Ber. nat.-med. Verein Innsbruck	Band 84	S. 269 – 286	Innsbruck, Okt. 1997

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, Titanoecidae 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 devided 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 screes, 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 Palaearctic Palaeotropical; PAT Palaearctic Afrotropical; H Holarctic; P Palaearctic; TP Trans-palaearctic; WP West Palaearctic; 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.

The present investigation was supported by Project B-318, National Fund Scientific Investigations.

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
Atypidae													
Atypus piceus (SULZER)	−	+	−	+	−	−	−	−	+	+	−	−	MSE
Scytodidae													
Scytodes thoracica (LATREILLE)	−	+	−	+	−	−	−	−	+	+	−	−	H
Pholcidae													
Holocnemus pluchei (SCOPOLI)	−	+	−	−	−	−	−	−	+	+	−	−	MED
Pholcus opilionoides (SCHRANK)	−	+	+	+	−	−	+	+	+	+	−	−	H
Segestriidae													
Segestria senoculata (LINNAEUS)	−	+	−	+	+	−	−	−	+	+	+	−	P
Dysderidae													
Dysdera erythrina (WALCKENAER)	−	+	−	+	−	−	−	−	+	+	−	−	MSE

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

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

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

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

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

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

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

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

Taxa	N1	N2	N3	N4	M	S	I	II	III	IV	V	VI	ZOOG
Euophrys aequipes (O.P.-CAMBRIDGE)	−	+	−	+	−	−	−	−	+	+	−	−	P
E. frontalis (WALCKENAER)	−	+	−	+	−	−	−	−	+	+	−	−	P
E. herbigrada (SIMON)	−	−	+	−	−	−	−	+	+	+	−	−	E
E. obsoleta (SIMON)	−	−	+	−	−	−	+	+	+	+	−	−	P
E. petrensis L. KOCH	−	+	−	+	−	−	−	−	+	+	−	−	E
Evarcha flammata (CLERCK)	−	+	−	+	−	−	−	−	+	+	−	−	H
E. laetabunda (C.L. KOCH)	−	−	−	+	−	+	−	−	+	+	−	−	P
Heliophanus aeneus (HAHN)	−	+	−	+	−	−	−	−	+	+	−	−	P
H. auratus C.L. KOCH	−	+	−	+	−	−	−	−	+	+	−	−	P
H. cupreus WALCKENAER	−	+	+	+	−	−	−	−	+	+	+	−	P
H. dubius C.L. KOCH	−	+	−	+	−	−	−	−	+	+	−	−	P
H. flavipes HAHN	−	+	−	+	−	−	−	−	+	+	−	−	P
H. patagiatus THORELL	−	+	−	+	−	−	−	−	+	+	−	−	P
Marpissa muscosa (CLERCK)	−	+	−	+	−	−	−	−	+	+	−	−	P
Pellenes tripunctatus (WALCKENAER)	−	+	−	+	−	−	−	−	+	+	−	−	P
Phlegra fasciata (HAHN)	−	+	−	+	−	−	−	−	+	+	−	−	P
Pseudicius encarpatus (WALCKENAER)	−	+	−	+	−	−	−	−	+	+	−	−	E
Salticus cingulatus (PANZER)	−	+	−	+	−	−	−	−	+	+	−	−	P
S. scenicus (CLERCK)	−	+	−	+	−	−	−	−	+	+	−	−	H
Sitticus floricola (C.L. KOCH)	−	+	−	+	−	−	−	−	+	+	+	−	P
S. pubescens (FABRICIUS)	−	+	−	+	−	−	−	−	+	+	−	−	H
S. zimmermanni (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, Titanoecidae 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, THALER1980), 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.

