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## SPECIES SPECTRUM AND FLIGHT ACTIVITY OF PSOCIDS (PSOCOPTERA) IN PERMANENT RESEARCH AREAS IN THE HIGH TATRAS IN 2008

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### ABSTRACT

In this paper are processed data from the detailed psocopterological research that was carried out in 2008 in the High Tatras (Vyšné Hágy, Nová Polianka, Tatranská Lomnica and Tatranské Zruby). The objective of this study was on the basis of the results obtained to establish psocid taxocenoses occurring in the High Tatra Mts. The focus was also on the flight activity of the most dominant species of the High Tatras. Overall, there were found 24 psocid species and the most abundant species was *Philotarsus parviceps*. Its flight activity reaches the peak in the middle of August. Among other dominant species were *Valenzuela burmeisteri* and *Valenzuela despaxi*.

**Key words:** psocids, species taxocenoses, flight activity, the High Tatras, Slovakia

**Acknowledgments:** This research had been funded by the Operational Program of Research and Development and co-financed with the European Fund for Regional Development (EFRD). Grant: ITMS 26220220087: The development of ecological methods to control chosen forest pests in vulnerable mountainous regions of Slovakia. We are also grateful to Dr. Ľubomír Vidlička for providing the material.

## INTRODUCTION

In comparison with other European countries psocids (Psocoptera) are relatively little studied in Slovakia. Due to their small size, not very strong coloration and rather complex way of catching and preparation, psocids remain on the margins of entomologists' interest. Psocids have broad ecological distribution and can be found from lowlands to mountain ecosystems. So far, there is 55 known psocid species living in Slovakia (Pongrácz, 1936; Obr, 1977; Holuša & Holuša, 2002a,b; Holuša & Kučerová, 2010). Majority of them come from the High Tatras and the region of Čižstov near Šamorín. This paper is an effort to deepen the knowledge of this interesting but relatively neglected group of insects in Slovakia, with the focus on the High Tatras.

In the High Tatras from Vyšné Hágy to Tatranská Lomnica were set up four research stations in 2008. All of the studied areas originally belonged to forest type *Larici-Piceetum*. Soil type: cambisol, podzol. Vyšné Hágy – Smrekovec was selected as reference area (REF) that was not damaged by the windstorm in 2004. Another studied area (Tatranská Lomnica – NNR Studená dolina) was affected by the windstorm calamity. This area represents non-extracted forest and was left to self-development (NEXT). The third studied area (Nová Polianka – Danielov dom) represents a territory from which the damaged wood was extracted after the windstorm calamity (EXT), wood removed and site reforested. The fourth selected area (Tatranské Zruby – burned forest) was after the windstorm calamity followed by removal of the damaged wood hit by major fire (FIRE) in 2005.

## MATERIAL AND METHODS

In order to catch psocids Malaise traps were set up at selected localities. This type of trap is very useful for catching flying insects. Due to the way of life of most psocid species Malaise trap represents an effective way to catch them. The research in the High Tatra Mts. (Vyšné Hágy, Nová Polianka, Tatranská Lomnica and Tatranské Zruby) was carried out in 2008 from May 23 till October 13, 2008 and the material was collected more or less on weekly basis. As soon as the material was sorted the psocids were preserved in little containers filled with denatured ethanol. Another step was determination of species using stereoscopic microscope Leica E74. In some cases there was also need to use microscope with greater magnification. In order to determine specific psocid species several determination keys were used. The basic one was *Klíč zvířeny III* (Obr, 1959) along with *Staubläuse, Psocoptera* (Günther, 1974); *Faune de France* (Leinhard, 1998) and sometimes was used also *Klucze do Oznaczenia Owadów Polski* (Martini, 1975). In the whole paper is used Latin terminology according to Lienhard & Smithers (2002). Only psocid imagoes were determined. Caught larvae are not included to the results of this work.

Dominance of species at individual localities was calculated according to the formula  $D_i = (n_i/N) \cdot 100\%$ , where  $n_i$  is a number of a particular species in a sample and  $N$  is the total multiplicity of the sample. While analysing the psocid taxocenoses and the flight activity of the most abundant species, the data were evaluated using the Excel program.

## RESULTS AND DISCUSSION

### Species spectrum of psocids (Psocoptera)

During the research were determined 358 psocid imagoes belonging to 24 species in 7 families (Tab. 1).

In Tatranská Lomnica (NEXT) were identified 11 species. None of the species was particularly dominant, all of them were represented only in small quantities.

## MENDELNET 2013

In Tatranské Zruby (FIRE) was detected the poorest community considering both a number of psocids found as well as the number of species – only 6 species altogether. Significantly abundant was *Valenzuela despaxi* -56%.

In Nová Polianka (EXT) were identified 12 species, almost all of them were represented quite poorly. The only dominant species was *Mesopsocus unipunctatus* (29.17%).

The richest psocid community was detected at locality Smrekovec (REF) in Vyšné Hágy – 18 species. The most abundant was *Philotarsus parviceps* (41.2%). With more than 10% representation were two other species – *Valenzuela burmeisteri* and *Valenzuela despaxi*. Dominant and eudominant species accounted for more than 81% of all recorded psocids. At this particular locality was also detected the highest number of psocids from all the other studied localities in the High Tatras. Only at this locality was representation of female psocids greater than that of male psocids (♀ : ♂ - 1 : 0,5).

