

## Spiders (Araneae) from the Panský diel (Starohorské vrchy Mts, Slovakia)

Valerián Franc & Stanislav Korenko

**Abstract:** Spiders were collected at the massif 'Panský diel' near the city of Banská Bystrica (Central Slovakia). We recorded 252 spider species for the territory and one new species for Slovakia. Although the summit reaches an altitude of 1.100 m a.s.l., more or less thermophilous species apparently prevail here, especially at lower moderate sites. On the other hand, only several typical oreophilous species were documented. Many recorded species are scarce or even very rare. This indicates the very high value of this territory from both a genetic and an environmental perspective.

**Key words:** biomonitoring, faunistics, new record, NATURA 2000, Starohorské vrchy Mts

Banská Bystrica is a regional capital situated directly in the centre of Slovakia among mountainous terrain. Detailed research on spiders of this region was carried out by Svatoň in the 1970s, especially on the Urpín hill situated adjacent to the suburban area (SVATOŇ 1985). The author mentioned many rare, largely thermophilous spider species, including several new records for the Slovakian fauna. The spider fauna of the rest of this territory including the Panský diel Mt is, however, almost unknown. Our major study area belongs to the network of protected sites of the European Union member states – NATURA 2000 (Council Directive 92/43/EEC) and is noted in the 'List of sites of Community Importance' (Regulation of Ministry of environment SR No. 3/2004-5.1). The final NATURA 2000 network of sites covers the most valuable areas and investigation of their spider faunas should be included in future ecological assessments. Therefore we aimed to fill this gap in the data and to improve our knowledge of spiders within this heterogeneous and remarkable territory.

### Material and Methods

Arachnological research in the massif of the Panský diel Mt, including the border suburban area of the Banská Bystrica city, was carried out during

2003–2005. We applied several collecting methods, especially sifting detritus, sweeping the spiders from vegetation and hand-collecting under stones, etc. Material was identified according to MILLER (1971), HEIMER & NENTWIG (1991), ROBERTS (1995) and LOKSA (1969, 1972). The difficult genus *Dysdera* was identified according to ŘEZÁČ et al. (2007) and the genus *Eresus* according to ŘEZÁČ et al. (2008). The genus *Sibianor* was identified according to LOGUNOV (2001). Nomenclature follows PLATNICK (2008).

The limestone massif of Panský diel is more or less horseshoe-shaped. The left, western branch is a ridge of the Baranovo Mt, while the right, eastern branch is a prominent peak of the Panský diel Mt itself. A south ridge is of the Hrádok Mt. The Sásovská valley is enclosed between these two branches. Research was carried out almost in the whole area, but focussed on the following five main sites (abbreviations are also used in the text and in Tab. 1):

**JSS** – Jakub Study Site: xerothermic grasslands, pastures and shrubby slopes with altitudes between 400–500 m a.s.l. This study site include the protected site 'Jakub' belonging to a large protected area of Low Tatras National Park (48° 45' 51" N, 19° 08' 40" E).

**B** – Baranovo, a steep prevailingly wooded area of older to ancient deciduous forests (beech, oak, hornbeam; maple and lime trees on the rocky places) with altitudes between 500–700 m a.s.l. The nature reserve 'Baranovo' was established in 1993 in the rocky branch valley approximately in the middle of the SW slope (48° 46' 48" N, 19° 08' 15" E). Unfortunately, the greater part of this area is outside the protected territory. A remarkable habitat of forest

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stream and a marsh with moss pillows occurs locally between JSS and the Baranovo Nature Reserve.

**Pd** – Panský diel, the highest part of the examined territory with an altitude of 1,100 m a.s.l. (48° 47' 55" N, 19° 08' 55" E). Habitats: mountain beech and mixed forests with spruce and fir, mesophilous and semi-xerophilous meadows.

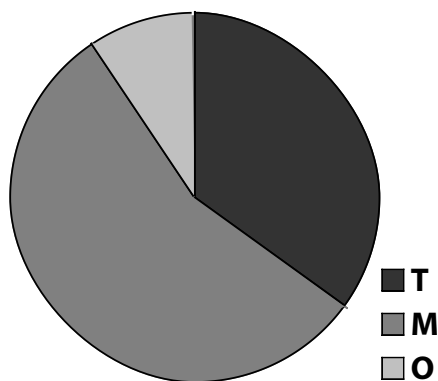
**Sv** – Sásovská valley with an altitudes between 400–950 m a. s. l. Habitats: shady deciduous forests, littoral zone of a brook, xerothermic grasslands and pastures in the lower altitudes and suburban environments (48° 46' 50" N, 19° 09' 24" E).

**ŠD** – Špania Dolina with an altitude of 710 m a.s.l. An old mountain mining village on the NW slopes of the Panský diel Mt. Habitats: mountain beech and mixed forests and meadows. The vegetation along the forest roads and ski tracks are locally ruderalised. A very remarkable habitat of forest marsh is situated close to the tourist path below the Šachtička saddle (48° 48' 12" N, 19° 08' 39" E). This site is only small and currently threatened by eutrophic succession.

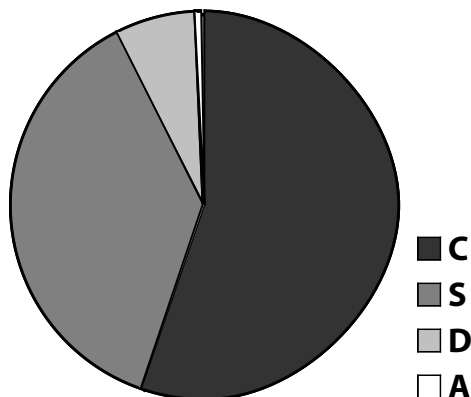
## Results

There were 252 spider species collected in the studied territory and one species, *Sibianor tantulus* was recorded for the first time from Slovakia. Although it is a mountain area, predominantly covered by forest and reaching 1,100 m a.s.l., thermophilous species made up nearly 35%, while oreophilous species were represented by less than 10% (Fig. 1). Mesophilous species from temperate environments were quite prevalent (more than 55%). Rare or even very rare species of xerothermic grasslands and forest steppes included: *Eresus moravicus*, *Ero tuberculata*, *Dipoena coracina*, *Euryopsis quinqueguttata*, *Lasaeola prona*, *Phycosoma inornatum*, *Nematogmus sanguinolentus*, *Cyclosa oculata*, *Cheiracanthium oncognathum*, *Phrurolithus minimus*, *Kishidaia conspicua*, *Micaria subopaca*, *Poecilochroa variana*, *Ozyptila pullata*, *Xysticus ninnii*, *Pellenes tripunctatus*, etc. The species of temperate or colder submountain forests included *Evansia merens*, a rare myrmecophilous species, as well as, *Robertus neglectus*, *Acantholycosa lignaria*, *Coelotes atropos*, *Xysticus gallicus* and *Sitticus rupicola*.

