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## THRIPS (Thysanoptera) IN NESTS OF BIRDS AND MAMMALS IN SLOVAKIA

JAROSLAV PELIKÁN,\* PETER FEDOR,\*\* MIROSLAV KRUMPÁL,\*\*\*  
DUŠAN CYPRICH\*\*\*

\*Klatovská 26, 602 00 Brno, The Czech Republic

\*\*Department of Ecosozology, Faculty of Natural Sciences, Comenius University, Mlynská dolina, 842 15 Bratislava, Slovakia, e-mail: fedor@fns.uniba.sk

\*\*\*Department of Zoology, Faculty of Natural Sciences, Comenius University, Mlynská dolina, 842 15 Bratislava, Slovakia, e mail: krumpal@fns.uniba.sk

### Abstract

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Nests of birds and mammals provide ecological conditions for a rich and diverse invertebrate nido-fauna. Although there are a lot of acarological and entomological studies dealing with nests, thrips have not been intensively observed yet. Therefore our research on 252 vertebrate nests according to 38 bird and 5 mammal species in Slovakia, positive in thrips, has brought original and interesting information into an untraditional field of the thysanopterology. 1,135 thrips of 38 species and Thripidae and Phlaeothripidae families were recorded in the study material. *Limothrips denticornis* (Haliday, 1836) (35.96%), *Chirothrips manicatus* (Haliday, 1836) (14.09%) and *Thrips viminalis* (Uzel, 1895) (9.60%) were the most dominant thrips. We also determined 2 new species for the fauna of Slovakia here: *Cryptaplothrips famelicus* (Priesner, 1926) and *Limothrips angulicornis* (Jablonski, 1894). The highest value of an occurrence frequency (41.7%) was recorded in nests around water or even right on a water level (*Acrocephalus arundinaceus*, *Acrocephalus palustris*, *Anas platyrhynchos*). Because thrips don't form a typical nidicole fauna, respectively they are not nest parasites, their occurrence in the nest material probably and mainly corresponds with a passive transport on straws of various plants representing a material to build a nest. However, an active transport of mobile species can not be excluded.

*Key words:* Thysanoptera, nests, birds, mammals, Slovakia

### Introduction

Nests of birds and mammals represent a very specific microhabitat with numerous and various immigrating animal species. From the ecological point of view they are usually parasites of nesting vertebrates (Siphonaptera, Heteroptera, Acarina – Ixodidae (Cyprich, Krumpál,

1996; Krumpál et al., 1995; Országh et al., 1989), often their ontogenetical stages, miscellaneous decompositores consuming nesting material and organic matter remains relating to nesting (Acarina, Psocoptera) (Ondrejková et al., 1991; Krumpál et al., 1994) as well as animals, especially arthropods looking for their shelters, or they accidentally appear here.

Most of thrips are ecologically fixed on their feed-plant, the only predators are classified in the family Aeolothripidae. Thrips usually appear in nests accidentally, with nesting material or they actively migrate here. The study on thrips according to their occurrence in nests of birds and mammals is supposed to be pioneer under the conditions of Slovakia, but even of the whole scientific world. Moreover the order Thysanoptera has been actually insufficiently studied in the comparison with other insect groups (Coleoptera, Diptera). As for former Czechoslovakia studying systematics of thrips relates especially to Pelikán (1957), from the global point of view publications by Nakahara (1994, 1997) as well as Schliephake, Klimt (1979) dominate. Pelikán (1996), Crespi et al. (1997) or Lewis (1973) are focused on studying some ecological aspects of various thrip species.

### Material and methods

The nests were collected during all the year seasons of 15 years (1975-1989) and stored in PVC bags. Later the material was extracted in Tullgren thermoelectors with a 40 W bulb (Ondrejková et al., 1991). The obtained invertebrates were stored in a 90 % ethyl alcohol. The thrips were preserved according to the common methods (Lewis, 1973).

### Results and discussion

The study material consisted of 1514 nests (252 of them were positive in thrips) with 1135 thrip individuals, 895 of the family Thripidae (78.84 %) and 240 of Phlaeothripidae (21.16 %). From the qualitative point of view they were classified as 38 species (24 of Thripidae and 14 of Phlaeothripidae), mentioned in Table 1. *Limothrips denticornis* (35.96 %), *Chirothrips manicatus* (14.09 %) and *Thrips viminalis* (9.60 %) were the dominant species in the study material. *Limothrips denticornis* reached the maximal frequency value (42.1 %), occurring in 106 nests. *Chirothrips manicatus* was present in 12 nests only, but its considerable dominance caused the high number of individuals per one positive nest (13.33).

