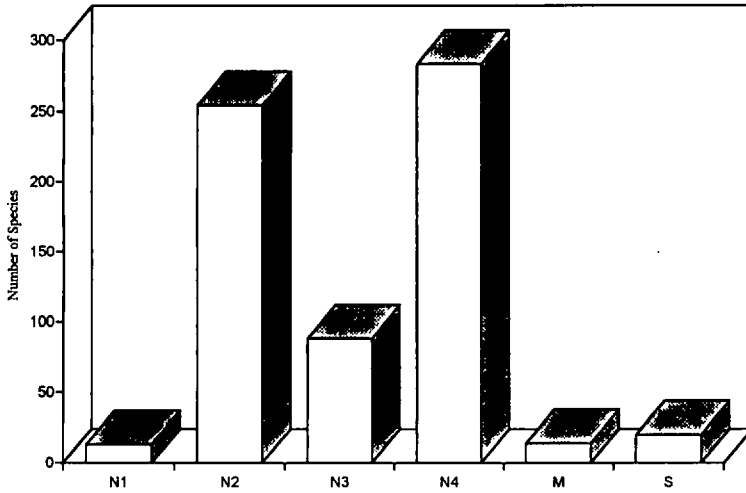


Fig. 2: Numbers of spider species in geographic subdivisions of Pirin mt., see fig. 1.

The revision of Drensky's collection produced some corrections in the list of Pirin spiders: "*Drassus pirini*" DRENSKY 1921 = *Drassodes lapidosus* (WALCKENAER 1802), nov. syn.; "*Euryopis dentigera*" = *Achaeearanea ohlerti*; "*Araneus proximus*" = *A. diadematus*; "*Dictyna bicolor*" = *D. pusilla*; "*Xysticus baleatus*" = *X. gallicus*; "*Xysticus erraticus*" = *X. gallicus*; "*Neon reticulatus*" = *Euophrys petrensis*; "*Euophrys erratica*" = *E. frontalis*; "*Euophrys difficilis*" = *E. frontalis*; "*Evarcha arcuata*" = *E. flammata*.

### 3.2. Vertical distribution:

Vertical belts are very well represented in Bulgarian mountains, due to relief and climate, and are characterized by specific vegetation and fauna.

Spiders are represented best in the montane-coniferous belt (269, 83.8 %) (fig. 3). Most of the spiders in this belt are widely distributed. Some species, *Achaeearanea ohlerti*, *Bolyphantes luteolus*, *Lepthyphantes pinicola*, *Micaria aenea*, *M. romana*, can be considered as mountain elements. The European complex is also well represented, mountain elements being *Araneoncus anguineus*, *Cinetata gradata*, *Gonatum orientale*, *Lepthyphantes alacris*, *Pardosa blanda*, *P. ferruginea*, *Zelotes talpinus*, *Philodromus vagulus*. Endemic species must also be regarded as mountain elements: *Coelotes jurinitschi*, *C. karlinskii*, *C. kulczynskii*, *Tegenaria montana*, *Zodarion pirini* and *Xysticus macedonicus*. The number of mediterranean species is not high, mountain elements are *Robertus mediterraneus* and *Zelotes pr. olympi*.

Almost the same number of spider species occur in the montane-deciduous belt (232, 72.3 %) (fig. 2). Best represented is again the complex of widely distributed species. But some mountain elements (*Achaeearanea ohlerti*, *Bolyphantes luteolus*) characteristic of the subalpine belt have not been found. The situation with European species is similar, though *Araneoncus anguineus*, *Cinetata gradata* and *Gonatum orientale* were not recorded in this belt. The endemics (*Coelotes jurinitschi*, *C. karlinskii*, *C. kulczynskii*, *Tegenaria montana*, *Zodarion pirini*) and Mediterranean species (*Araniella opistographa*, *Zelotes pr. olympi*) also occur there.

The subalpine belt is inhabited by 101 species (31.5 %), some of which are also abundant in the forest zone (fig. 3). The complex of widely distributed species, which are numerous in the subalpine belt, includes mountain elements, such as *Achaeearanea ohlerti*, *Ceratinella brevis*, *Boly-*

