THYSANOPTERON
PISMO ENTOMOLOGICZNE

Vol. **3(1)**, 2007**:** 9–13 ISSN 1733–7631 Katowice, 01.10.2007

BARK-DWELLING THRIPS (THYSANOPTERA) AND OTHER ARTHROPODS IN XEROTHERMOPHILOUS OAK WOODS IN SW SLOVAKIA (PRELIMINARY RESULTS)

MICHAL DUBOVSKÝ*
RUDOLF MASAROVIČ**

*Department of Zoology, Faculty of Natural Sciences, Comenius University, Mlynská dolina, SK-84215 Bratislava, Slovakia, e-mail: dumiso@gmail.com
**Department of Ecosozology, Faculty of Natural Sciences, Comenius University, Mlynská dolina, SK-84215 Bratislava, Slovakia, e-mail: rudko.masarovic@gmail.com

ABSTRACT: This paper presents preliminary results of the research in Martinský les wood which is a rare isolated refuge of natural oak wood stands (Aceri tatarici-Quercetum, Zólyomi, 1957) situated in lowland close to the town of Senec (SW Slovakia). Thrips and other arthropods were collected by arboreal photoeclectors from 3 various sites in one locality during the vegetation period 2006 at three week intervals. Totally 858 specimens of thrips were collected. According to our research in conditions of Central European lowland oak wood the bark-dwelling Thysanoptera prefer S – exposed microhabitats and predominantly occur at the height of 1m above the ground. Corticicolous thrips declare typical seasonal dynamics with maximum at the end of May.
KEYWORDS: Thysanoptera, corticicolous, bark-dwelling, trees

Introduction

This research is focused on activity of corticicolous thrips (Thysanoptera) and presents preliminary results from primary monitoring and testing the special method of tree photoeclectors. In past this approach was used to sample arthropods by NORD et LEWIS (1970). Since that time it has been used for monitoring of arboricolous arthropods mainly in tropical ecosystems (ADIS, 1988).

The first national check-list of Thysanoptera lists 151 species in Slovakia (FEDOR et al, 2003). Amongst them 17 species may be considered as corticicolous (MASAROVIČ, 2007). Some sporadic data on bark-dwelling thrips in Slovakia were published within more complex research (e.g. VIDLIČKA, 1987; MAJZLAN et FEDOR, 2003). Several faunistic notes on this matter refer to FEDOR et al. (2007).

Study area

This paper refers to the area of Martinský les wood which is a rare isolated refuge of natural oak wood stands (*Aceri tatarici-Quercetum,* Zólyomi 1957) situated in lowland. With its relatively small size of 445.60 ha it is located in the vicinity of Senec (SW Slovakia) (48°16´ N, 17°22´ E; Databank of the fauna of Slovakia: 7770, 185 m a. s. l) and represents a unique locality with almost all the oak species occurring in Slovakia. Since 2004 it has been proposed as a special conservatory area.

Site A (Figure 1) represents a 110 year old approx. 10 ha large seminatural oak forest (*Aceri tatarici –Quercetum* Zólyomi, 1957) covered particularly by *Quercus cerris, Quercus robur, Quercus fraineto, Quercus petraea agg., Ulmus minor,* with diverse undergrowth of *Acer campestre, Lithospermum purpurocaeruleum, Dictamnus albus*.

THYSANOPTERON
PISMO ENTOMOLOGICZNE

Vol. **3(1)**, 2007**:** 9–13 ISSN 1733–7631 Katowice, 01.10.2007

Ulmus minor, Cornus mas, Melica uniflora, Ligustrum vulgare. Average perimeter of the studied trunks was 94.5 cm.

Site B (Figure 2) may be defined as the similar seminatural oak forest, 90 years of age and 8.71 ha of size. Average perimeter of the studied trunks was 95 cm.

Site C (Figure 3) represents a 20 year old, 9.74 ha large oak (*Quercus petrea*) monoculture with sporadic occurrence of *Robinia pseudoacacia* and with no undergrowth. Average perimeter of the studied tree trunks was 64 cm.

All the sampling sites are in a close mutual contact.

Figure 1: Site A

Figure 2: Site B

Figure 3: Site C

Figure 4: Typical bark of the studied trees (right - site A and B, left - site C)

Because our interest was predominantly focused on oak bark-dwelling fauna, the used traps were obviously installed on oaks. However to point out the effects of tree diversity on richness of Thysanoptera one trap was installed on *Acer campestre* and another one on *Robinia pseudoacacia*.

Bark of all observed trees may be characterized as rough and tessellated, with grey brown to dark brown colour (Figure 4).