The thrips were determined from the nests of 58 species of birds, mammals and their combinations:

1. *Acrocephalus arundinaceus*, 2. *Acrocephalus palustris*, 3. *Acrocephalus scirpaceus*, 4. *Aegithalos caudatus*, 5. *Anthus trivialis*, 6. *Buteo buteo*, 7. *Carduelis carduelis*, 8. *Certhia brachydactyla*, 9. *Certhia familiaris*, 10. *Ficedula albicollis*, 11. *Ficedula albicollis* + *Glis glis*, 12. *Ficedula albicollis* + *Muscardinus avellanarius*, 13. *Ficedula parva*, 14. *Fringilla coelebs*, 15. typ *Fringilla*, 16. *Garrulus glandarius*, 17. *Hippolais icterina*, 18. *Chloris chloris*, 19. typ *Chloris*, 20. *Lanius collurio*, 21. typ *Lanius*, 22. *Merops apiaster*, 23.

T a b l e 1. The list of the thrips recorded in the study material

Species	Individuals		Nests		P
	n	D[%]	n	F[%]	
Thripidae: 24 species	895	78.84			
<i>Limothrips denticornis</i> Haliday, 1836	408	35.95	106	42.1	3.85
<i>Chirothrips manicatus</i> Haliday, 1836	160	14.09	12	4.8	13.33
<i>Thrips viminalis</i> Uzel, 1895	109	9.60	55	21.8	2.00
<i>Physothrips salicis</i> (Reuter, 1878)	47	4.14	12	4.8	3.92
<i>Physothrips albicornis</i> (Knechtel, 1923)	38	3.35	7	2.8	5.43
<i>Thrips major</i> Uzel, 1895	31	2.73	8	3.2	3.87
<i>Frankliniella intonsa</i> (Trybom, 1895)	21	1.85	16	6.3	1.31
<i>Dendrothrips saltatrix</i> Uzel, 1895	19	1.67	13	5.1	1.46
<i>Dendrothrips degeeri</i> Uzel, 1895	12	1.05	9	3.6	1.33
<i>Thrips albopilosus</i> Uzel, 1895	11	0.97	6	2.4	1.83
<i>Similothrips atratus</i> (Haliday, 1836)	9	0.79	8	3.2	1.12
<i>Taeniothrips vulgatissimus</i> (Haliday, 1836)	8	0.70	7	2.8	1.14
<i>Dendrothrips ornatus</i> (Jablonowski, 1894)	4	0.35	1	0.4	4.00
<i>Aptinothrips rufus</i> Haliday, 1788	4	0.35	4	1.6	1.00
<i>Thrips alni</i> Uzel, 1895	3	0.26	3	1.2	1.00
<i>Thrips minutissimus</i> Uzel, 1895	2	0.18	2	0.8	1.00
<i>Limothrips angulicornis</i> Jablonowski, 1894	2	0.18	1	0.4	2.00
<i>Frankliniella tenuicornis</i> (Uzel, 1895)	1	0.09	1	0.4	1.00
<i>Oxythrips bicolor</i> (Reuter, 1879)	1	0.09	1	0.4	1.00
<i>Oxythrips ulmifoliorum</i> (Haliday, 1836)	1	0.09	1	0.4	1.00
<i>Thrips flavus</i> Schrank, 1781	1	0.09	1	0.4	1.00
<i>Thrips sambuci</i> Heeger, 1854	1	0.09	1	0.4	1.00
<i>Thrips trehernei</i> Priesner, 1927	1	0.09	1	0.4	1.00
<i>Aptinothrips stylifer</i> Trybom, 1894	1	0.09	1	0.4	1.00
Phlaeothripidae: 14 species	240	21.16			
<i>Xylaplothrips fuliginosus</i> (Schille, 1910)	65	5.73	34	13.5	1.91
<i>Haplothrips subtilissimus</i> (Haliday, 1852)	62	5.46	18	7.1	3.44
<i>Haplothrips aculeatus</i> (Fabricius, 1803)	38	3.35	27	10.7	1.41
<i>Cryptaplothrips famelicus</i> Priesner, 1926	32	2.82	4	1.6	8.00
<i>Phlaeothrips annulipes</i> Reuter, 1880	16	1.41	10	4.0	1.60
<i>Haplothrips kurdjunovi</i> Karny, 1913	10	0.88	7	2.8	1.43
<i>Bolothrips dentipes</i> (Reuter, 1880)	8	0.70	5	2.0	1.60
<i>Phlaeothrips corticeus</i> Haliday, 1836	2	0.18	2	0.8	1.00
<i>Cephalothrips monilicornis</i> (Reuter, 1880)	2	0.18	1	0.4	2.00
<i>Bolothrips bicolor</i> (Heeger, 1852)	1	0.09	1	0.4	1.00
<i>Bolothrips icarus</i> (Uzel, 1895)	1	0.09	1	0.4	1.0
<i>Hoplothrips distinguendus</i> (Uzel, 1895)	1	0.09	1	0.4	1.0
<i>Hoplothrips semicaecus</i> (Uzel, 1895)	1	0.09	1	0.4	1.0
<i>Liothrips pragensis</i> Uzel, 1895	1	0.09	1	0.4	1.0
Thysanoptera: 38 species	1.135	100			

