THYSANOPTERON
PISMO ENTOMOLOGICZNE

Vol. **1(1)**, 2008: 13–19 ISSN 1733–7631 Katowice, 18.09.2008

DIVERSITY OF THRIPS (THYSANOPTERA) IN THE REGION OF BRATISLAVA (SW SLOVAKIA)

PETER FEDOR, MARTINA DORIČOVÁ

Comenius University, Faculty of Natural Sciences, Department of Ecosozology, Mlynská dolina, 842 15 Bratislava, Slovakia, fedor@fns.uniba.sk

ABSTRACT. This paper is to summarize and generalize all the relevant and available data on diversity of thrips (Thysanoptera) in the region of Bratislava. Several methods for collecting thrips were applied in this research, including individual sampling, shaking, sieving and sweeping. High diversity of Thysanoptera in Bratislava region is associated with heterogenity of ecological systems from a wide variety of forest complexes to xerothermous habitats. Of the total richness (167 species) recorded in Slovakia at least 109 species occur in the city of Bratislava and its surroundings. Plenty of pests are able to survive in house and flat interiors, winter gardens, glasshouses and this is why the fauna has been enriched in exotic taxa with circumtropical distribution recently.
KEY WORDS: thrips, diversity, Bratislava.

Introduction

History of the research on thrips in Bratislava region dates back to the end of the 19th century, when a quite sporadic data on occurrence of foliophagous and synanthropic *Heliothrips dracaenae* right in the city (Pozsony = Bratislava) appeared in Fauna Regni Hungariae (JABLONOWSKI, 1899). In this period the first monograph on Thysanoptera, an imperial work by the Czech professor Jindřich UZEL (1895), was published forming thysanopterology in former Austro-Hungarian Empire and even worldwide.

Most papers dealing with thrips of Bratislava region (e.g. PELIKÁN, 1951, 1965, 1990, 1992, FEDOR, 2003 a, 2004 a, 2005 a, 2006 a, b, SIERKA, 2004, 2005, 2006) show rather sporadic faunistic data without complex references to specific biotopes. In spite of that they have undisputedly contributed to general knowledge on biodiversity and formed essential fundaments to establish annotated checklists (e.g. PELIKÁN, 1952, 1977, FEDOR, 2004 b, FEDOR et al., 2003, 2004 a, SIERKA et FEDOR, 2004 b) and determination keys (PELIKÁN, 1957, SIERKA et FEDOR, 2004 a). Recently the research has infiltrated into applied consequences in phytopathology and pest control (VARGA, 2007, KLÍMOVÁ, 1992, FEDOR et VARGA, 2007).

Several more complex and synthetic papers refer to the nearby conservatory areas including the National Nature Reserve – an alder forest surrounded by Pannonian xerotherms (FEDOR et al., 2007 b) and The National Nature Reserve Devínska Kobyla – a woody steppe slope habitats just at the confluence of the Morava and Danube rivers (FEDOR, 2005 b). Bioindication potential of aeroplanktonic assemblages of thrips in wetland forests were analysed by GRUĽA (2007).

This paper is to summarize and generalize all the relevant and available data on diversity of thrips

THYSANOPTERON
PISMO ENTOMOLOGICZNE

Vol. **1(1)**, 2008: 13–19 ISSN 1733–7631 Katowice, 18.09.2008

(Thysanoptera) in the region of Bratislava.

Material and methods

Several methods for collecting thrips were applied, including individual sampling, shaking, sieving and sweeping. To analyse corticicolous fauna a tree photoeclector was installed on tree trunks (FEDOR et al., 2007 a, DUBOVSKÝ et MASAROVIČ, 2007, MASAROVIČ, 2007). Another equipment being based on a positive phototaxy of insects was applied to study aeroplanktonic stratocoenoses (MAJZLAN et FEDOR, 2004). Thrips as a part of hypogeal and epigeal fauna were sampled using a quarter method. All the applied methods have been described in detail in the relevant papers listed.

Study area

The study area of Bratislava region is situated in SW Slovakia covering several orographical units – Malé Karpaty Mts., Podunajská nížina lowland, Borská nížina lowland and Trnavská pahorkatina hills. On the West and South it is restricted by the state borders with Hungary and Austria (Figure 1). The whole area (1,500 km^2) has a typical continental character with the average annual temperature between 8°C – 10°C and the total annual rainfall of 500-700 mm (FAŠKO et ŠŤASTNÝ, 2002). The studied localities have been described in the relevant literature listed.