Species from well-preserved or merely little-disturbed (semi-natural) habitats are highly prevalent (92%) (Fig. 2.) and indicate the satisfactory state of habitat conservation in this territory, and the Starohorské vrchy Mts generally.



**Fig. 1:** Spider faunal composition according to thermo-preference. T – thermophilous species (88 spp., 35%), M – mesophilous species (140 spp., 55%), O – oreophilous species (24 spp., 10%).



**Fig. 2:** Spider faunal composition according to well-preserved habitat stage. C – climax species (139 spp., 55%), S – seminatural species (94 spp., 37%), D – species of disturbed habitats (17 spp., 7%), A – species of artificial habitats (2 spp., 1%).

A systematic list of the recorded spiders is shown in Tab. 1. A brief evaluation of their thermo-preference and originality of habitat, based on the Catalogue of Spiders of the Czech Republic (BUCHAR & RŮŽIČKA 2002) is also included. Finally, their vulnerability (V) in Slovakia (GAJDOŠ & SVATOŇ 2001) and the Czech Republic (RŮŽIČKA 2005) is listed. The following species (marked by '►' in Tab. 1) deserve special mention:

►1 *Ero tuberculata* – JSS, in the lower vegetation near to a path April 1, 2005, ♀. A species occurring sporadically in warmer habitats. ►2 *Eresus moravicus* – JSS, running on the soil surface May 7, 2003, ♂. (rev. M. Řezáč). ►3 *Dipoena coracina* – JSS, swept from vegetation on a xerothermic shrubby slope May 1, 2005, ♂ + 3 ♀ (rev. J. Svatoň). A rare species from xerothermic habitats known from only a few records (GAJDOŠ et al. 1999). ►4 *Euryopis quinqueguttata* – JSS, May 1, 2005, ♀. A rare species of well-preserved warm habitats, known only from a few records (GAJDOŠ et al. 1999). ►5 *Lasaeola prona* – JSS, habitat as for *D. coracina*, July 3, 2005, ♂. ►6 *Phycosoma inornatum* – JSS, habitat as for *D. coracina*, April 9, 2004, ♂ (Rev. P. Gajdoš). A very rare species, known only from a few old records from East Slovakia (Chyzer & Kulczyński lgt.); and recently from the Zvolenská basin (GAJDOŠ et al. 1999). ►7 *Robertus neglectus* – JSS, sieved from the leaf litter in the open forest edge June 21, 2005, ♂. ►8 *Theridion nigrovariegatum* – JSS, beaten from the branches on a shrubby slope June 21, 2005, 2 ♂ + ♀. Locally quite abundant in warm habitats. ►9 *Centromerus cavernarum* – JSS, among debris in the shady little forest ravine April 16, 2005, ♀. ►10 *Ceratinella major* – B, sieved from the leaf litter of an older beech forest May 14, 2005, ♂ + ♀. This species, formerly considered to be very rare (MILLER 1971), is nowadays known from numerous places, but nevertheless indicates well-preserved environments. ►11 *Diplocephalus helleri* – B, in the wet moss on the forest marsh June 26, 2005 ♀, July 13, 2005 ♂ and October 18, 2005, 2 ♂. A very localised and rare species of wet mountain habitats. Several recent records from mountain regions of Slovakia are available (GAJDOŠ et al. 1999). ►12 *Evansia merens* – Pd, in a colony of *Formica lemami* under the rotten log September 3, 2005, ♀. A disjunct and little-known species. Although it is usually ranked among very rare spiders, under favourable conditions it may be found quite often: Veľká Fatra Mts – Kozia skala Mt, July 12, 2001 ♀, Kremnické vrchy Mts – Skalka Mt, May 17, 2002, 2 ♀, Muránska planina Mts – Veľká Stožka Mt, August 4, 2003, ♀; all records V. Franc leg.; and Poľana Mts – Žiarc Mt, July 24, 2005, ♂ + ♀, V. Franc & M. Mardiaková leg. This species is apparently myrmecophilous. It is cited from ant colonies of *Manica rubida*, *Formica fusca* and *Formica sanguinea* (MILLER 1971, BUCAR & RŮŽIČKA 2002); OBENBERGER (1949) stated only *Formica fusca*. In fact, it strongly prefers the host-ant *For-*