Material and methods

Bark-dwelling thrips and other corticicolous arthropods were sampled by tree photoeclectors which are based on a principle of positive phototaxy, negative geotropism and outline orientation of arthropods (MAJZLAN et FEDOR, 2003). The traps were constructed of black cotton funnel, fixed to the PVC tube of 5 cm in its diameter. PET bottle, which served as a collecting jar (Figure 5) was sleeved on this tube. The deck was made of a bigger PET bottle. The cotton funnel was fixed to bark with a wire and empty space was filled with cement to increase sampling effectiveness. The solution of 96% ethanol (25 %), surfactant (5 %) and water (70 %) was used as conservation liquid. 12 traps were exposed at the height of 1 m, 3 traps of 2m and 3m and 1 trap at the height of 4m above the ground during the vegetation period

Vol. **3(1)**, 2007**:** 9–13 ISSN 1733–7631 Katowice, 01.10.2007

2007. The material was collected in 3 week intervals.

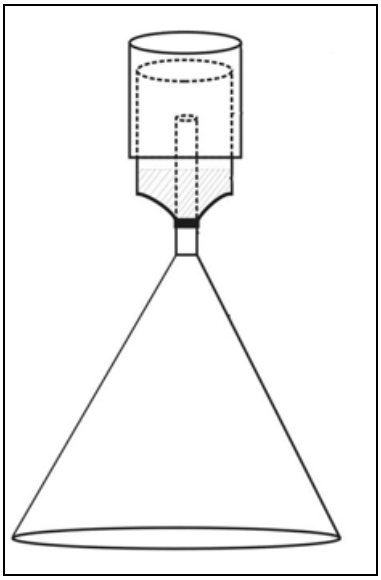

Figure 5: The tree photoeclector used to sample bark-dwelling thrips.

The collected thrips were analysed according to the standard methods used in thysanopterology and stored in Canada balsam on microscopic slides (LEWIS, 1973, SIERKA et FEDOR, 2004).

Results and discussion

In total 53, 927 arthropods being classified into 23 groups (Acarina, Collembola, Hymenoptera, Auchenorhyncha, Diptera, Coleoptera, Thysanoptera, Araneae, Heteroptera, Lepidoptera, Sternorrhyncha, Dermaptera, Blattodea, Psocoptera, Diplopoda, Isopoda, Orthoptera, Chilopoda, Pseudoscorpionidea, Opilionidea, Neuroptera, Mecoptera, Raphidoptera) (listed according to their dominance) were sampled in the tree photoeclectors (Table 1.).

Totally 858 specimens of Thysanoptera were collected. Such the quantity may be undisputedly considered as relatively high, especially when compared with the value from Finland (156 individuals of thrips from 40 trunk window traps) (KETTUNEN et al., 2005). However their research was focused on saproxilic species with traps installed on decaying trees.

Most of the collected thrips come from the 110 year old stand (314 individuals) (site A). The lower quantity refers to the site B (274 ind.) as well as site C (272 ind.). Despite we installed one more trap at the site A, there were only 19 specimens captured in it. Average abundance of thrips in one trap during the whole period reached a similar value at all the sites (at site A 45, site B 46 and site C 45 thrips), however the research declares significant differences in quantity according to vertical distribution of Thysanoptera (57 ind. at the height of 1 m, 24 ind. at 2 m and 47 ind. at the height of 3m). The average number of thrips in one sample was approximately 6 specimens during the whole vegetation period.

Table 1: Abundance and dominance of the sampled arthropods

	Abundance	**Dominance**
Acaridae	22, 709	42.111
Collemola	19, 357	35.895
Hymenoptera	3, 102	5.752
Auchenorhyncha	2, 312	4.287
Diptera	1, 848	3.427
Coleoptera	1, 439	2.668
Thysanoptera	**858**	**1.591**
Araneae	676	1.254
Heteroptera	580	1.076
Lepidoptera	412	0.764
Sternorhyncha	407	0.755
Dermaptera	100	0.185
Blatodea	41	0.076
Psocoptera	20	0.037
Diplopoda	16	0.030
Isopoda	14	0.026
Orthoptera	9	0.017
Chilopoda	8	0.015
Pseudoscorpionidea	7	0.013
Opilionidea	5	0.009
Neuroptera	3	0.006
Mecoptera	2	0.004
Raphidioptera	2	0.004
Total	**53, 927**	**100.000**

Vol. **3(1)**, 2007**:** 9–13 ISSN 1733–7631 Katowice, 01.10.2007

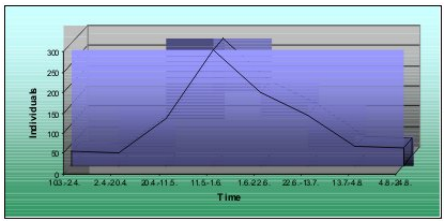

Figure 6: Abundance dynamics of thrips during the vegetation season 2007

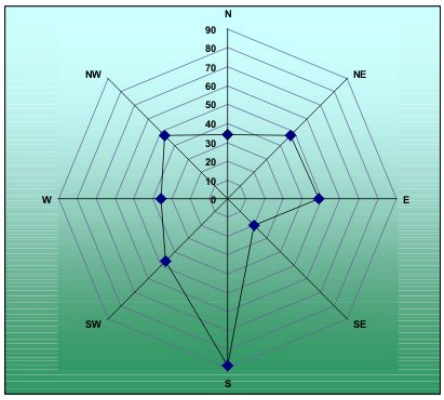

Figure 7: Preference of cardinal directions by thrips during the vegetation season 2007