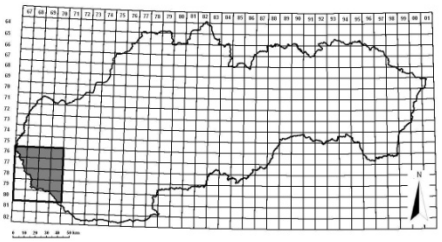

Figure 1: A sketch of the study area (incl. the coordinates of the Databank of Slovak Fauna)

Results and discussion

High diversity of Thysanoptera in Bratislava region is associated with heterogeneity of ecological systems from a wide variety of forest complexes (e.g. Martinský les wood, Bodíky) to xerothermous habitats (e.g. Kopáč). Of the total richness (167 species) recorded in Slovakia (app. 250 species estimated) at least the following 109 species (Aeolothripidae: 9, Thripidae: 70, Phlaeothripidae: 30) occur in the city of Bratislava and its surroundings.

Aeolothripidae UZEL, 1895
Melanthripinae BAGNALL, 1913
Melanthrips fuscus SULTZER, 1776: (syn. *M. gracilicornis*, MALTBAEK, 1931)
Melanthrips pallidior PRIESNER, 1919
Melanthrips acetosellae JOHN, 1927
Aeolothripinae UZEL, 1895
Aeolothrips albicinctus HALIDAY, 1836
Aeolothrips ericae BAGNALL, 1920
Aeolothrips intermedius BAGNALL, 1934
Aeolothrips melaleucus HALIDAY, 1852
Aeolothrips propinquus BAGNAL, 1924
Aeolothrips versicolor UZEL, 1895
Thripidae STEPHENS, 1829
Panchaetothripinae BAGNALL, 1912
Parthenothrips dracaenae HEEGER, 1852
Thripinae STEPHENS, 1829
Dendrothrips degeeri UZEL, 1895
Dendrothrips ornatus JABLONOWSKI, 1894
Dendrothrips saltatrix UZEL, 1895
Neohydatothrips abnormis KARNY, 1910
Neohydatothrips gracilicornis WILLIAMS, 1916
Sericothrips bicornis KARNY, 1910
Stenothrips graminum UZEL, 1895
Drepanothrips reuteri UZEL, 1895
Chirothrips aculeatus BAGNALL, 1927
Chirothrips ambulans BAGNALL, 1932
Chirothrips hamatus TRYBOM, 1895
Chirothrips manicatus HALIDAY, 1836
Chirothrips molestus PRIESNER, , 1926