*mica lemami*, formerly considered to be a subspecies of *Formica fusca*. However, *Formica fusca* itself occurs in warmer habitats of lower altitudes (often xerothermic), while *Formica lemami* occurs in mountain regions (BONDROIT 1917). ►13 *Gongylidiellum vivum* – ŠD, in the wet leaf litter on a little forest marsh below the Šachtička saddle September 3, 2005, ♀ (Rev. J. Svatoň). A very rare species, known only from a few scattered records: MILLER (1974) mentioned the Vysoké Tatry Mts, in the wet moss of mountain forests; the further records are from the Západné Tatry Mts – Jalovecká valley (GAJDOŠ 1994); unpublished records are available from the Kysucká vrchovina Mts and the 'Považské podolie' river basin (GAJDOŠ et al. 1999). The most recent records are from Danubian alluvial forests (GAJDOŠ 1995), from the surroundings of Trenčín city in alluvial forest (GAJDOŠ 2005a) and wood spring in the eastern part of the Kozie chrby Mts (KORENKO 2007). ►14 *Hilaira excisa* – ŠD, habitat as *G. vivum* July 4, 2005, ♂ + ♀. It occurs locally and rarely in wet habitats of higher altitudes. Only a handful of records are available: Vysoké Tatry Mts, Žilinská kotlina basin, Liptovská kotlina basin ('Švihrovské' peat bog), Popradská kotlina basin and Kremnické vrchy (GAJDOŠ et al. 1999). Recent records were published from 'Udavská slatina' fen, autumn 1998 and autumn 2000, 3 ♂ + 4 ♀ (SVATOŇ et al. 2003) and wood spring in the eastern part of Kozie chrby Mts (KORENKO 2007). ►15 *Hypomma cornutum* – JSS, May 14, 2005 ♂, and B, June 14, 2005 ♂. A rare species, living in semi-wet debris of well-preserved habitats. Approximately one half of all records are old – late 19<sup>th</sup> century (GAJDOŠ et al. 1999). ►16 *Ipa keyserlingi* – JSS, collected and observed several times April 16, May 1, July 4, 2005, and quite late: October 18, 2005. It is a locally abundant species, occurring in well-preserved warmer habitats only. ►17 *Nematogmus sanguinolentus* – JSS, sieved from the leaf litter of a xerothermic shrubby slope, May 14, 2005, 3 ♂. It occurs very locally and rarely, exclusively in warm regions of Central Europe. Only a few isolated records have been published: the Urpín hill close to the Banská Bystrica city, 1970s (SVATOŇ 1985); Devínska Kobyla hill (GAJDOŠ 2005b), Bratislava – Petržalka: Ovsište (GAJDOŠ et al. 1992); unpublished records are available from the Hornonitrianska basin and the Považské podolie river basin (GAJDOŠ et al. 1999). Note that a present occurrence in Urpín is unlikely, because the xerothermic character of this locality has been totally

altered by the pine forestation. ►**18** *Oedothorax gibbifer* – Pd, in the wet moss and leaf litter on a little forest marsh September 3, 2005, ♂. A relatively rare species of wet habitats. ►**19** *Peponocranium orbiculatum* – B, same habitat as *O. gibbifer*, May 4, 2004, ♀ (det. J. Svatoň); third record for Slovakia. A rare and little-known species (BUCHAR & RŮŽIČKA 2002). The specimen was collected in detritus close to forest marsh with dominant moss pillows. Only a general record from Podunajská lowland has been cited (GAJDOŠ et al. 1999), which probably concerns older finding somewhere in Danubian alluvial forests; and the last record in SVATOŇ (2002) comes from the 'Mútňanská Píla' peat bog, spring 2002 (pitfall traps), 2 ♀. ►**20** *Tapinocyba pallens* – B, in the leaf litter of an open deciduous forest, May 1, 2005, ♂. Only the following published records are available: nickel leach dumps near the Sereď town, 1993 – 1995 (long-termed pitfall traps) (KRAJČA & KRUMPÁLOVÁ 1998); the Snina town – Pod Kamennou hill, November 10, 1999, 3 ♂ (THOMKA 2003); the Bzaná Nature Reserve, autumn 1999 – spring 2000 (pitfall traps), ♂; the Hlboké Nature Reserve, autumn 1999 – spring 2000 (pitfall traps), ♂; a fen in the valley of the Stuzica river, spring – autumn 2002 (pitfall traps), ♂ (SVATOŇ et al. 2003). A little known, tiny spider which is probably often confused (or misidentified) with relatives. It seems not to be abundant anywhere. ►**21** *Araneus angulatus* – JSS, in the web among the branches of a hawthorn May 25, 2005, 3 ♂ and April 10, 2005, 2 juvenile ♀. ►**22** *Aranella inconspicua* – B, June 21, 2005, ♂. ►**23** *Argiope bruennichi* – JSS, swept from the vegetation July 3, 2005, ♂ and July 4, 2005, juvenile ♀. A highly conspicuous spider that was formerly considered rare (MILLER 1971), but now seems rather widely distributed. ►**24** *Cyclosa oculata* – JSS, swept from the xerothermic vegetation June 21, 2005, ♂ and May 1, 2005, juvenile ♀. A quite rare species of warmer habitats. It seems its population is slightly increasing in recent years. ►**25** *Acantholycosa lignaria* – Pd, on the log along the forest road July 3, 2005, ♀. It occurs sporadically, but sometimes often in open older forests of higher altitudes. In several Red Lists it is ranked among the currently threatened species. ►**26** *Arctosa maculata* – ŠD, among the gravel and detritus close to the Banský brook, August 17, 2007, ♂. A rare species of the well-preserved bank zone of water streams. ►**27** *Coelotes atropos* – an abundant and wide-spread spider in the forests and ecotones

