Thrips (Thysanoptera) from dead aspen (*Populus tremula*) trees in Eastern Finland

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Thrips were collected from dead aspens (*Populus tremula*) using trunk-window traps at two forest areas in Eastern Finland during 2001 and 2002. We collected 156 individuals of 23 species (15 Terebrantia; 8 Tubulifera). Four of the species – all Tubulifera – were previously unknown from Finland, and two unknown from Fennoscandia, indicating that the thrips fauna of this area is poorly known. Three of these species, *Hoplothrips carpathicus* Pelikán, *Liophloeothrips glaber* Priesner and *L. hungaricus* (Priesner) are fungivores, while *Lispothrips crassipes* (Jablonowski) is an arboreal herbivore. The species assemblages of the study areas are compared and a list presented of all species collected.

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1. Introduction

Finnish thrips fauna has remained practically unstudied since 1940's, when the last checklist with new observed species was published (Hukkinen 1942). This checklist was updated by Silfverberg (1984) including a total of 113 species (87 Terebrantia; 26 Tubulifera). A large proportion of the early studies on Finnish Thysanoptera concentrated on potential pests threatening cultivated plants, and on other species living in agricultural environments (mainly Terebrantia) (e.g. Reuter 1900, 1901, Hukkinen 1917, 1934, Brummer 1939). Consequently, only 12 fungivorous species were included in the list. This contrasts the fact that the suborder Tubulifera constitutes more than 50% of the thrips species world wide of which 60% are fungivorous (Mound 2005). Recent surveys of the thrips fauna on dead trees in Norway and Sweden have revealed several fungivorous thrips species previously unrecorded in those countries (Hansson 1998, Kobro & Nittérus 1999, Kobro 2001, Kobro & Solheim 2002). As it is reasonable to assume that these species should also be present in Finland, we examined thrips collected from dead aspens in two forest areas in Eastern Finland.

2. Research areas and methods

Our material was received from a project that focused on beetle fauna living in dead aspen (*Populus tremula*) trees in two aspen-rich forest

areas, located in the municipalities of Jäppilä (from 2004 part of Pieksänmaa) and Joroinen (Hyvärinen & Martikainen unpubl.). Both areas contain large aspen-trees, with diameter up to 90 cm. The distance between the areas was 6 km. The forest studied in Jäppilä, called Sorsasalo (69155-8:5343-7, Finnish KKJ27 coordinates), is a 28-ha old-growth forest patch dominated by Norway spruce (*Picea abies*). This forest is rather shady and includes moist *Sphagnum*-dominated patches. Scots pine (*Pinus sylvestris*), birches (*Betula* spp.) and aspen are the most common admixed tree species. The study site in Joroinen, called Ahvenisenmäki (69110:5355), was an 18-ha young sapling stand (tree height ca. 2–5 m) that had been clear-cut and burned in 1994. Most of the large aspen-trees had been retained in the cutting and almost all of them had died in the fire.

Insects were collected using trunk-window traps, which were attached to standing aspen trunks. The traps consisted of two crossed 40 x 60 cm transparent polycarbonate panes, and a funnel leading to a 1–l container (Fig. 1) (Martikainen 2001). The funnel was bent from the margin tightly to the surface of the tree. A solution of water, salt and detergent was used in the container to preserve the insects. The number of traps was 20 in both areas. Most of the traps were attached to dead aspen-trees, but a few traps were also placed on hollow living trees. Collecting periods were from 9 June to 13 October in 2001 (Jäppilä) and from 12 May to 20 September in 2002 (Joroinen); the traps were emptied three or five times during the periods, respectively. All adult thrips were picked from the samples and preserved in 70% ethanol. The specimens were prepared in Canada balsam; the slides are stored at the University of Joensuu, Finland, and at The Norwegian Plant Protection Institute, Norway. We identified most thrips specimens according to Schliephake and Klimt (1979) and Mound *et al.* (1976). One specimen was identified and a few critical specimens checked by Richard zur Strassen, Frankfurt, Germany.

Fig. 1. A trunk-window trap on a dead aspen (photo not from the study areas).

3. Results

Altogether 23 thrips species were found in the two areas studied: 9 species in Jäppilä and 20 species in Joroinen (Table 1). Also the total catch was roughly two times higher in Joroinen (99 exx.) than in Jäppilä (57 exx.). Fifteen of the species belonged to the suborder Terebrantia. Most of these species are common and they forage on grasses, flowering herbs and common heath (*Calluna vulgaris*), or are arboreal (Table 1).