THYSANOPTERON
PISMO ENTOMOLOGICZNE

Vol. **1(1)**, 2008: 13–19 ISSN 1733–7631 Katowice, 18.09.2008

Chirothrips pallidicornis PRIESNER, 1925
Limothrips angulicornis JABLONOWSKI, 1894
Limothrips cerealium HALIDAY, 1836
Limothrips consimilis PRIESNER, 1926
Limothrips denticornis HALIDAY, 1836
Anaphothrips badius WILLIAMS, 1913
Anaphothrips euphorbiae UZEL, 1895
Anaphothrips obscurus MÜLLER, 1776
Aptinothrips elegans PRIESNER, 1924
Aptinothrips karnyi JOHN, 1927
Aptinothrips rufus HALIDAY, 1836
Aptinothrips stylifer TRYBOM, 1894
Belothrips acuminatus HALIDAY, 1836
Belothrips morio O. M. REUTER, 1899
Oxythrips bicolor O. M. REUTER, 1836
Oxythrips ulmifoliorum HALIDAY, 1836
Rubiothrips ferrugineus UZEL, 1895
Rubiothrips silvarum PRIESNER, 1920
Rubiothrips sordidus UZEL, 1895
Rubiothrips validus KARNY, 1910
Baliothrips dispar HALIDAY, 1836
Sphaeropothrips vittipennis BAGNALL, 1927
Bolacothrips jordani Uzel, 1895
Frankliniella intonsa TRYBOM, 1895
Frankliniella occidentalis PERGANDE, 1895
Frankliniella. pallida UZEL, 1895
Frankliniella tenuicornis UZEL, 1895
Iridothrips iridis WATSON, 1924
Kakothrips robustus UZEL, 1895
Mycterothrips albidicornis KNECHTEL, 1923
Mycterothrips salicis O. M. REUTER, 1878
Odontothrips confusus PRIESNER, 1926
Odontothrips loti HALIDAY, 1852
Odontothrips meliloti PRIESNER, 1951
Odontothrips phaleratus HALIDAY, 1836
Pezothrips dianthi PRIESNER, 1921
Pezothrips frontalis UZEL, 1895
Platythrips tunicatus HALIDAY, 1852
Rhaphidothrips longistylosus UZEL, 1895
Ceratothrips ericae HALIDAY, 1836
Taeniothrips picipes ZETTERSTEDT, 1828
Taeniothrips pini UZEL, 1895
Tenothrips frici UZEL, 1895
Theilopedothrips pilosus UZEL, 1895
Thrips albopilosus UZEL, 1895
Thrips alni UZEL, 1895
Thrips angusticeps UZEL, 1895
Thrips atratus HALIDAY, 1836
Thrips brevicornis PRIESNER, 1920
Thrips flavus SCHRANK, 1776
Thrips fulvipes BAGNALL, 1923
Thrips fuscipennis HALIDAY, 1836
Thrips linarius UZEL, 1895
Thrips major UZEL, 1895
Thrips menyanthidis BAGNALL, 1923
Thrips minutissimus LINNAEUS, 1761
Thrips nigropilosus UZEL, 1895
Thrips physapus LINNAEUS, 1758
Thrips pillichi PRIESNER, 1924
Thrips praetermissus PRIESNER, 1920
Thrips sambuci HEEGER, 1854
Thrips tabaci LINDEMAN, 1888
Thrips trehernei PRIESNER, 1927: (*T. hukkineni* PRIESNER, 1937)
Thrips urticae FABRICIUS, 1781
Thrips validus UZEL, 1895
Thrips viminalis UZEL, 1895

Phlaeothripidae UZEL, 1895

Idolothripinae BAGNALL, 1908

Bolothrips bicolor HEEGER, 1852
Bolothrips dentipes O. M. REUTER, 1880
Bolothrips icarus UZEL, 1895
Cryptaplothrips famelicus PRIESNER, 1926

Phlaeothripinae UZEL, 1895

Gynaikothrips ficorum MARCHAL, 1908
Haplothrips acanthoscelis KARNY, 1909
Haplothrips aculeatus FABRICIUS, 1803
Haplothrips alpester PRIESNER, 1914
Haplothrips angusticornis PRIESNER, 1921
Haplothrips crassicornis JOHN, 1924
Haplothrips dianthinus PRIESNER, 1924
Haplothrips distinguendus UZEL, 1895
Haplothrips flavicinctus KARNY, 1910
Haplothrips kurdjumovi KARNY, 1913
Haplothrips leucanthemi SCHRANK, 1781
Haplothrips niger OSBORN, 1883

Vol. **1(1)**, 2008: 13–19 ISSN 1733–7631 Katowice, 18.09.2008

Haplothrips phyllophilus PRIESNER, 1914
Haplothrips setiger PRIESNER, 1921
Haplothrips subtilissimus HALIDAY, 1852
Haplothrips tritici KURDJUMOV, 1912
Xylaplothrips fuliginosus SCHILLE, 1910
Hoplandrothrips williamsianus PRIESNER, 1923
Phlaeothrips annulipes O. M. REUTER, 1880
Phlaeothrips coriaceus HALIDAY, 1836
Cephalothrips monilicornis O. M. REUTER, 1880
Hoplothrips quercinus KNECHTEL, 1935
Liothrips austriacus KARNY, 1909
Liothrips pragensis UZEL, 1895
Liothrips setinodis O. M. REUTER, 1880
Megathrips lativentris HEEGER, 1852