in the whole examined territory. It contrasts markedly with the note of MILLER (1971) "occurs very rarely in mountain and submountain forests under stones and timber". Its population has apparently been increasing during the last two decades. ►**28** *Cheiracanthium oncognathum* – JSS, swept from vegetation May 16, 2005, ♂. A very rare species known only from a few newer records: Súľovské skaly Nature Reserve, dateless (pitfall traps) ♀ (MILLER & SVATOŇ 1974); Nová Sedlica village – Sinkuska, June 13, 1999, 2 ♀, (SVATOŇ et al. 2003); Dolné Vestenice village, swept from vegetation of a xerothermic karst slope May 18, 2002, ♂ + 2 ♀ (FRANC 2004); an unpublished record comes from the Zemplínske vrchy Mts (GAJDOŠ et al. 1999). ►**29** *Clubiona corticalis* – B, under the bark of a sycamore (*Acer pseudoplatanus*) May 1, 2005, 2 ♀. A less abundant species of older deciduous forests. ►**30** *Phrurolithus minimus* – JSS, in the leaf litter of a xerothermic slope June 22, 2004, ♂. A relatively rare species of warm habitats. ►**31** *Gnaphosa lucifuga* – JSS, under stones on a xerothermic karst slope April 16, 2005, ♂; July 4 and October 4, 2005, 2 ♀. Quite an abundant species, but in the well-preserved warm habitats only. ►**32** *Kishidaia conspicua* – JSS, in the leaf litter of a shrubby ecotone wood April 16, 2005, juvenile ♀. A rare and sporadic species known from several (about 12) sites from southern regions of Slovakia. ►**33** *Micaria subopaca* – JSS, on the bark of a solitary lime May 14, 2005, ♂. A very rare species, known from scattered records in well-preserved warmer regions. ►**34** *Poecilochroa variana* – JSS, running on the soil of a xerothermic karst slope June 21, 2005, ♂. A very rare species, known from only a few records: Devínska Kobyla Nature Reserve, June 4, 1978, ♂, the first record for the territory of Slovakia (GAJDOŠ et al. 1984); Slovenský kras Mts – Brzohôrka and Gombasek, dateless (SVATOŇ & MAJKUS 1988); Soví hrad Nature Reserve, April 22, 1995, juvenile ♂ and the surroundings of the Gemerské Dechtáre village, April 29, 1995, juvenile ♂ (FRANC & HANZELOVÁ 1995); Lackovce village: Veliká, summer – autumn 2001 (pitfall traps), 2 ♂ + ♀; Dlhé nad Cirochou village – foot of the Biely vrch Mt, autumn 1998 – summer 2000 (pitfall traps), 3 juvenile ♀ (THOMKA 2003). ►**35** *Philodromus albidus* – B, June 15, 2005, ♀. A little known and obviously quite rare species. ►**36** *Ozyptila pullata* – JSS, among gravel and leaf litter of a xerothermic slope April 16, 2005, ♀. A rare species of well-preserved warm sites. ►**37** *Xysticus gallicus* – B, swept

from vegetation on the forest edge June 14, 2005, ♂. A rare species, known from approximately 20 records mainly from higher altitudes. ▶**38** *Xysticus ninnii* – B, July 7, 2005, ♂ and JSS, July 4, 2005, ♂ + 3 ♀. A relatively rare species of warmer habitats. ▶**39** *Asianellus festivus* – JSS, April 16, 2005, ♀. A scattered and scarce species of warmer habitats. ▶**40** *Pseudicius encarpatus* – JSS, May 14, 2005, 1 ♂ and

May 24, 2005, 1 ♂. A scarcer species of warm open forests, especially occurring on tree branches. ▶**41** *Sibianor tantulus* – B, July 16, 2005, 1 ♂. New species for Slovakia. Species has a trans-palaearctic temperate range, from France to central Mongolia; in central Europe the species was previously collected only in Poland (LOGUNOV 2001) and in Germany (BLICK et al. 2004).

**Tab. 1:** Spiders of the Panský diel massif. **Sites:** JSS – Jakub Study Site, B – Baranovo hill, Pd – Panský diel hill, Sd – Sásovská valley, ŠD – Špania Dolina village and surroundings; 1/2 – one male and two females were collected, -/1j – one juvenile female, 1/- – one male was collected, but more individuals were registered and left, ▶ – detailed data are supplemented in the text. **Originality of habitat:** cl – climax, sn – semi-natural, di – disturbed, ar – artificial. **Thermo-preference:** T – thermophyticum, M – mesophyticum, O – oreophyticum; bold printing marks the preference, brackets mark exceptional records. **V (Vulnerability):** Sk – Slovak Republic, Cz – Czech Republic; **CR** – critically endangered, **EN** – endangered, **VU** – vulnerable, **DD** – data deficiency, **LR** – lower risk, **LC** – (lower risk) least concern, **NT** – (lower risk) near threatened.

Family / Species	Sites					Originality of habitat	Thermo-preference	V	
	JSS	B	Pd	Sd	ŠD			Sk	Cz
<b>Pholcidae</b>									
<i>Pholcus opilionoides</i>	2/+					cl, sn, ar	T (M)		
<b>Segestriidae</b>									
<i>Segestria senoculata</i>		1/-:		-/1:		cl, sn	(T) M (O)		
<b>Dysderidae</b>									
<i>Dysdera lantosquensis</i>	1/4					cl, sn	T (M)		
<i>Harpactea hombergi</i>	1/3:	1/+		-/2:		cl, sn	T M		
<i>Harpactea rubicunda</i>	2/3					cl, sn, ar	T M		
<b>Mimetidae</b>									
<i>Ero aphana</i>	-/2j					cl	T	LC	
<i>Ero furcata</i>		-/1				cl, sn	T M		
<i>Ero tuberculata</i> ▶ <sup>1</sup>	-/1					cl, sn	T	VU	VU
<b>Eresidae</b>									
<i>Eresus moravicus</i> ▶ <sup>2</sup>	1/-:					cl	T		
<b>Theridiidae</b>									
<i>Achearanea lunata</i>		-/1				cl, sn	(T) M		
<i>Achearanea riparia</i>				1/-		cl, sn	(T) M		
<i>Achearanea simulans</i>		-/1				sn	(T) M		
<i>Crustulina guttata</i>	2/6:			1/2:		cl, sn	T M		
<i>Dipoena coracina</i> ▶ <sup>3</sup>	1/3					cl	T	LC	EN
<i>Dipoena melanogaster</i>	7/8			2/1		cl, sn	T		
<i>Enoplognatha latimana</i>	1/-					sn, di	T M		
<i>Enoplognatha ovata</i>	6/2			1/2		cl, sn, di	T M		
<i>Enoplognatha thoracica</i>	-/1					cl, sn, di	T M		
<i>Episinus angulatus</i>	-/3			-/1		cl, sn	T M		
<i>Euryopis flavomaculata</i>	-/1			1/1		cl, sn	T M		
<i>Euryopis quinqueguttata</i> ▶ <sup>4</sup>	-/1					cl	T	VU	EN
<i>Keijia tincta</i>		3/-		1/-		cl, sn	T M		
<i>Lasaeola prona</i> ▶ <sup>5</sup>	1/-					cl	T	VU	EN
<i>Lasaeola tristis</i>	1/2					cl, sn	M		
<i>Neottiura bimaculata</i>	3/1	1/1		2/1		cl, sn, di	T M		
<i>Paidiscura pallens</i>		3/1				cl, sn	M		
<i>Pholcomma gibbum</i>		1/1	1/-			cl, sn	M		
<i>Phycosoma inornatum</i> ▶ <sup>6</sup>	1/-					cl	T (M)	EN	
<i>Robertus arundineti</i>	1/-					cl, sn, di	(T) M		
<i>Robertus lividus</i>	2/3	1/1	-/2	-/3	2/1	cl, sn	T M O		
<i>Robertus neglectus</i> ▶ <sup>7</sup>	1/-					cl, sn	(T) M	NT	
<i>Theridion impressum</i>	2/-			1/-		cl, sn, di	T M (O)		
<i>Theridion mystaceum</i>		1/4				cl, sn	M		