D Dominance [%], F Frequency [%], P Number of thrips per 1 positive nest

*Motacilla alba*, 24. *Motacilla* sp., 25. *Muscicapa striata*, 26. *Nucifraga caryocatactes*, 27. *Parus major*, 28. *Parus major* + *Passer montanus*, 29. *Passer domesticus*, 30. *Passer montanus*, 31. *Ficedulla albicollis* + *Passer montanus*, 32. *Passer* sp., 33. Passeriformes, 34. *Phoenicurus ochruros*, 35. typ *Phoenicurus*, 36. *Pica pica*, 37. *Remiz pendulinus*, 38. *Riparia riparia*, 39. *Sitta europea* + *Passer montanus*, 40. *Streptopelia* spp., 41. *Sturnus vulgaris*, 42. *Sylvia atricapilla*, 43. *Sylvia* app., 44. typ *Sylvia*, 45. *Troglodytes troglodytes*, 46. *Turdus merula*, 47. *Turdus pilaris*, 48. *Turdus philomelos*, 49. *Turdus* sp. 50. typ *Turdus*, 51. *Anas platyrhynchos*, 52. *Parus* sp. + *Musccardinus avellanarius*, 53. *Arvicola terrestris*, 54. *Micromys minutus*, 55. *Microtus arvalis*, 56. *Musccardinus avellanarius*, 57. *Sciurus vulgaris*. 58. *Aves* sp.

The next list presents the thrips recorded in the study material. The numbers relate to species of birds, mammals and their combinations according to the previous list.

*Limothrips denticornis*: 1, 3, 5, 9, 10, 11, 15, 17, 18, 19, 20, 21, 24, 25, 26, 28, 29, 30, 31, 33, 35, 36, 43, 44, 46, 47, 48, 49, 50, 52, 54, 55, 56

*Chirothrips manicatus* 28, 30, 31, 38

*Physothrips salicis* 9, 23, 32, 33, 38, 43, 46, 47, 48, 49

*Physothrips albidicornis* 32, 37, 43, 46, 48, 49

*Thrips major* 29, 30, 34, 39, 48, 49

*Frankliniella intonsa* 15, 19, 21, 33, 36, 43, 44, 47, 49, 54, 56

*Dendrothrips saltatrix* 1, 12, 15, 21, 36, 46, 48, 49

*Dendrothrips degeeri* 15, 20, 21, 43, 46, 49

*Thrips albopilosus* 15, 44, 49

*Similothrips atratus* 1, 29, 33, 36, 44, 45, 49

*Taeniothrips vulgatissimus* 21, 33, 36, 47, 49

*Dendrothrips ornatus* 45

*Aptinothrips rufus* 32, 49, 56

*Thrips alni* 18, 44, 49, 50

*Thrips minutissimus* 22, 38

*Limothrips angulicornis* 46

*Frankliniella tenuicornis* 43

*Oxythrips bicolor* 49

*Oxythrips ulmifoliorum* 20

*Thrips flavus* 49

*Thrips trehernei* 48

*Aptinothrips stylifer* 56

*Xylaplothrips fuliginosus* 4, 9, 15, 18, 20, 33, 36, 43, 46, 47, 48, 49, 50

*Haplothrips subtilissimus* 7, 16, 20, 32, 43, 46, 48, 49

*Haplothrips aculeatus* 6, 16, 19, 21, 27, 28, 30, 33, 40, 43, 44, 46, 49

*Cryptaplothrips famelicus* 1, 53

*Phlaeothrips annulipes* 1, 20, 33, 36, 43, 47, 48, 49, 50

*Haplothrips kurdjumovi* 4, 13, 36, 37, 49, 56

*Bolothrips dentipes* 51

*Phlaeothrips coriaceus* 26, 43

*Cephalothrips monilicornis* 56  
*Bolothrips bicolor* Aves sp.  
*Bolothrips icarus* 28, 46, 53  
*Hoplothrips distinguendus* 47  
*Haplothrips semicaecus* 23  
*Liothrips pragensis* 48