Diversity undisputedly reflects macrogeographic aspects, climate and local conditions which form structure of taxocoenoses. Many species from this region are of European origin (e.g. *Thrips linarius, Dendrothrips degeeri*) and are common in the whole continent. The fauna is significantly enriched by Eurosiberian (e.g. *Dendrothrips saltatrix, Chirothrips aculeatus*) and Holarctic elements (e.g. *Chirothrips hamatus, Aptinothrips stylifer, Kakothrips robustus*). Several species have been introduced to the New World (*Iridothrips iridis, Stenothrips graminum*) thus increasing their distribution area substantially. Fauna has been also shaped by Palaearctic (e.g. *Drepanothrips reuteri, Thrips fuscipennis*), W-Palaearctic (e.g. *Melanthrips fuscus, Limothrips angulicornis*), Turano-Mediterranean (*Melanthrips acetosellae*) and Submediterranean (e.g. *Anaphothrips euphorbiae, Haplothrips flavicinctus*) species. Some thrips have cosmopolite distribution (e.g. *Limothrips cerealium, Frankliniella tenuicornis*).

Recent knowledge on thrips diversity in Bratislava region has encouraged us to sketch clear vision of future faunistic research. Generally it has been declared by Jaroslav Pelikán, the most reputable expert in the Czechoslovak thysanopterology (PELIKÁN, 1983). Entomologists expect to record higher portion of Pannonian, Mediterranean and Submediterranean elements.

Modern ways of human development corresponding with globalization bring about infiltration of thrips into new regions. Plenty of pests are able to survive in house and flat interiors, winter gardens, glasshouses and this is why our fauna has been enriched in exotic taxa with circumtropical distribution (*Parthenothrips dracaenae, Heliothrips haemorrhoidalis, Hercinothrips femoralis*). Possible occurrence of *Thrips palmi*, a quarantine pest, in Slovakia has been a disputable question for the recent years. Originally distributed circumtropically it is not able to overwinter in mild climate out of glasshouses. In 1986 the thrip was recorded in Plzeň region, the Czech Republic (PELIKÁN, 1998) where it was introduced on orchids exported from Thailand. At this latitude it was studied in artificially heated place exclusively (BOURNIER, 1985).

The thrips fauna in Bratislava region is commonly represented by xerothermophilous elements (e.g. *Neohydatothips abnormis, Aptinothrips rufus, Anaphothrips euphorbiae, Haplothrips acanthoscelis*) which obviously determine various xerothermous sites of steppe (e.g. *Limothrips consimilis*) and woody steppe character. Wetlands are preferred by many hygrophilous species such as *Chirothrips hamatus, Iridothrips iridis* copying site claims of their host plants (for instance *Iris pseudacorus* at *Iridothrips iridis*). Mesophilous

Vol. **1(1)**, 2008: 13–19 ISSN 1733–7631 Katowice, 18.09.2008

vegetation stands offer conditions that predispose the species like *Kakothrips robustus* and *Thrips flavus* to frequent occurrence. A lot of thrips with no specific preferences to their environment are classified as eurypotent species (e.g. *Limothrips denticornis, Chirothrips manicatus*). *Aeolothrips versicolor, Thrips minutissimus* or *Thrips viminalis* form a category of arboricoles and as sciophilous insects they often avoid direct sun exposition.

A traditionally used ecological classification in thysanopterology determines topical preferences more in detail. From this point of view most species are represented by floricoles (e.g. *Melanthrips fuscus, Frankliniella intonsa, Belothrips morio*), however some thrips incline to inhabit leaves (*Thrips minutissimus, Aeolothrips melaleucus,* etc.), grasses (e.g. *Aelothrips albicinctus, Haplothrips crassicornis*) or are bark-dwelling (e.g. *Xylaplothrips fuliginosus*).

From the trophic point of view most species are classified as phytophagous insects including monophagous (e.g. *Iridothrips iridis, Thrips sambuci*), oligophagous (e.g. *Kakothrips robustus, Thrips alni*) and polyphagous elements (e.g. *Limothrips angulicornis, Chirothrips manicatus*). In some cases mycophagy (e.g. *Megathrips lativentris*) and zoophagy (*Aeolothrips melaleucus*) have been proved.

Analyses in field of community ecology (biocoenology) have emphasized fidelity of certain species for a certain assemblage structure. Zoocoenotical approach in entomology has a significant potential for precise bioindication in practical environmental dimensions.