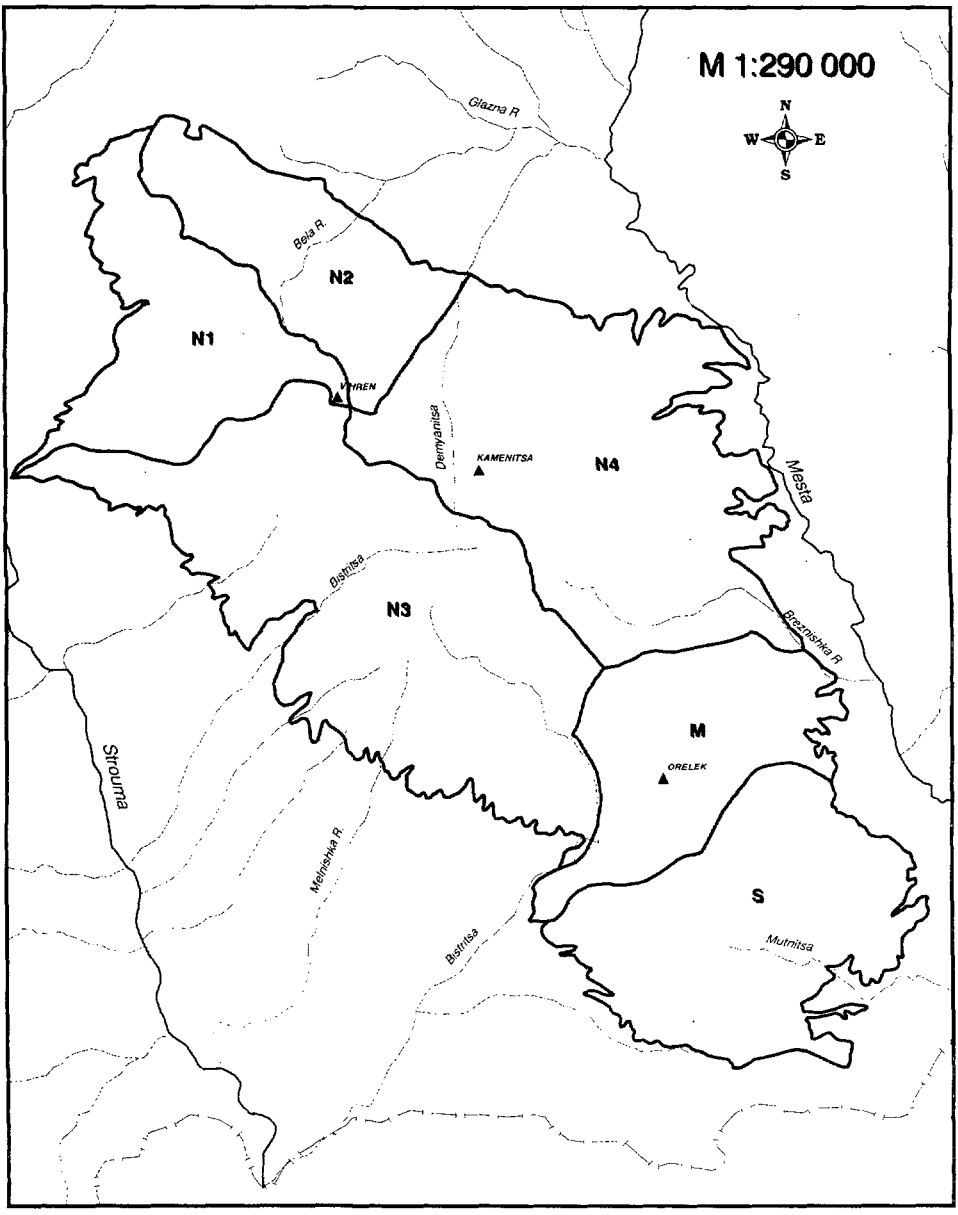

Fig. 1: Geographic subdivision of Pirin mt.

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.

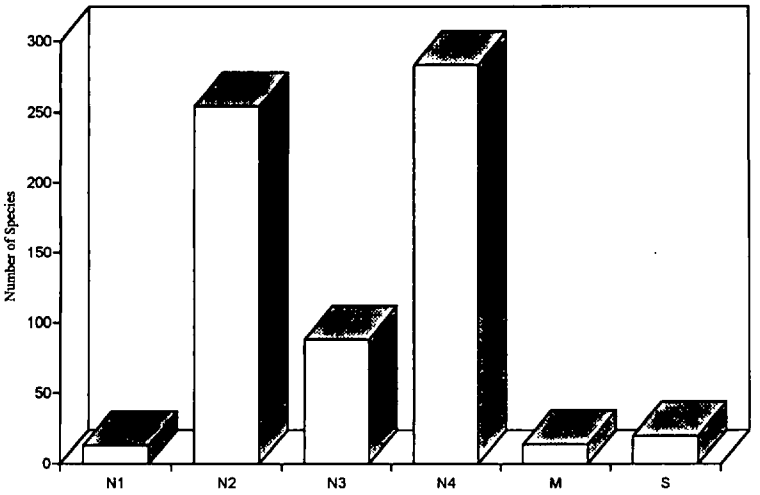

Fig. 2: Numbers of spider species in geographic subdivisions of Pirin mt., see fig. 1.