Eight species belonging to the suborder Tubulifera were recorded. Seven of them are probably fungivorous, foraging on or associated with wood-rotting fungi, while one species is arboreal (Table 1). Four of the species belonging to Tubulifera were observed for the first time in Finland.

The dominating species in Jäppilä was *Thrips pini* (Uzel) (40 exx.), but in Joroinen there were two species slightly more abundant: *Xylaplothrips fuliginosus* (Schille) (20 exx.) and *Mycterothrips consociatus* (Targioni-Tozzetti) (16 exx.) (Table 1). Species belonging to Terebrantia were almost three times more numerous in the clear-cut (14 spp.) than inside the old-

Table 1. The number of thrips individuals in trunk-window traps. New species to Finland are marked with an asterisk (*). A = arboreal species, G = grass and heath feeders, F = fungivorous species, Fl = species visiting flowers of herbs. Other columns: Forag. = adult foraging; Joroinen = clear-cut and burned area in Joroinen, Finland; Jäppilä = old-growth forest in Jäppilä.

Species	Forag.	Joroinen	Jäppilä	Total
Terebrantia				
Ceratothrips ericae (Haliday)	G	1	–	1
Chirothrips manicatus Haliday	G	3	–	3
Frankliniella intonsa (Trybom)	Fl	9	–	9
Frankliniella tenuicornis (Uzel)	G	1	–	1
Mycterothrips consociatus (Targioni-Tozzetti)	A	16	–	16
Mycterothrips latus (Bagnall)	A	2	–	2
Mycterothrips salicis (O. M. Reuter)	A	3	2	5
Odontothrips biuncus John	Fl	–	1	1
Oxythrips ajugae Uzel	A	2	2	4
Oxythrips bicolor (O. M. Reuter)	A	3	7	10
Thrips flavus Schrank	Fl	2	–	2
Thrips fuscipennis Haliday	Fl	3	–	3
Thrips major Uzel	Fl	9	–	9
Thrips pini (Uzel)	A	15	40	55
Thrips vulgatissimus Haliday	Fl	1	–	1
Tubulifera				
Hoplothrips carpathicus Pelikán*	F	3	1	4
Hoplothrips corticis (De Geer)	F	1	–	1
Hoplothrips pedicularius (Haliday)	F	–	1	1
Hoplothrips ulmi (Fabricius)	F	3	–	3
Liophloeothrips glaber Priesner*	F	1	–	1
Liophloeothrips hungaricus (Priesner)*	F	–	2	2
Lispothrips crassipes (Jablonowski)*	A	1	–	1
Xylaplothrips fuliginosus (Schille)	F	20	1	21
Species/trap (mean)		1.00	0.45	0.58
Individuals/trap (mean)		4.95	2.85	3.90
Species, total		20	9	23
Individuals, total		99	57	156

growth forest (5 spp.). The corresponding difference in Tubulifera was much smaller (6 spp. vs. 4 spp.).

4. Species new to Finland

Four of the species have not previously been reported from Finland: *Hoplothrips carpathicus* Pelikán, *Liophloeothrips hungaricus* (Priesner), *Liophloeothrips glaber* Priesner and *Lispothrips crassipes* (Jablonowski), but the two *Liophloeothrips* may eventually be recognized as a single species (see below).

Hoplothrips carpathicus Pelikán, 1961

Material. Sb: Jäppilä, Sorsasalo (69157:5344) 9.VI. – 21.VII.2001 1 ♀. Sb: Joroinen, Ahvenisenmäki (69110:5355) 25.VII. – 16.VIII.2002 2 ♀, 16.VIII. – 20.IX.2002 1 ♀.

Notes. This species has been considered rare in Central Europe, where it has been collected on dead beech trees (*Fagus* spp.) (Pelikán 1961, zur Strassen 1994). It was recorded from Sweden in 1997 (Kobro & Nittérus 1999) and from Norway in 1998 (Kobro & Solheim 2002), and it seems to be common in northern Europe on dead birches infested with the ascomycete fungus *Pseudospiropes longipilus* (Corda) Hol. (Dothideales) (Kobro & Nittérus 1999, Kobro & Solheim

2002). The adult can be winged or wingless. Because two of the individuals caught in this study were wingless or with vestigial wings, we assume that *H. carpathicus* can find its host also on aspen. However, thrips are very dispersive and can be transported by winds (Lewis 1973).