Structure of aeroplanktonic stratocoenoses contains potential to indicate successional trends in ecosystems. For instance GRUĽA (2007) analysed aeroplanktonic thrips diversity in wetland forests and sketched development in structure of assemblages along the successional gradient from poplar monoculture to climax of *Salici populetum*. Thus *Mycterothrips salicis* and *Thrips major* are expected to decline in their dominance during a continual increase of *Aeolothrips intermedius, Limothrips cerealium, Thrips physapus* and *Haplothrips phillopilus* abundance towards a climax stage.

Acknowledgement

The project was financially suported by VEGA 1/4339/07.

References

BALOGH, J., 1958: Lebensgemeinschaften der Landtiere. Ihre Erforschung und besonderer Berücksichtigung der zoozonologischen Arbeitsmethoden. Akad. Verl., Berlin, 560 pp.

BOURNIER, J.P., 1985: About the distribution of the noxious Thrips palmi Karny. In: Holman, J., Pelikán, J.(eds.), Population Structure, Genetics and Taxonomy of Aphids and Thysanoptera, Proc. Int. Symp. Smolenice, Bratislava, p. 418-423.

DUBOVSKÝ, M., MASAROVIČ, R., 2007: Bark-dwelling thrips (Thysanoptera) and other arthropods in xerothermophilous oak woods in SW Slovakia (preliminary results). Thysanopteron - Pismo Entomologiczne, 3(1): 9-13.

FAŠKO, P., ŠŤASTNÝ, P., 2002: Priemerné ročné úhrny zrážok M 1: 2 000 000. In: MŽP; SaŽP, 2002, Atlas krajiny Slovenskej republiky, 1. vyd., Bratislava, Banská Bystrica, 344 pp.

FEDOR, P.J., 2003: First records of *Thrips albopilosus* Uzel, 1895 (Thysanoptera: Thripidae) in Slovakia. Biológia, Bratislava, 58(5): 966.

FEDOR, P.J., 2004 a: First records of *Dendrothrips degeeri* Uzel, 1895

Vol. **1(1)**, 2008: 13–19 ISSN 1733–7631 Katowice, 18.09.2008

(Thysanoptera: Thripidae) in Slovakia. Biológia (Bratislava), 59(2): 13-14.

FEDOR, P.J., 2004 b: Druhová diverzita strapiek (Thysanoptera) Slovenska a jej potenciál v bioindikácii. Habilitačná práca, Katedra ekosozológie a fyziotaktiky, Prírodovedecká fakulta Univerzity Komenského, Bratislava, 136 pp.

FEDOR, P.J., 2005 a: First records of *Melanthrips acetosellae* (Thysanoptera,Aeolothripidae) in Slovakia. Biologia, 60(2): 177-178.

FEDOR, P.J., 2005 b: Strapky (Thysanoptera). In: MAJZLAN, O. (ed.): Fauna Devínskej Kobyly, Bratislava, APOP, p. 72-74.

FEDOR, P.J., 2006 a: Back to the record of *Mycterothrips albidicornis* (Thysanoptera, Thripidae) in nests of birds. Biologia, 61(5): 564-564.

FEDOR, P.J., 2006 b: Xerothermophilous *Aptinothrips karnyi* (Thysanoptera, Thripidae) at Devínska Kobyla hill-the first record from Slovakia. Biologia, 61(2): 148-148.

FEDOR, P.J., DUBOVSKÝ, M., MAJZLAN, O., 2007 a: Tree photoeclector in sampling bark-dwelling thrips (Thysanoptera). Thysanopteron - Pismo Entomologiczne, 3(1): 14-16.

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

FEDOR, P.J., SIERKA, W., MAJZLAN, O. 2004 a: The Thrips (Thysanoptera) of Slovakia. Acta Phytopathologica et Entomologica Hungarica 39 (1-2): 299-307.

FEDOR, P.J., SIERKA, W., MAJZLAN, O., 2003: Strapky (Thysanoptera) Slovenska-prvý národný check-list. Folia Faunistica Slovaca, 8: 57-59.

FEDOR, P.J., VARGA, L., 2007: The first record of Gynaikothrips ficorum Marchal, 1908 (Thysanoptera) in Slovakia. Thysanopteron - Pismo Entomologiczne, 3(1): 1-2.

GRUĽA, D., 2007: Strapky (Thysanoptera) ako súčasť aeroplanktónu lužného lesa v okolí obce Bodíky. Diplomová práca, Katedra ekosozológie a fyziotaktiky, Prírodovedecká fakulta UK v Bratislave, 119 pp.