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" = Achaearanea 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, *Achaearanea 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 *Araeoncus anguineus, Cinetata gradata, Gonatium 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 distributes species. But some mountain elements (*Achaearanea ohlerti, Bolyphantes luteolus*) characteristic of the subalpine belt have not been found. The situation with European species is similar, though *Areaoncus anguineus, Cinetata gradata* and *Gonatium 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 *Achaearanea ohlerti, Ceratinella brevis, Boly-*

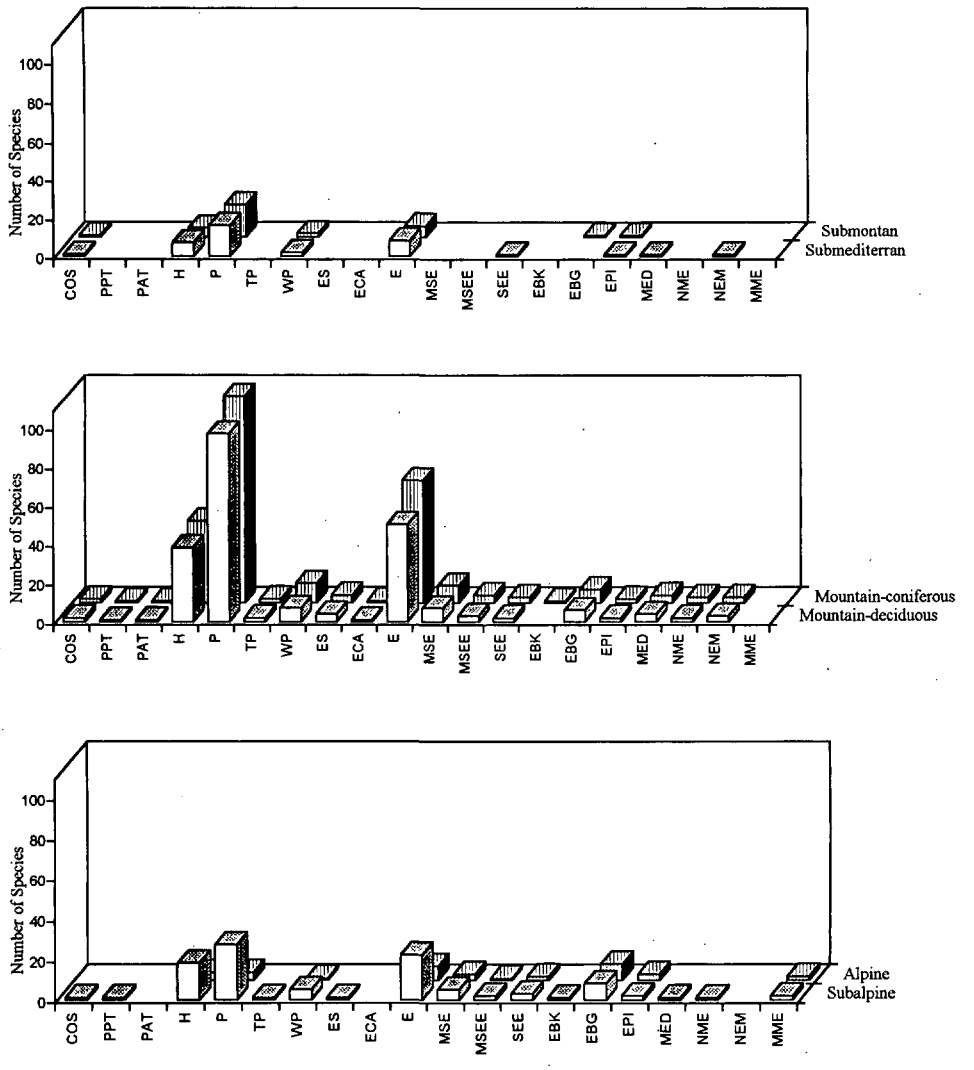

Fig. 3: Zoogeographical categories of spiders in altitudinal belts of Pirin mt. Explanation see fig. 5.

phantes luteolus, Meioneta gulosa, and high altitude elements, such as *Theridion petraeum, Evansia 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 (*Araeoncus clivifrons, Erigone pirini, Pardosa drenskii, Cryphoeca pirini*). The distribution of *Anthro-*