The survey of positive nest types according to their situating is presented in Table 2. The highest thrip occurrence frequency (41.7 %) was recorded in nests close to water or right on a water level (*Acrocephalus arundinaceus*, *Acrocephalus palustris*, *Anas platyrhynchos*), with hygrophilous thrip species (*Phlaeothrips annulipes*, *Cryptaplothrips famelicus*). As for mammals, nests of *Arvicola terrestris* and *Muscardinus avellanarius* seem to be significant. Wet biotopes, often of a meadow character, are the most preferable microhabitat for thrips in Sweden (Oettingen, 1954).

*Limothrips denticornis* as a species with the highest dominance belongs to relatively common taxons. Schliephake, Klimt (1979) considered it as a frequent thrip occurring in

Table 2. Situating of the nests

Location of nests	Inspected nests	Positive nests	
		No.	[%]
On trees and shrubs	668	186	27.8
In nest holes and boxes	428	37	8.6
In tunnels, burrows, dens	291	4	1.6
On the ground	82	10	12.2
On or above the water	12	5	41.7
On buildings	33	7	21.2
Total	1514	249	16.4

various grassy stands. Oettingen (1942) classified it as the hygrophilous species. Lewis (1973) emphasize its relatively high mobility, flying ability and a vertical distribution to the height of 15 m of tree stands, what can be connected with its appearance in nests on trees and shrubs. A relatively wide ecological valance to occupy a new suitable niche was confirmed by Post, Colberg (1958). However this species probably got to the nests on blades or by a passive transport as well.

On the contrary, *Chirothrips manicatus*, the second dominant thrip in the study material is typical by a weak flying activity and as for a vertical distribution it usually occurs in undergrowth. Lewis (1961) presents it as one of the most common species captured in traps in England. It probably got to the nests by a passive transport on vegetation, used as building material. For example Glick (1960) mentioned *Aptinothrips rufus*, a wingless species, floating due to wind at the height of 150 m.

Occurrence of thrips in nests of invertebrates seems to be connected with their passive transport on vegetation, especially on blades forming basic material to build a nest. A passive

transport by wind is supposed to be an important factor as well. An active transport can't be excluded. Species with wings fly for shorter distances, although relatively slowly. Lewis (1958) recorded, that *Limothrips denticornis* is able to fly at maximally 33.1 cm/sec.

The study nest material included several rare species of thrips. 32 individuals of *Cryptaplothrips famelicus* were recorded in nests of the water vole (*Arvicola terrestris*) (30) as well as the great reed warbler (*Acrocephalus arundinaceus*) (2) situated in emergent littoral vegetation at the site of Jurský Šúr near Bratislava. This was the first record of this species in Slovakia and even former Czechoslovakia (Pelikán, 1992). Also 2 females of *Limothrips angulicornis*, found in the nest of *Turdus merula*, represent the first record of the species in Slovakia (Pelikán, 1992).

*Bolothrips dentipes*, another rare species in the obtained material, was recorded in nests of *Anas platyrhynchos* (2), *Arvicola terrestris* (5), and *Turdus merula* (1), what proves its considerable preference to wet biotopes, usually wet meadows (Lewis, 1973). The nests were collected at the site of Jurský Šúr near Bratislava, mainly in sedge communities or stands of *Phragmites australis* and *Typha* spp. One nest of *Turdus merula* was situated on a roof of a shed at the height of 2.5 m.

The recorded thrip species are possible to be classified into 4 categories according to their ecological preferences (Table 3):

1. *Graminicole*: occurring on plant stalks, especially blades
2. *Corticicole*: occurring on or in a bark of trees and shrubs
3. *Foliicole*: occurring on leaves of vegetation
4. *Floricole*: occurring on flowers of vegetation.