Liophloeothrips hungaricus (Priesner, 1924) and *Liophloeothrips glaber* Priesner, 1919

Material. L. hungaricus: Sb: Jäppilä, Sorsasalo (69157:5344), 9.VI. – 21.VII.2001 1 ♂ (micropterous), 21.VII. – 17.VIII.2001 1 ♀ (apterous). *L. glaber*: Sb: Joroinen, Ahvenisenmäki (69110:5355) 28.VI. – 25.VII.2002 1 ♀ (macropterous).

Notes. L. hungaricus and *L. glaber* are not known previously from Fennoscandia. The known records have been limited to Albania, Czech Republic, Hungary, Poland, Slovakia, Ukraine and Near East (zur Strassen 2004). *L. hungaricus* has been reported from *Salix* bark and *L. glaber* from *Quercus ilex* bushes (Priesner 1928, Schliephake & Klimt 1979). However, since *L. hungaricus* is apterous or micropterous, and *L. glaber* macropterous, they may be forms of the same species (R. zur Strassen pers. comm.).

Lispothrips crassipes (Jablonowski, 1894)

Material. Sb: Joroinen, Ahvenisenmäki (69110:5355) 28.VI. – 25.VII.2002 1 ♂, from trap on a hollow living aspen.

Notes. L. crassipes has been found in Russia, Sweden and in many Central and South European countries, where it is collected from the leaves and trunks of *Populus nigra* and *P. tremula* (Schliephake & Klimt 1979, zur Strassen 2004). It is regarded as a pest on poplar cultures in Croatia (Hrašovec & Lovas 1996) and Italy (Lapietra & Allegro 1982), attacking in strength already weakened trees and destroying them. It is possibly a synonym with *L. wasastjernae* (O. M. Reuter) (Priesner 1928), which has been found only once in the world (Helsinki rural district at 1890's [Reuter 1899]).

5. Discussion

The samples were considerably larger and contained more species in the open clear-cut than inside the old-growth forest (Table 1). This is not surprising, as the more diverse shrub and grass flora at the Joroinen clear-cut supports a more diverse herbivorous thrips fauna (Terebrantia only) than do the inner parts of the closed forest in Jäppilä. Similar observations have been made by Hansson (1998) and Kobro & Nittérus (1999). Although herbivorous thrips are not dependent on dead wood, they may nevertheless benefit from standing dead trees on clear-cuts, as it has been observed that rough or flaking bark of trees offer good shield for many overwintering herbivorous thrips (Ahlberg 1926, Lewis 1973, Kobro & Nittérus 1999). The number of fungivorous species was similar in both areas, which can be explained by their habitats, dead aspen trunks, which were still present even in the clear-cut.

Species belonging to Tubulifera were rather scarce in the samples. Still, eight species, of which four were new to the Finnish fauna, were recorded. Thus, trunk-window traps proved to be a useful method of catching Tubulifera. This method could be an alternative to bark-sample collecting and funneling, which have been used in some recent studies (Kobro & Nittérus 1999, Kobro 2001). As thrips are not good flyers, window traps may not be optimal for collecting them. However, when window traps are attached directly on tree trunks, even thrips without developed wings can walk into the traps. The presence of very rare species in the trunk-window trap samples proved that this trap type can be a valuable addition to the methods of collecting Thysanoptera.

Although our material was relatively small and collected from 40 aspen trees only, as much as 50% of the observed species of Tubulifera were new to Finland and two of them were also new to Fennoscandia. We can thus conclude that the thrips fauna of this region is still inadequately known. In particular, saproxylic species (Speight 1989) dependent on fungi living on dead trees seem to be poorly studied. We anticipate that many new thrips species can still be found in Fennoscandia, especially by being inventive in choice of collecting methods and study sites.

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References

Ahlberg, O. 1926: Tripsar, Thysanoptera. Svensk insektfauna 6. — Almqvist & Wiksells Boktryckeri A.-B., Uppsala. 62 pp.

Brummer, V. 1939: Beiträge zum Problem der durch Thysanopteren verursachten Schartigkeit des Roggens. — Acta Agralia Fennica 11: 127–145.