Family / Species	Sites					Originality of habitat	Thermo-preference	V	
	JSS	B	Pd	Sd	ŠD			Sk	Cz
<i>Theridion nigrovariegatum</i> ▶ <sup>8</sup>	2/1					cl, sn	T		
<i>Theridion pinastris</i>				-/1		cl, sn	T M		
<i>Theridion sisyphium</i>		3/1	2/-			cl, sn	M (O)		
<i>Theridion varians</i>	6/-			4/-		cl, sn, di	T M		
<b>Linyphiidae</b>									
<i>Anguliphantes angulipalpis</i>	-/2					cl, sn	T M		
<i>Asthenargus paganus</i>			1/3			cl, sn	M O	NT	
<i>Bathypantes nigrinus</i>				2/7	-/3	cl, sn	T M (O)		
<i>Centromerus cavernarum</i> ▶ <sup>9</sup>	-/1					cl	M		
<i>Centromerus incilium</i>	-/1					cl, sn	T M		
<i>Centromerus sellarius</i>			-/4			cl, sn	M (O)		
<i>Centromerus sylvaticus</i>		3/2				cl, sn, di	T M O		
<i>Ceratinella brevis</i>		2/5	-/4			cl, sn	M O		
<i>Ceratinella major</i> ▶ <sup>10</sup>		1/1				cl	T M		
<i>Ceratinella scabrosa</i>		-/2				cl, sn	M		
<i>Dicymbium tibiale</i>			9/5			cl	M O		
<i>Diplocephalus cristatus</i>	1/2					cl, sn, di	M (O)		
<i>Diplocephalus helleri</i> ▶ <sup>11</sup>		3/1				cl	M O	EN	
<i>Diplocephalus picinus</i>		3/2	2/1			cl, sn	T M O		
<i>Diplostyla concolor</i>		3/5	1/2	-/3		cl, sn	T M O		
<i>Drapetisca socialis</i>		-/5				cl, sn	M (O)		
<i>Entelecara acuminata</i>	2/2	2/1		1/-		cl, sn	M		
<i>Erigone atra</i>	2/-					cl, sn, di	T M O		
<i>Erigone dentipalpis</i>	2/1					cl, sn, di	T M O		
<i>Evansia merens</i> ▶ <sup>12</sup>			-/1			cl, sn	M O	VU	
<i>Frontinellina frutetorum</i>	1/2					cl	T		VU
<i>Gongylidiellum latebricola</i>		2/-				cl, sn	M (O)		
<i>Gongylidiellum vivum</i> ▶ <sup>13</sup>				-/1		cl, sn	M (O)	VU	
<i>Helophora insignis</i>		1/-				cl	M		
<i>Hilaira excisa</i> ▶ <sup>14</sup>				1/1		cl	M O	VU	
<i>Hypomma bituberculatum</i>		1/-				cl, sn	(T) M		
<i>Hypomma cornutum</i> ▶ <sup>15</sup>	2/-					cl, sn	(T) M	LC	
<i>Ipa keyserlingi</i> ▶ <sup>16</sup>	6/5					cl	T (M)		
<i>Kaestneria torrentum</i>				1/-	-/2	cl	M O		
<i>Labulla thoracica</i>		-/2				cl, sn	M O	NT	
<i>Linyphia hortensis</i>	2/5			-/3		cl, sn	(T) M		
<i>Linyphia triangularis</i>		2/7	1/2	-/2		cl, sn, di	T M		
<i>Mansuphantes mansuetus</i>		-/1				cl, sn, di	M		
<i>Maso sundevalli</i>		-/3				cl, sn	T M (O)		
<i>Meioneta rurestris</i>				2/4		cl, sn, di	T M O		
<i>Micrargus herbigradus</i>		1/3				cl, sn	(T) M O		
<i>Micrargus subaequalis</i>	1/-					cl, sn, (di)	T M		
<i>Microlinyphia pusilla</i>				-/1		cl, sn, di	T M (O)		
<i>Microneta viaria</i>		6/9	2/8	1/9	4/7	cl, sn	T M O		
<i>Minicia marginella</i>	1/2			-/2		cl, sn	T M		
<i>Nematogmus sanguinolentus</i> ▶ <sup>17</sup>	3/-					cl	T	VU	
<i>Neriere clathrata</i>				-/1		cl, sn	T M		
<i>Neriere emphana</i>		1/-				cl, sn	M		
<i>Neriere peltata</i>	1/8	1/4		-/6		cl, sn	M		
<i>Obscuriphantes obscurus</i>			1/-			cl	M O		
<i>Oedothorax agrestis</i>		1/8		1/4	-/8	cl, sn	M O		
<i>Oedothorax apicatus</i>	1/1			1/5		cl, sn, di	T M		
<i>Oedothorax gibbifer</i> ▶ <sup>18</sup>			1/-			cl	M		VU
<i>Oedothorax retusus</i>				-/1		cl, sn, di	(T) M		
<i>Ostearius melanopygius</i>				1/-		sn, di, ar	T M		
<i>Pallidiphantes pallidus</i>		-/1				cl, sn	T M		
<i>Pelecopsis elongata</i>		1/-				cl	M		
<i>Peponocranium orbiculatum</i> ▶ <sup>19</sup>		-/1				cl	M O	CR	
<i>Porrhomma convexum</i>			2/5			cl	M O		