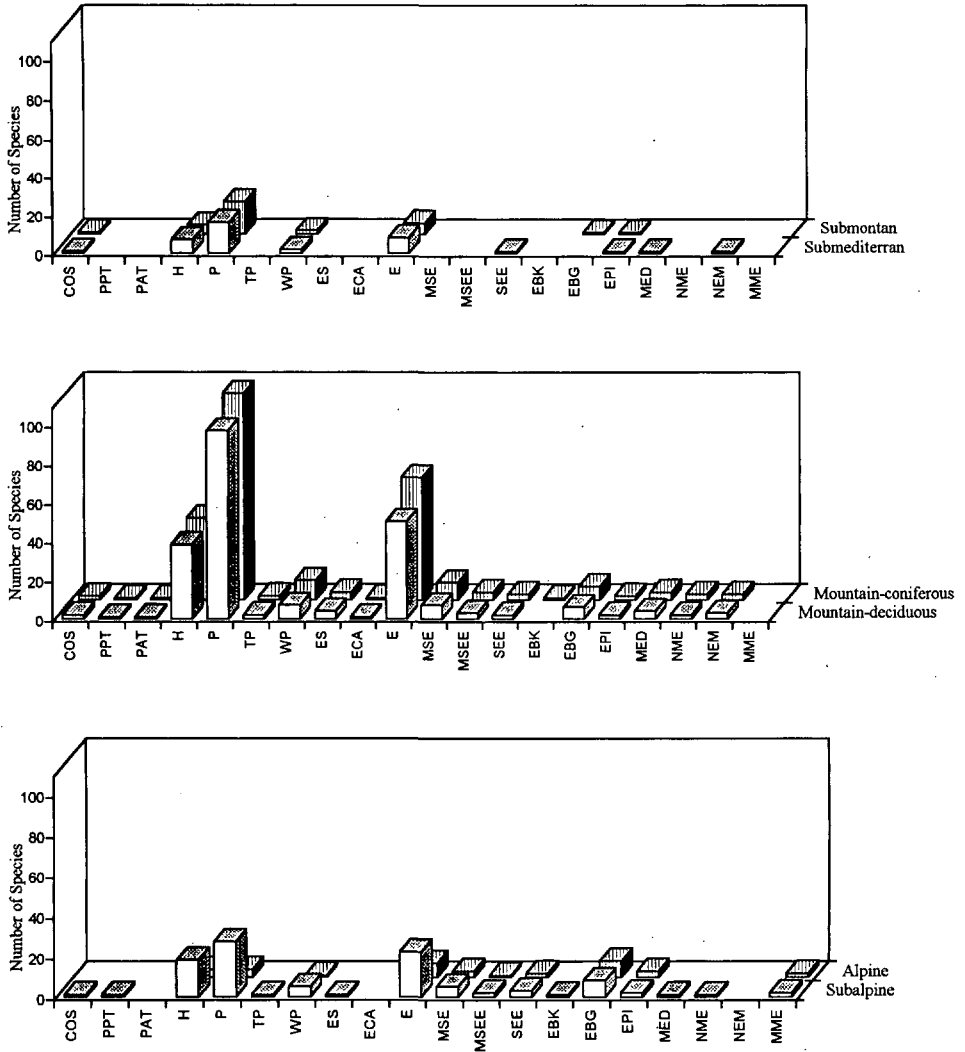


Fig. 3: Zoogeographical categories of spiders in altitudinal belts of Pirin mt. Explanation see fig. 5.

*phantes luteolus*, *Meioneta gulosa*, and high altitude elements, such as *Theridion petraeum*, *Evanisia merens*, *Mecynargus paetulus*, *Micaria aenea*. The group of European species comprises mainly species typical of the high mountains in Central Europe, *Araneoncus anguineus*, *Cinetata gradata*, *Diplocephalus foraminifer*, *Walckenaeria capito*, *Lepthyphantes pulcher*, *Pardosa albatula*, *P. blanda*, *P. ferruginea*, *Clubiona alpicola*, *Philodromus vagulus*. The endemics are also mountain elements (*Centromerus paucidentatus*, *Lepthyphantes rectilamellus*, *Coelotes kulczynskii*, *Tegenaria montana*, *Zodarion pirini*, *Xysticus macedonicus*) and high mountain elements (*Araneoncus clivifrons*, *Erigone pirini*, *Pardosa drenskii*, *Cryphoea pirini*). The distribution of *Anthro-*