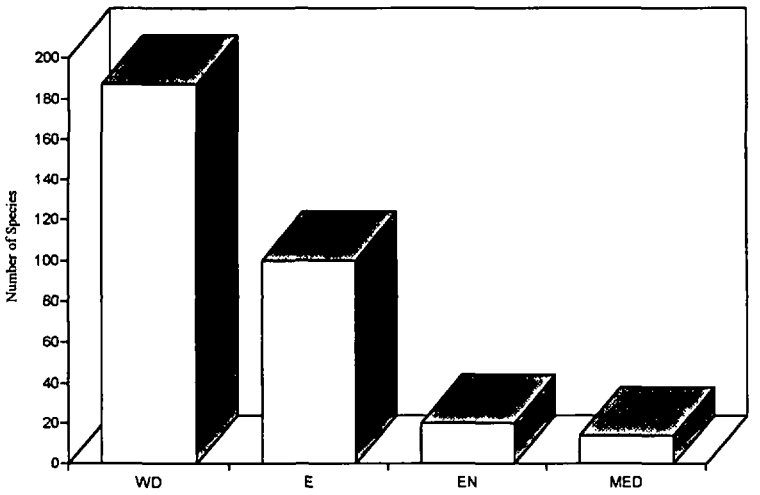

Fig. 4: Main chorological types in the spider fauna of Pirin Mt.: WD species with wide distribution; E European complex; EN endemic species; MED mediterranean species.

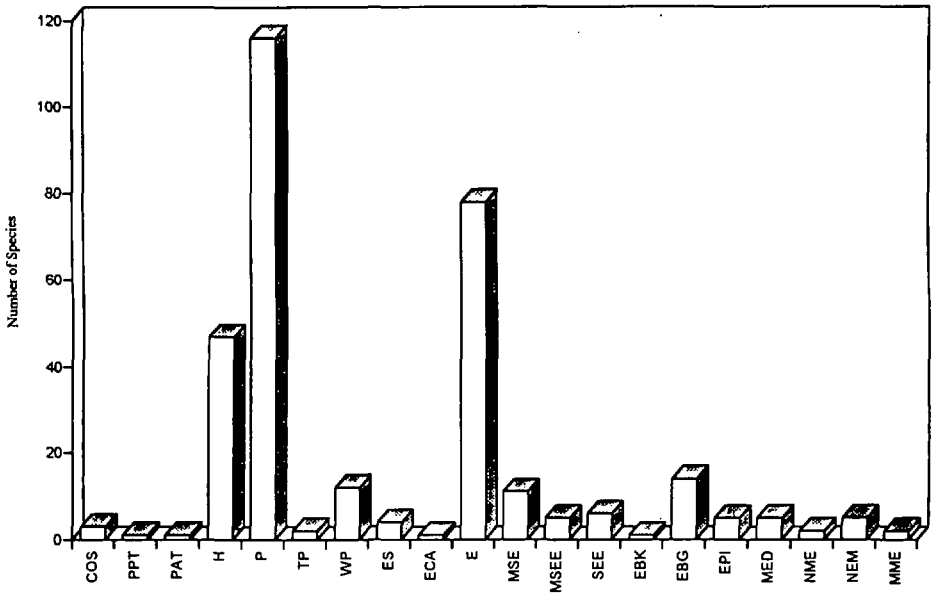

Fig. 5: Zoogeographical types in the spider fauna of Pirin Mt.: COS cosmopolitan; PPT palaearctic/palaeotropical; PAT palaearctic-afrotropical; H Holarctic; P Palaearctic; TP Trans-palaearctic; WP West palaearctic; ES Eurosiberian; ECA Euro-centroasian; E European; MSE Middle-south european; MSEE Middle-south-east 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, with 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 lithoclasicolus, 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 *Cryphoeca 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 b e l o w 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 lithoclasicolus, Pardosa drenskii, Cryphoeca 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.

Acknowledgements: We are expecially indebted to Dr. K. Thaler and Dr. K.-H. Steinberger (Innsbruck) for discussion. Many thanks to our colleagues Dr. S. Andreev, Dr. P. Beron, Dr. V. Gueorguiev and Dr. Z. Hubenov for their assistance in collecting the material. My best thanks go to Dr. P. Merrett for linguistic improvement.

5. Literature:

BONDEV, I. (1991): [The vegetation of Bulgaria]. – St. Kl. Ochridski University Press, Sofia: 1 - 184.

BUCHAR, J. (1968): Zur Lycosidenfauna Bulgariens (Arachn., Araneae). – Vest. Cs. spol. zool. **32:** 116 - 130.

DELTSHEV, C. (1980): On the high altitude spiders (Araneae) in Bulgaria. – Proc. 8th Int. Congr. Arachn. Vienna: 405 - 409.

– (1983a): A contribution to the taxonomical study of *sylvaticus* group of genus *Centromerus* F. Dahl (Araneae, Linyphiidae) in Bulgaria. – Acta zool. bulg. **21:** 53 - 58.

– (1983b): Notes on spiders of genus *Erigone* Audouin (Araneae, Erigonidae) in Bulgaria. – Acta zool. bulg. **22:** 71 - 76.