Family / Species	Sites					Originality of habitat	Thermo-preference	V	
	JSS	B	Pd	Sd	ŠD			Sk	Cz
<i>Porrhomma microphthalmum</i>		-/1				cl, sn, di	T M		
<i>Stemonyphantes lineatus</i>	-/1					cl, sn, (di)	(T) M		
<i>Tapinocyba insecta</i>	-/1					cl, sn	(T) M		
<i>Tapinocyba pallens</i> ▶ <sup>20</sup>		1/-				cl, sn, di	(T) M O	DD	
<i>Tapinopa longidens</i>		-/1				cl, sn	M		
<i>Tenuiphantes alacris</i>			1/4			cl, sn	M O		
<i>Tenuiphantes cristatus</i>		1/1				cl, sn	M O		
<i>Tenuiphantes flavipes</i>		5/9		4/8		cl, sn	T M		
<i>Tenuiphantes mengei</i>		1/2	1/-			cl, sn	T M O		
<i>Tenuiphantes tenebricola</i>			-/4	-/2		cl, sn	M O		
<i>Thyreosthenius parasiticus</i>		-/1				cl, sn, di	M O		
<i>Tiso vagans</i>	1/2					cl, sn, (di)	M (O)		
<i>Trematocephalus cristatus</i>	3/2	1/1				cl, sn	(T) M		
<i>Walckenaeria acuminata</i>		1/1				cl, sn	M O	LC	
<i>Walckenaeria antica</i>		3/-		1/-		cl, sn	(T) M (O)		
<i>Walckenaeria corniculans</i>		-/1		-/1		cl, sn	M		
<i>Walckenaeria dysderoides</i>				-/1	-/1	cl, sn	(T) M		
<b>Tetragnathidae</b>									
<i>Meta menardi</i>			-/1:			cl, sn, ar	(T) M (O)		
<i>Metellina mengei</i>		4/2	2/1	-/3		cl, sn	T M O		
<i>Metellina merianae</i>		1/1	1/2			cl, sn, ar	T M O		
<i>Metellina segmentata</i>		1/2	1/-			cl, sn, di	T M O		
<i>Pachygnatha listeri</i>		2/-		1/-		cl, sn	(T) M		
<i>Tetragnatha montana</i>				1/2		cl, sn	(T) M		
<i>Tetragnatha obtusa</i>					-/2	cl, sn	M		
<i>Tetragnatha pinicola</i>	3/2:			3/1:		cl, sn	T M		
<b>Araneidae</b>									
<i>Aculepeira ceropegia</i>	-/1j					cl, sn, di	(T) M		
<i>Agalenatea redii</i>	1j/-					cl, sn	T M		
<i>Araneus angulatus</i> ▶ <sup>21</sup>	3/2j					cl, sn	T M		
<i>Araneus diadematus</i>	-/1:	1/-:		-/1:		cl, sn, di	T M O		
<i>Araneus quadratus</i>				-/1:		cl, sn	T M (O)		
<i>Araniella cucurbitina</i>	1/1	-/1				cl, sn, di	T M		
<i>Araniella inconspicua</i> ▶ <sup>22</sup>		1/1				cl, sn	M		
<i>Araniella opisthographa</i>	1/2			1/-		cl, sn	T M		
<i>Argiope bruennichi</i> ▶ <sup>23</sup>	1/1j					cl, sn, di	T M		
<i>Cyclosa conica</i>		3/4j				cl, sn	(T) M		
<i>Cyclosa oculata</i> ▶ <sup>24</sup>	1/1j					cl	T M		
<i>Gibbaranea bituberculata</i>	2/8	-/3				cl, sn	T (M)		
<i>Hypsosinga sanguinea</i>	1/2					cl, sn	T M		
<i>Larinioides cornutus</i>				-/1		cl, sn	M		
<i>Mangora acalypha</i>	1/6:	-/3:		2/1:		cl, sn, di	T M		
<i>Zilla diodia</i>	2/-					cl, sn	M		
<b>Lycosidae</b>									
<i>Acantholycosa lignaria</i> ▶ <sup>25</sup>			-/1			cl, sn	(M) O		EN
<i>Alopecosa accentuata</i>	3/2			1/2		cl, sn	T M		
<i>Alopecosa cuneata</i>	-/2			1/1		cl, sn, di	T M (O)		
<i>Alopecosa trabalis</i>	2/2					cl, sn	T M		
<i>Arctosa maculata</i> ▶ <sup>26</sup>					1/-	cl, (sn)	M		VU
<i>Aulonia albimana</i>	1/3:			1/1:		cl, sn	T M		
<i>Pardosa alacris</i>	4/7	1/2				cl, sn	T (M)	DD	
<i>Pardosa amentata</i>				1/4		cl, sn, di	T M O		
<i>Pardosa hortensis</i>	2/-					cl, sn, di	T		
<i>Pardosa lugubris</i>		2/-				cl, sn, di	T M O		
<i>Pardosa monticola</i>	1/-					cl, sn	(T) M		
<i>Pardosa palustris</i>				3/1		cl, sn, di	T M O		
<i>Pardosa pullata</i>	-/1					cl, sn, di	T M O		
<i>Pardosa riparia</i>	1/-					cl, sn	T M (O)		
<i>Pirata hygrophilus</i>				1/4	-/2	cl, sn	T M (O)		