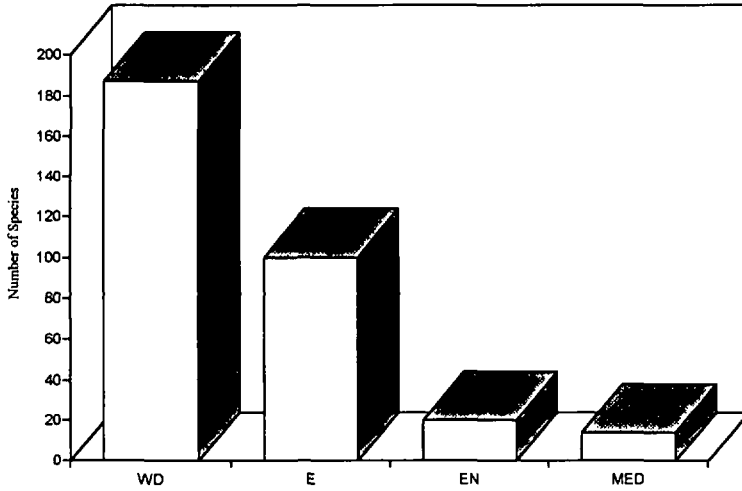


Fig. 4: Main chorological types in the spider fauna of Pirin Mt.: WD species with wide distribution; E European complex; EN endemic species; MED mediterranean species.

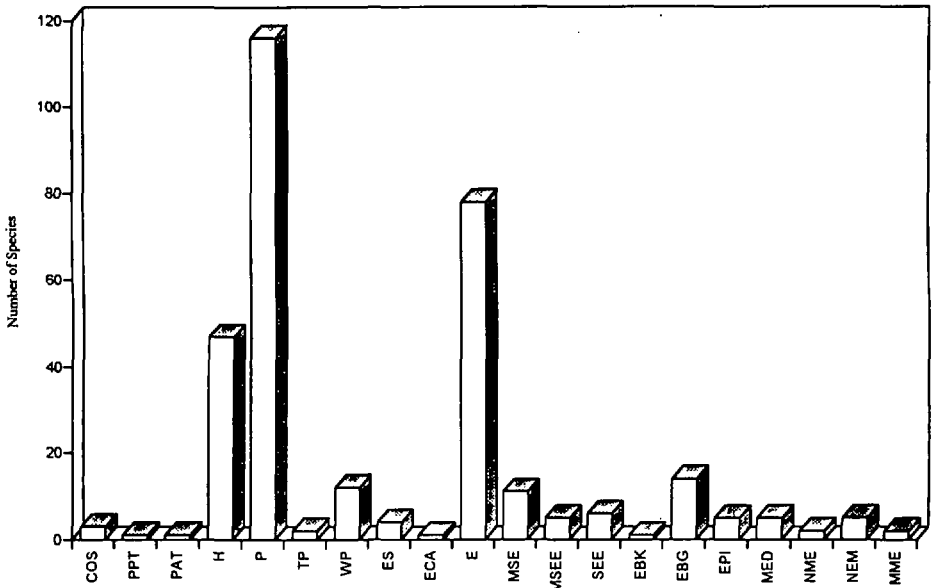


Fig. 5: Zoogeographical types in the spider fauna of Pirin Mt.: COS cosmopolitan; PPT palaeartic/palaeotropical; PAT palaeartic-aftropical; H Holarctic; P Palaeartic; TP Trans-palaeartic; WP West palaeartic; ES Eurosiberian; ECA Euro-centroasian; E European; MSE Middle-south european; MSEE Middle-south-east european; SEE Southeast european; EBK endemic in Balkan peninsula; EBG endemic in Bulgaria; EPI endemic to Pirin mt.; MED Mediterranean; NME North mediterranean; NEM Northeast mediterranean; MME Montane mediterranean.

*hyphantes rhodopensis* is striking, as this species occurs at high altitude and in caves (DELTSHEV 1990, 1995, 1996). Mediterranean species are *Robertus mediterraneus*, *Aculepeira talishia*, *Pardosa incerta*.

The other belts are represented by nearly equal numbers of species, Submediterranean 38 (1.8%), Submontane 33 (10.3%) and Alpine 35 (10.9%) (fig. 3). Most interesting is the species composition of this last belt, which includes mainly high altitude elements (fig. 3). There are European species, typical of high mountains in Central Europe, which do not occur below 2500 m (*Lepthyphantes improbulus*, *L. quadrimaculatus*, *Pardosa nigra* and *Xysticus bonneti*). Most characteristic are endemic high-mountain elements, *Lepthyphantes lithoclasticolus*, *Metopobactrus orbelicus*, known only from the alpine belt of Rila and Pirin, and *Diplocephalus altimontanus* and *Drepanotylus pirinicus* established only in the high alpine zone of Pirin. In this group also belong *Araeoncus clivifrons*, *Erigone pirini*, *Pardosa drenskii* and *Cryphoea pirini*, which occur in the subalpine and alpine belts of both mountains (DELTSHEV 1995). The holarctic species *Entelecara media* and *Mecynargus paetulus* are high-mountain elements, which can be regarded as ancient (arctic-alpine) species. Two mountain-mediterranean species can also be considered as ancient elements namely *Aculepeira talishia* and *Pardosa incerta*. In the alpine zone also occur *Meioneta rurestris*, *Haplodrassus signifer*, *Thanatus formicinus*, due to their aeronautic behaviour and protocratic nature (*H. signifer*; THALER 1988).