JABLONOWSKI, J., 1899: Classis. Insecta. Ordo. Thysanoptera. Editio senerata. Fauna Regni Hungariae. A Magyar birodalom állatvilága, A.K.M. Termés zettudományi társulat, Budapest, p. 17-18.

KLÍMOVÁ, R., 1992: Strapka západná, nebezpečný škodca skleníkových kvetov a zeleniny. Vydavateľstvo NOI, Bratislava, 31 pp.

MAJZLAN, O., FEDOR, P., 2004: Aktivita článkonožcov v air-fotoeklektore. Entomofauna carpathica, 16: 1-4.

MASAROVIČ, R., 2007: Taxocenózy korticikolných strapiek (Thysanoptera) ako súčasť biocenotického konexu teplomilnej dúbravy. Bakalárska práca, Univerzita Komenského v Bratislave, Prírodovedecká fakulta, Katedra ekosozológie a fyziotaktiky, 53 pp.

PELIKÁN J., 1952: Přehled třásnokřídlých z Československa. Entomol. Listy, 15: 185-195.

PELIKÁN J., 1998: Třásněnka *Thrips palmi* Karny, 1925 (Thysanoptera: Thripidae) ohrožuje evropské skleníky. Plant Protection Science, 34: 39-42.

PELIKÁN, J., 1951: O třásněnce karafiátové. (*Taeniothrips dianthi* Priesner). Entomol. Listy, 14: 5-38

PELIKÁN, J., 1957: Řád třásnokřídlí-Thysanoptera. In: KRATOCHVÍL, J. (ed.), Klíč zvířeny ČSR, 2, ČSAV, Praha, p. 9-34.

PELIKÁN, J., 1965: New species of Thysanoptera from Czechoslovakia-V. Acta Soc. Entomol. Čechoslov., 62: 98-104.

Vol. **1(1)**, 2008: 13–19 ISSN 1733–7631 Katowice, 18.09.2008

PELIKÁN, J., 1977. Thysanoptera. In: DLABOLA J. (ed.), Check list - Enumeratio insectorum bohemoslovakiae. Acta faun. entomol. Mus. nat. Pragae, 15 (4): 55-59.

PELIKÁN, J., 1983: Zur Faunistik der Thysanopteren Mitteleuropas. Verh. SIEEC X., Budapest, p. 295– 297.

PELIKÁN, J., 1990: Thysanoptera. Faunistic records from Czechoslovakia. Acta Entomol. Bohemoslov., 87: 232-234.

PELIKÁN, J., 1992: *Cryptaplothrips famelicus* Priesner, 1926 a *Limothrips angulicornis* Jablonowski, 1894. Faunistic records from Czechoslovakia, Acta Entomol. Bohemoslov., 89: 168.

SIERKA, W., 2004: First records on a species of the genus Belothrips Haliday, 1836 (Thysanoptera, Thripidae) in Slovakia. Biologia (Bratislava), 59(5): 683-684.

SIERKA, W., 2005: First records of three thrips species (Thysanoptera, Thripidae, Thripinae) from southwestern Slovakia. Biologia (Bratislava), 60(2): 111-112.

SIERKA, W., 2006: First records of *Chirothrips ambulans* (Thysanoptera, Thripidae) in Slovakia. Biologia (Bratislava), 61(5): 641-642.

SIERKA, W., FEDOR, P. J., 2004 b: Gatunki wciornastkow (Insecta, Thysanoptera) polskiej i słowackiej części Karpat. Thysanopteron - Pismo Entomologiczne, 1(1): 58-72.

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

ŠŤASTNÝ, P., NIEPLOVÁ, E., MELO, M., 2002: Priemerná ročná teplota vzduchu M 1: 2 000 000. In: MŽP; SaŽP, 2002, Atlas krajiny Slovenskej republiky, 1. vyd., Bratislava, Banská Bystrica, 344 pp.

UZEL, J., 1895: Monographie der Ordnung Thysanoptera. Königgrätz, 472 pp.

VARGA, L., 2007: Legislative aspects in monitoring of thrips (Thysanoptera) in Slovakia. Thysanopteron - Pismo Entomologiczne, 3(1): 3-8.