Hansson, C. 1998: Betydelsen av tillskapade granhögstubbar för skalbaggs- (Coleoptera) och tripsfaunan (Thysanoptera). — M.Sc. thesis, Sveriges Lantbruksuniversitet, Uppsala. 12 pp. [In Swedish.]

Hrašovec, B. & Lovas, O. 1996: *Lispothrips crassipes* Jabl. – Poplar Pest in Northeastern Croatia. — In: Proceedings of the 20th Session of the International Poplar Commission,1–4 Oct. 1996, Budapest 1: 236–241.

Hukkinen, Y. 1917: Rakkojalkaiset (Thysanoptera) valkotähkien aiheuttajana. — Maatalous 10: 22–26. [In Finnish.]

Hukkinen, Y. 1934: Über die Weissährigkeit der Gramineen. I. — Acta Agralia Fennica 6: 139–152.

Hukkinen, Y. 1942: Blick auf die Erforschung der Thysanopterenfauna Finnlands, besonders ihrer schädlichen Arten. — Ann. Ent. Fenn. 8: 25–45.

Kobro, S. 2001: *Hoplothrips polysticti* (Thysanoptera) on the wood-rotting polypore *Trichaptum abietinum* infesting dead *Picea abies* in Norway. — Entomol. Fennica 12: 15–21.

Kobro, S. & Nittérus, K. 1999: Tripsar (Thysanoptera) i döda björkar. (Thrips [Thysanoptera] in dead birches). — Entomologisk Tidskrift 120: 93–98 [In Swedish with English abstract.]

Kobro, S. & Solheim, H. 2002: *Hoplothrips carpathicus* Pelikán in Norway. — Norw. J. Entomol. 49: 143–144.

Lapietra, G. & Allegro, G. 1982: A new sap-sucking insect on Poplar in North Italy: *Lispothrips crassipes* Jabl. (Thysanoptera, Phloeothripidae). — In: IX Sess. FAO/IPC Working Party on insects and other animal pests, Casale Monferrato, FO:CIP/I/82/5, 4 pp.

Lewis, T. 1973: Thrips: their biology, ecology and economic importance. — Academic Press, London. 349 pp.

Martikainen, P. 2001: Conservation of threatened saproxylic beetles: significance of retained aspen *Populus tremula* on clearcut areas. — Ecological Bulletins 49: 205–218.

Mound, L. A. 2005: Thysanoptera: Diversity and interactions. — Annu. Rev. Entomol. 50: 247–269.

Mound, L. A., Morison, G. D., Pitkin, B. R. & Palmer, J. M. 1976: Thysanoptera. — Handbooks for the Identification of British Insects vol. 1, part 11. Royal Entomological Society of London. 79 pp.

Pelikán, J. 1961: New species of Thysanoptera from Czechoslovakia IV. — Acta Societatis Entomologicae Cechosloveniae 58: 60–70.

Priesner, H. 1928: Thysanopteren Europas (reprint 1963). — A. Asher & Co., Amsterdam. 755 pp.

Reuter, E. 1900: Über die Weissährigkeit der Wiesengräser in Finnland. — Acta Soc. Fauna Flora Fennica 19: 1–136.

Reuter, E. 1901: *Physopus tenuicornis* Uzel als Erzeuger totaler Weissährihkeit bei Hafer. — Medd. Soc. Fauna Flora Fennica 27.

Reuter, O. M. 1899: Förteckning och beskrifning öfver finska Thysanoptera. — Acta Soc. Fauna Flora Fennica 17: 3–67.

Schliephake, G. & Klimt, K. 1979: Thysanoptera, Fransenflügler. — VEB Gustav Fischer Verlag, Jena. 477 pp.

Silfverberg, H. 1984: Thysanoptera. – In: Huldén, L. (ed.), A check list of the Finnish insects. Small orders. — Notulae Entomol. 64: 19–21.

Speight, M. C. D. 1989: Saproxylic invertebrates and their conservation. — Council of Europe, PE-VS 87. 4, Strasbourg. 67 pp.

zur Strassen, R. 1994: On some rare fungivorous phlaeothripid Thysanoptera (Insecta) from Germany and Sweden. — In: zur Strassen, R. (ed.), Proceedings of the workshop on Thysanoptera at Beijing, China and of the symposium on Thysanoptera at Halle, Germany 1992, CFS 178: 115–119.

zur Strassen, R. 2004: Thysanoptera, thrips. — Fauna Europaea version 1.1, URL: http://www.faunaeur.org.