### 3.3. Zoogeographic analysis:

According to their distribution the 321 species can be classified in 19 zoogeographic categories, grouped into 5 complexes (fig. 4, 5).

Best represented is the complex of widely distributed species (cos + ppt + pat + h + p + tp + wp + es + aca, 187, 58.3%, inhabiting all belts, but most abundant in the forest zone (fig. 3). Palaearctic species s.l. are dominant (41.1%); followed by Holarctic (14.6%), Eurosiberian s.l. (2.6%) and Cosmopolitan species (1%). Mountain elements are a.o. *Achaearanea ohlerti*, *Bolyphantes luteolus*, *Lepthyphantes pinicola*, *Micaria aenea*, *M. romana*; true high mountain elements are *Entelecara media*, *Mecynargus paetulus*, *Theridion petraeum*. Some xenotopic species (THALER 1988) are widely distributed in the mountains and reach the highest summits as aeronauts. To this group belong *Meioneta rurestris*, *Erigone dentipalpis*, *E. vagans*, *Oedothorax apicatus*, *O. fuscus*, *Bathyphantes gracilis*, *Pardosa amentata*, *P. lugubris*, which inhabit the high mountain zone in dense populations (DELTSHEV 1990, 1995).

The European complex (e + mse + msee + see, 100, 31.15%) comprises widespread spiders in Europe and Bulgaria, inhabiting both lowlands and mountains. They are best represented in the forest and subalpine belts (fig. 3). Characteristic is the group of European mountain species, most of which are not found below the three-line. All species except *Araeoncus anguineus*, *Bolyphantes luteolus*, *Achaearanea ohlerti*, *Rugathodes bellicosus*, *Pardosa blanda*, *P. ferruginea*, *Philodromus vagulus* are considered as high mountain elements.

In the group of endemics (ebk + ebg + epi, 20, 6.2%) Bulgarian species are dominant. *Antrohyphantes rhodopensis*, *Coelotes jurinitschi*, *C. karlinskii*, *C. kulczynskii*, *Callobius balcanicus* and *Zodarion pirini* are present on most Bulgarian mountains. High Mountain elements are: *Araeoncus clivifrons*, *Diplocephalus altimontanus*, *Erigone pirini*, *Metopobactrus orbelicus*, *Drepanotylus pirinicus*, *Lepthyphantes lithoclasticolus*, *Pardosa drenskii*, *Cryphoea pirini*. Together with two local elements, *Diplocephalus altimontanus* and *Drepanotylus pirinicus*, they represent the basic part of the high altitude species complex in Bulgarian high mountains (DELTSHEV 1995, 1996). All endemics (except *Antrohyphantes rhodopensis*, *Cheiracantium macedonicum*) can be regarded as derivatives of their respective Holarctic, Palaearctic and European sister species. Speciation may have been achieved by disjunction of ranges during glacial periods. *Antrohyphantes rhodopensis* is closely related to the genus *Fageiella*, known only from caves in Bosnia



and Hercegovina. It may be a relic of the ancient mediterranean fauna (DELTSHEV 1990, 1995, 1996).

The Mediterranean species complex includes 14, 4.4 % of all spiders of Pirin mountain. The main part are species widely distributed in the Mediterranean region. Most interesting are two mountain-mediterranean species, *Aculepeira talishia* and *Pardosa incerta*, which may be regarded as ancient elements in the high mountain species complex, and *Robertus mediterraneus* and *Zelotes pr. olympi* as true mountain forms.

#### 4. Conclusion:

321 species have been found in total on Pirin mountain. They are best represented in the forest (montane coniferous belt 269, montane deciduous belt 232) and in the subalpine zone (101). In other belts spiders are present in roughly equal numbers (submediterranean 38, alpine 35, submontane 33). Most characteristic and interesting is the high mountain species complex, which comprises most of the endemics and ancient elements. Some are present also in the montane zone. Most of these can be regarded as neoendemics and derivatives of their respective Holarctic, Palaearctic and European sister species. A few species may be remnants of the ancient mediterranean mountain fauna. This can be regarded as a result of the isolation of Pirin mt. from the zonal areas. Therefore Pirin mountain can be considered as a possible centre of speciation.

The composition of the fauna shows for the Pirin mountain spider fauna a Palaearctic and mainly European character. Endemic species emphasise its local character. The high percentage (6.2) of endemic species suggests an important process of autogenesis.

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