Family / Species	Sites					Originality of habitat	Thermo-preference	V	
	JSS	B	Pd	Sd	ŠD			Sk	Cz
<i>Trochosa ruricola</i>	1/-					cl, sn, di	T M		
<i>Trochosa terricola</i>	2/1			-/2		cl, sn, di	T M (O)		
<b>Pisauridae</b>									
<i>Pisaura mirabilis</i>	2/-:	-/2:		-/2:		cl, sn, (di)	T M		
<b>Agelenidae</b>									
<i>Agelena labyrinthica</i>	1/1					cl, sn	(T) M		
<i>Histopona torpida</i>	3/2:	2/-:		1/2:	-/2:	cl, sn	M (O)		
<i>Malthonica ferruginea</i>		-/2:		-/1:		cl, sn, ar	(T) M		
<i>Malthonica silvestris</i>		5/1				cl, sn	M (O)		
<i>Tegenaria agrestis</i>	1/2					cl, sn, di	T M		
<i>Textrix denticulata</i>		-/2:				cl	T		
<b>Cybaeidae</b>									
<i>Cybaeus angustiarum</i>				1/1		cl, sn	M O		
<b>Hahniidae</b>									
<i>Antistea elegans</i>		5/9				cl, sn	(T) M (O)		
<i>Cryphoea silvicola</i>			-/1			cl, sn	M O		
<i>Habnia helveola</i>		1/1				cl, sn	M	LC	
<i>Habnia ononidum</i>	-/1					cl, sn	M		
<b>Dictynidae</b>									
<i>Cicurina cicur</i>		-/1		-/1		cl, sn, di	(T) M		
<i>Dictyna uncinata</i>	1/-					cl, sn, di	(T) M		
<i>Nigma flavescens</i>	9/3:					cl, sn	T M		
<b>Amaurobiidae</b>									
<i>Amaurobius fenestralis</i>		-/1:	-/1:			cl, sn	M O		
<i>Callobius claustrarius</i>			1/2	-/2		cl, sn	M O		
<i>Coelotes atropos</i> ▶ <sup>27</sup>		1/3:	-/2:	-/2:		cl, sn	M O		
<i>Eurocoelotes inermis</i>		3/2	2/3			cl, sn	M O		
<b>Titanoecidae</b>									
<i>Titanoeca quadriguttata</i>	2/1:			2/-:		cl, sn	T M		
<b>Miturgidae</b>									
<i>Cheiracanthium erraticum</i>					1/1	cl, sn	(T) M		
<i>Cheiracanthium oncognathum</i> ▶ <sup>28</sup>	1/-					cl, sn	T M	EN	EN
<b>Anyphaenidae</b>									
<i>Anyphaena accentuata</i>		2/-:		2/-:		cl, sn	T M		
<b>Liocranidae</b>									
<i>Agroeca brunnea</i>		-/2				cl, sn	T M		
<i>Agroeca cuprea</i>	2/1					cl	T M		
<i>Apostenus fuscus</i>		5/9				cl, sn	T M		
<i>Liocranum rupicola</i>		-/4				cl, sn, (ar)	(T) M		
<b>Clubionidae</b>									
<i>Clubiona caerulea</i>		-/3		-/1		cl, sn	(T) M		
<i>Clubiona comta</i>	1/1	-/1			-/1	cl, sn	T M		
<i>Clubiona corticalis</i> ▶ <sup>29</sup>		-/2				cl	M		
<i>Clubiona lutescens</i>	1/2					cl, sn, (di)	(T) M		
<i>Clubiona marmorata</i>		3/2				cl, sn	T M		
<i>Clubiona neglecta</i>		1/1				cl, sn	(T) M		
<i>Clubiona pallidula</i>		2/-				cl, sn	(T) M		
<i>Clubiona terrestris</i>		1/2		2/-		cl, sn	M		
<b>Corinnidae</b>									
<i>Phrurolithus festivus</i>	2/1			1/1		cl, sn	T M		
<i>Phrurolithus minimus</i> ▶ <sup>30</sup>	1/-					cl, sn	T M		
<b>Zodariidae</b>									
<i>Zodarium germanicum</i>	-/1:					cl, sn	T M		
<b>Gnaphosidae</b>									
<i>Drassodes lapidosus</i>	2/1					cl, sn	T M		
<i>Drassyllus praeficus</i>	-/1					cl, sn	T M		
<i>Drassyllus pusillus</i>				1/1		cl, sn, (di)	T M		
<i>Drassyllus villicus</i>	1/2					cl	T		
<i>Gnaphosa lucifuga</i> ▶ <sup>31</sup>	1/2:					cl	T		