Tab. 1 List of all psocid species found in the High Tatras

	Druhy	Vyšné Hágy - Smrekovec 2008	Tatranská Lomnica - Jany 2008	Nová Polianka - Danielov Dom 2008	Tatranské Zruby - burned forest 2008
1	<i>Amphigerontia bifasciata</i>	5	0	0	0
2	<i>Blaste quadrimaculata</i>	0	0	1	0
3	<i>Elipsocus abdominalis</i>	22	0	3	1
4	<i>Elipsocus moebiusi</i>	8	0	0	0
5	<i>Enderleinella obsoleta</i>	6	0	0	0
6	<i>Loensia fasciata</i>	8	1	0	0
7	<i>Loensia pearmani</i>	4	0	1	0
8	<i>Loensia variegata</i>	2	1	0	0
9	<i>Mesopsocus unipunctatus</i>	0	3	7	0
10	<i>Metylophorus nebulosus</i>	16	1	1	0
11	<i>Peripsocus didymus ssp. silesiaca</i>	7	0	0	0
12	<i>Peripsocus subfasciatus</i>	4	1	0	0
13	<i>Philotarsus parviceps</i>	124	1	3	0
14	<i>Philotarsus picicornis</i>	20	2	0	0
15	<i>Reuterella helvimacula</i>	1	0	0	0
16	<i>Stenopsocus lachlani</i>	3	1	1	1
17	<i>Trichadenotecnum majus</i>	6	0	0	1
18	<i>Trichadenotecnum sexpunctatum</i>	0	0	1	0
19	<i>Valenzuela atricornis</i>	0	0	1	0
20	<i>Valenzuela burmeisteri</i>	31	1	1	3
21	<i>Valenzuela despaxi</i>	32	2	3	9
22	<i>Valenzuela flavidus</i>	0	0	0	1
23	<i>Valenzuela gynapterus</i>	2	0	0	0
24	<i>Valenzuela piceus</i>	0	3	1	0
	<b>Total</b>	<b>301</b>	<b>17</b>	<b>24</b>	<b>16</b>

## Flight activity of dominant psocid species

The flight activity was evaluated only for dominant and abundant psocid species. The established criteria met just three species found at locality Smrekovec (REF). The results of evaluating the flight activity of eudominant species from this locality indicate an interesting fact – the occurrence of all three species is shifted to late summer and autumn (Fig. 1).

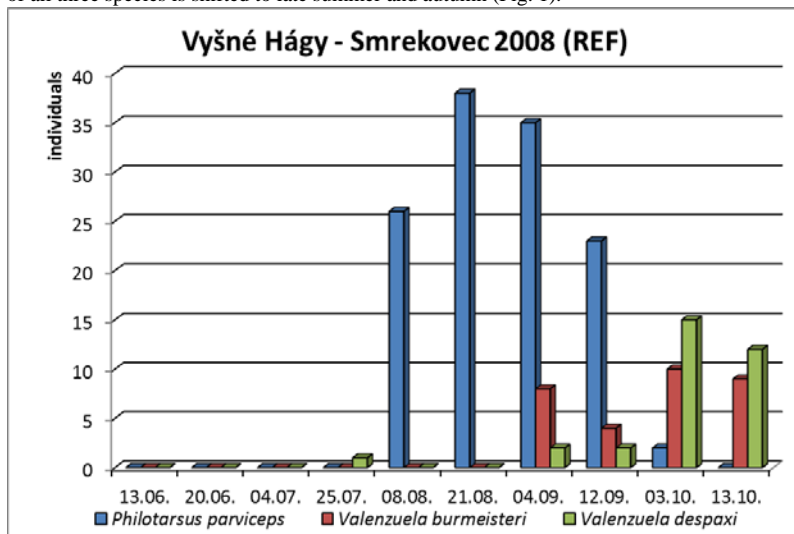


Fig. 1 Flight activity of the 3 most dominant psocid species at locality Smrekovec (REF)

The species *Philotarsus parviceps* (the most dominant species – more than 41%) occurs from the beginning of August, its flight activity reaches the peak in the middle of August and during September it plummets and ends. *Valenzuela despaxi* appears as early as the end of July but reaches the maximum flight activity in early October. Similar course of the flight activity shows also *Valenzuela burmeisteri* though the species was for the first time recorded at this locality at the beginning of September.

## CONCLUSIONS

In 2008 in the High Tatras was conducted entomological research using Malaise traps. Three of the studied areas were damaged by the windstorm calamity in 2004 and the other selected referential locality was not affected by the windstorm. Overall, there were identified 24 psocid species in the High Tatras Mts. At the localities afflicted by the windstorm calamity was detected considerably poorer species spectrum of psocids and the number of psocids was also significantly lower.

Assessment of dominance showed that the most abundant species in the High Tatras is *Philotarsus parviceps*. Analysis of the flight activity of the dominant species indicates that the majority of psocid species in the High Tatras have their flight activity shifted approximately about a month later than species living in lowlands.

To conclude, in the High Tatra Mts. live both the most common and tolerant psocid species (*Mesopsocus unipunctatus*, *Stenopsocus lachlani*) as well as species that with their ecological

requirements prefer higher altitude localities (*Philotarsus parviceps*, *Amphigerontia bifasciata*, *Valenzuela burmeisteri*, *Valenzuela despaxi*).

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