– (1983c): A contribution to the taxonomical and faunistical study of genus *Lepthyphantes* Menge (Araneae, Linyphiidae) from Pirin Mountain. – Acta zool. bulg. **23:** 25 - 32.

– (1984): A new *Diplocephalus* species from the Bulgarian mountains (Arachnida, Araneae, Erigonidae). – Reichenbachia **22:** 91 - 93.

– (1985): A contribution to the study of the family Erigonidae (Araneae) from Pirin Mountain, with description of a new species *Metopobactrus orbelicus* n.sp. – Bull. Br. arachn. Soc. **6:** 359 - 366.

– (1987a): A critical review of genus *Zodarion* in Bulgaria. – Acta zool. bulg. **33:** 18 - 26.

– (1987b): A critical review of genus *Araeoncus* Simon (Araneae) in Bulgaria with a description of a new species. – Reichenbachia **25:** 97 - 102.

– (1988a): [Review of the species from the Family Lycosidae (Araneae) from Pirin Mountain]. – In: Fauna Southwestern Bulgaria 2, Bulg. Acad. Sci., Sofia: 170 - 176.

– (1988b): A contribution to the study of genus *Lepthyphantes* Menge (Araneae, Linyphiidae) from Pirin Mountain with a description of a new species (*Lepthyphantes rectilamellus* sp.n.). – Acta zool. bulg. **36:** 52 - 56.

– (1990): The high-altitude spiders (Arancae) in the Pirin Mountain, Bulgaria. – Acta Zool. Fenn. **190:** 111 - 115.

DELTSHEV, C. (1992b): *Drepanotylus pirinicus* n.sp. from Pirin Mountain (Bulgaria) with comparative remarks on the other species of the genus (Arachnida, Araneae, Linyphiidae). – Ber. nat.-med. Verein Innsbruck **79:** 173 - 176.

– (1993): The genus *Tegenaria* Latreille in Bulgaria: A critical review with description of two sibling species (Arachnida, Araneae: Agelenidae). – Ber. nat.-med. Verein Innsbruck **80:** 167 - 174.

– (1995b): Spiders (Araneae) from the high altitude zone of Rila Mountain, Bulgaria. – Ber. nat.-med. Verein Innsbruck **82:** 217 - 225.

– (1996): The origin, formation and zoogeography of Endemic Spiders (Araneae) of Bulgaria. – Rev. suisse Zoologie, vol. hors serie: 141 - 151.

DRENSKY, P. (1921): [Contribution a l'etude des araignees de la Macedonie orientale et de la Pirine planina]. – Bull. Bulg. Acad. Sci. **23:** 1 - 80.

– (1936): Katalog der echten Spinnen (Araneae) der Balkanhalbinsel. – Sborn. Bulg. Akad. Nauk. **32:** 1 - 223.

GUEORGUIEV, V. (1978): The problems of zoogeographic subdivision of Bulgaria. – Acta zool. bulg. **11:** 41 - 48.

KLEBELSBERG, R. von (1949): Handbuch der Gletscherkunde und Glacialgeologie. – Springer-Verlag, Wien: 730 - 779.

KULCZYNSKI, K. (1903): Arachnoidea in Asia Minore et ad Costantinopolium a Dre. F. Werner collecta. – Sitz.-ber. k. Akad. Wiss. Wien, mat.-naturw. Kl. **112:** 627 - 680.

LOUIS, H. (1930): Morfologische Studien in Südwest-Bulgarien. – Geogr. Abh. **III** 2.

MAURER, R. & A. HÄNGGI (1990): Katalog der Schweizerischen Spinnen. – Doc. Faun. Helvetiae **12:** without page numbers.

PLATNICK, N. (1993): Advances in Spider Taxonomy 1988 - 1991. With Synonymics and Transfers 1940 - 1980. – New York Entom. Soc., American Mus. Nat. History: 1 - 846.

TANASEVITCH, A. (1990): The spiders of family Linyphiidae in the fauna of Caucasus. – In: Fauna nazemnih bespozvonochnih Kavkaza, Nauka, Moskva: 5 - 114.

THALER, K. (1980): Die Spinnenfauna der Alpen: ein zoogeographischer Versuch. Verh. 8. – Int. Kongr. Arachnologie Wien 1980: 389 - 404.

– (1988): Arealformen in der nivalen Spinnenfauna der Ostalpen (Arachnida: Araneae). – Zool. Anz. **220:** 233 - 244.

TISHKOV, C. (1982): Climatic regions, subregions and districts. – In: Geography of Bulgaria 1, Bulg. Acad. Sci., Sofia: 472 - 477.