From the abundance dynamics point of view thrips declare a one-peak curve with the maximum in the period of May 11 – June 2, 2007 (Figure 6). According to our research Thysanoptera definitely prefer southern part of bark (Figure 7) most probably due to its highest sun exposition.

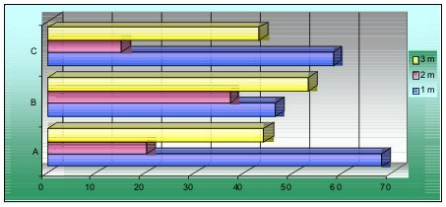

Figure 8: Average abundance of thrips in vertical stratification during the vegetation season 2007

In accordance with vertical stratification of corticicolous communities of Thysanoptera (Figure 8) most of the specimens were recorded at the height of 1 m at the site A (68 ind.) and C (58 ind.) and at the height of 3 m at the site B (53 inds.). The lowest abundance refers to the height of 2 m what hints at low equitability and proportionality in vertical distribution. According to VIDLIČKA (1987) or MAJZLAN et FEDOR (2003) thrips were more abundant in traps installed approx. at 1m than in higher photoeclectors. This actually corresponds with SPEIGHT (2005) that many external bark insects are not evenly distributed over the whole trunks and very often tend to be concentrated in certain regions.

Conclusion

Tree photoeclectors seem are supposed to be a suitable trap for collecting bark-dwelling thrips. According to our research in conditions of Central European lowland oak wood the bark-dwelling Thysanoptera prefer S – exposed microhabitats and predominantly occur at the height of 1m above the ground. Corticicolous thrips declare typical seasonal dynamics with maximum at the end of May.

Acknowledgements

We thank to Dr. Peter Fedor for his assistance in the research and comments on the manuscript and prof. Majzlan and prof. Krumpál for all their valuable advices.

The research was supported by VEGA. 1/4339/07.

References

ADIS, J., 1988: On the Abundance and Density of Terrestrial Arthropods in Central Amazonian Dryland Forests. Journal of Tropical Ecology, Vol. 4, No. 1: p. 19-24.

FEDOR P., SIERKA W., MAJZLAN O., 2003: Strapky (Thysanoptera) Slovenska

Vol. **3(1)**, 2007**:** 9–13 ISSN 1733–7631 Katowice, 01.10.2007

Prvý Národný Check-list. Folia faunistica Slovaca, 2003, 8: p. 57-59.

FEDOR, P. J., DUBOVSKÝ, M., VARGA, L., 2007: Strapky (Thysanoptera) ostrova Kopáč. In MAJZLAN, O. (ed.): Príroda ostrova Kopáč. Fytoterapia OZ, Bratislava, p 129 – 140.

KETTUNEN, J., KOBRO, S., MARTIKAINEN, P., 2005: Thrips (Thysanoptera) from dead aspen (Populus tremula) trees in Eastern Finland. Entomol. Fennica, 16: p. 246-250.

LEWIS, T., 1973: Thrips. Their biology, ecology and economic importance. Academic Press London and New York, 349 pp.

MAJZLAN, O., FEDOR, P.J., 2003: Vertical migration of Beetles (Coleoptera) and Other Arthropods (Arthropoda) on Trunks of Aesculus hippocastanum in Slovakia. Bull. Soc. Nat. Luxemb., 104: p 129-137.

MASAROVIC, R., 2007: Taxocenózy korticikolných strapiek (Thysanoptera) ako súčasť biocenotického konexu teplomilnej dúbravy. Bakalárska práca, Prírodovedecká fakulta UK 2006, Bratislava, 53 pp.

NORD, J. C., LEWIS, W. G., 1970: Two emergence traps for wood-boring insects. J. Georgia ent. Soc., 5: p 155-157.

SIERKA, W., FEDOR, P., 2004: Wciornastki (Insecta, Thysanoptera), Uniwersytet Slaski, Katowice, Poland, 174 pp.

SPEIGHT, R. M., 2005: Sampling insects from trees: shoots, stems, and trunks. In: LEATHER, S. (ed.) Blackwell Science, Oxford, UK 2005, P. 77-115.

VIDLIČKA, Ľ., 1987. Merocenózy článkonožcov (Arthropoda) na kmeňoch dubov. (Diplomová práca). Prírodovedecká fakulta UK, Bratislava, 89 pp.