Family / Species	Sites					Originality of habitat	Thermo-preference	V	
	JSS	B	Pd	Sd	ŠD			Sk	Cz
<i>Haplodrassus signifer</i>	1/-					cl, sn, (di)	T M (O)		
<i>Haplodrassus silvestris</i>		2/4				cl, sn	(T) M		
<i>Kishidaia conspicua</i> ▶ <sup>32</sup>	-/1j					cl, sn	T M	NT	VU
<i>Micaria fulgens</i>	-/1					cl, sn	T M		
<i>Micaria subopaca</i> ▶ <sup>33</sup>	1/-					cl, sn	T M	VU	
<i>Poecilochroa variana</i> ▶ <sup>34</sup>	1/-					cl, sn	T (M)	EN	
<i>Zelotes latreillei</i>	-/2					cl, sn, (di)	(T) M		
<i>Zelotes subterraneus</i>		-/1				cl, sn, (di)	(T) M (O)		
<b>Zoridae</b>									
<i>Zora nemoralis</i>	7/2					cl, sn	(T) M		
<i>Zora silvestris</i>		-/2				cl, sn	M		
<i>Zora spinimana</i>		2/1		-/1		cl, sn, di	T M (O)		
<b>Sparassidae</b>									
<i>Micrommata virescens</i>	1j/-:			-/2:		cl, sn	M		
<b>Philodromidae</b>									
<i>Philodromus albidus</i> ▶ <sup>35</sup>		-/1				cl, sn, di	T M	DD	
<i>Philodromus aureolus</i>	2/-			-/2	-/1	cl, sn, di	T M		
<i>Philodromus cespitum</i>	-/2	-/1				cl, sn, di	T M		
<i>Philodromus collinus</i>		-/1				cl, sn	(T) M (O)		
<i>Philodromus dispar</i>	1/1	2/1		1/-		cl, sn	T M		
<i>Thanatus formicinus</i>	2/2			-/2		cl, sn	T M		
<i>Tibellus oblongus</i>	1/-					cl, sn	T M		
<b>Thomisidae</b>									
<i>Diaea dorsata</i>	3/2	2/1		2/-		cl, sn	T M		
<i>Misumena vatia</i>	2/1:	1/2		2/-:		cl, sn, (di)	T M		
<i>Misumenops tricuspidatus</i>	2/-					cl, sn	T (M)		
<i>Ozyptila atomaria</i>	3/1			2/-		cl, sn	T M		
<i>Ozyptila clavata</i>	2/3	2/-				cl	T M		
<i>Ozyptila praticola</i>		-/1				cl, sn	T M		
<i>Ozyptila pullata</i> ▶ <sup>36</sup>	-/1					cl	T		VU
<i>Ozyptila trux</i>			1/-			cl, sn, (di)	M (O)		
<i>Pistius truncatus</i>	-/2	-/1				cl, sn	T M		
<i>Synema globosum</i>	1/-:			1/-:		cl, sn	T M		
<i>Tmarus piger</i>	4/3			1/2		cl, sn	T (M)		
<i>Xysticus acerbus</i>	1/-					cl	T (M)		
<i>Xysticus audax</i>				1/-		cl, sn	(T) M (O)		
<i>Xysticus bifasciatus</i>		1/1		-/1		cl, sn, di	(T) M (O)		
<i>Xysticus cristatus</i>		5/4		4/2	2/-	cl, sn, di	T M (O)		
<i>Xysticus gallicus</i> ▶ <sup>37</sup>		1/-				cl	M O		EN
<i>Xysticus kochi</i>	2/3			2/1	1/1	cl, sn, (di)	T M		
<i>Xysticus lanio</i>	6/2	4/1		3/-		cl, sn	T M		
<i>Xysticus luctator</i>		-/1				cl, sn	T M		
<i>Xysticus ninnii</i> ▶ <sup>38</sup>	1/2	1/1				cl	T		
<i>Xysticus ulmi</i>				1/-		cl, sn	(T) M		
<b>Salticidae</b>									
<i>Asianellus festivus</i> ▶ <sup>39</sup>	-/1					cl	T M		
<i>Ballus chalybeius</i>	1/1:	-/2:				cl, sn	T M		
<i>Euophrys frontalis</i>	-/3	-/2				cl, sn	T M		
<i>Evarcha arcuata</i>	3/2	2/3		-/2		cl, sn	T M		
<i>Evarcha falcata</i>	3/1			1/1		cl, sn	(T) M		
<i>Evarcha laetabunda</i>	6/1					cl	T (M)		
<i>Heliophanus aeneus</i>		3/2				cl	T M	LC	
<i>Heliophanus cupreus</i>	7/3	5/2		4/2	2/2	cl, sn	T M		
<i>Heliophanus flavipes</i>	1/-					cl, sn	(T) M		
<i>Marpissa muscosa</i>	-/1:					cl, sn	T M		
<i>Neon reticulatus</i>		-/1				cl, sn	T M		
<i>Pellenes tripunctatus</i>	1j/1					cl	T		
<i>Phlegra fasciata</i>	2/-					cl, sn	T M		
<i>Pseudeuophrys erratica</i>		1/1				cl, sn	T M	LC	

Family / Species	Sites					Originality of habitat	Thermo-preference	V	
	JSS	B	Pd	Sd	ŠD			Sk	Cz
<i>Pseudicius encarpatus</i> ▶ <sup>40</sup>	2/-					cl, sn	T M	LC	
<i>Salticus scenicus</i>	1/-			1/-		cl, sn, ar	T M		
<i>Salticus zebraeus</i>		3/-		1/-		cl, sn	T M		
<i>Sibianor tantulus</i> ▶ <sup>41</sup>		1/-		1/-		cl, sn	T M		
<i>Sitticus rupicola</i>			1/-			cl	(M) O		
Σ	129	110	29	85	20				

## Conclusions

The study area includes several xerothermic sites with a high number of thermophilous species (e.g. *E. aphaana*, *E. tuberculata*, *E. moravicus*, *D. coracina*, *E. quinqueguttata*, *L. prona*, *P. inornatum*, *T. nigrovariegatum*), many of them rare and only sporadically collected in the past. Altogether 11 % of the collected species are included in the Slovak spider Red List (GAJDOŠ & SVATOŇ 2001). Thermophilous species in study area represented 35 % of the collected spider fauna (Fig. 1.), which is notably high compared to the spider fauna collected in the valleys, Gaderská and Blatnická Dolina, of the Veľká Fatra Mts. This orographic unit is situated near the Starohorské vrchy Mts where SVATOŇ & GAJDOŠ (2005) reported only 16 % thermophilous species in the spider community.

From the arachnological point of view the most valuable and rare spiders in the study sites were *P. orbiculatum* – with its vulnerability status 'critically endangered' – *C. oncognathum*, *D. helleri*, *P. inornatum* and *P. variana* (all 'endangered') and *E. tuberculata*, *L. prona*, *E. quinqueguttata*, *E. merrisi*, *G. vivum*, *H. excisa*, *N. sanguinolentus* and *M. subopaca* ('vulnerable') (GAJDOŠ & SVATOŇ 2001). One species *S. tantulus* was collected for the first time from Slovakia. According to the originality of the habitat 55 % of the spider species are considered climax species (BUCHAR & RŮŽIČKA 2002) (Fig. 2.). The most vulnerable spiders belong to climax species of both a thermophyticum (e.g. *P. inornatum*, *E. quinqueguttata*) and oreophyticum (e.g. *D. helleri*, *H. excisa*). These indicate both types of habitats are well-preserved, and classify this area among the most interesting 'spider sites' in the Slovakia forming a valuable pool of genetic diversity.

Effective nature conservation of this territory will be neither easy nor conflict-free, because it will be necessary to deal seriously with the following problems:

- progressive forest succession in many xerothermic sites (extensive sheep grazing would be the best solution);

- development of intensive forestry in less-extreme slopes with all expected consequences, mainly clear-cutting and conversion of natural forests towards monocultures in the whole area;
- burning the vegetation of xerothermic grasslands (fortunately, it is not so frequent here as in South Slovakia);
- expansion of both cottage and suburban 'garden colonies' in the border suburban area;
- conversion of meadows and woodlands into an urban environment;
- expansion of ski tracks, especially in the highest part of the area (central massive of the Panský diel Mt).

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