More than a half (55.15 %) of the obtained individuals were considered as graminicoles, although from the qualitative point of view they belong to 11 species only (28.95 %). A high abundance of this group is caused especially by dominant species *Limothrips denticornis*, *Chirothrips manicatus*, together forming 50 % of the thysanopterological material. *Limothrips denticornis* belonged to the most common graminicoles in research by Boneß et al. (1992). Most of the species were involved in the group a foliicoles (36.84 %), what corresponds with a general preference of thrips to leaves.

## Conclusion

Almost the 15 year long research (1975–1989) on a nest fauna in Slovakia recorded an occurrence of 1135 thrips of 38 species, respectively of families Thripidae and Phlaeothripidae. The obtained representatives of Thysanoptera were determined from the nest material formed by 1514 nests. 252 of them relating to 38 bird species and 5 mammal species were positive in thrips. *Limothrips denticornis* (35.96 %), *Chirothrips manicatus* (14.09 %) a *Thrips viminalis* (9.60 %) were the dominant species in the study material. As for the ecological preferences the most dominant were foliicoles (36.84 %), except of them an occurrence of graminicoles (28.95 %), floricoles (21.05 %) a corticicoles (13.16 %) was recorded. We also determined 2 new species for the fauna of Slovakia here: *Cryptaplothrips*

Table 3. The Survey of the thrips according to their ecological groups

Ecological group	Individuals				Species
	No <sub>i</sub>	D <sub>i</sub> [%]	No <sub>s</sub>	D <sub>s</sub> [%]	
Graminicole	626	55.15	11	28.95	<i>Limothrips denticornis</i> , <i>Chirothrips manicatus</i> , <i>Aptinothrips rufus</i> , <i>Limothrips angulicornis</i> , <i>Frankliniella tenuicornis</i> , <i>Aptinothrips stylifer</i> , <i>Haplothrips aculeatus</i> , <i>Bolothrips dentipes</i> , <i>Cephalothrips monilicornis</i> , <i>Bolothrips bicolor</i> , <i>Bolothrips icarus</i>
Corticicole	116	10.23	5	13.16	<i>Xylaplothrips fuliginosus</i> , <i>Cryptaplothrips famelicus</i> , <i>Phlaeothrips annulipes</i> , <i>Phlaeothrips coriaceus</i> , <i>Haplothrips semicaecus</i>
Follicole	320	28.19	14	36.84	<i>Thrips viminalis</i> , <i>Physothrips salicis</i> , <i>Physothrips albidicornis</i> , <i>Dendrothrips saltatrix</i> , <i>Dendrothrips degeeri</i> , <i>Thrips albopilosus</i> , <i>Dendrothrips ornatus</i> , <i>Thrips alni</i> , <i>Thrips minutissimus</i> , <i>Oxythrips ulmifoliorum</i> , <i>Thrips sambuci</i> , <i>Haplothrips subtilissimus</i> , <i>Haplothrips kurdjumovi</i> , <i>Liothrips pragensis</i>
Floricole	73	6.43	8	21.05	<i>Thrips major</i> , <i>Frankliniella intonsa</i> , <i>Similothrips atratus</i> , <i>Taeniothrips vulgatissimus</i> , <i>Oxythrips bicolor</i> , <i>Thrips flavus</i> , <i>Thrips trehernei</i> , <i>Hoplothrips distinguendus</i>

No<sub>i</sub>, Number of individuals, D<sub>i</sub>, Dominance of individuals, No<sub>s</sub>, Number of species, D<sub>s</sub>, Dominance of species

*famelicus* (Priesner, 1926) and *Limothrips angulicornis* (Jablonowski, 1894). The highest frequency of Thysanoptera (41.7 %) was recorded in the nests close to water or right on a water level (nests of *Acrocephalus arundinaceus* L., *Acrocephalus palustris*, *Anas platyrhynchos*). Thrips can't be considered as typical representatives of a nidicole fauna, therefore their occurrence in nests probably relates to a passive transport on vegetation, usually on blades, which are basic material to build a nest.

Translated by Dr. P. Fedor

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Pelikán J., Fedor P.J., Krumpál M., Cyprich D.: **Strapky (Thysanoptera) v hniezdach vtákov a cicavcov na Slovensku.**

Hniezda vtákov a cicavcov poskytujú vhodné ekologické podmienky pre bohatú a rozmanitú hniezdnu faunu bezstavovcov. Hoci existuje množstvo akarologických a entomologických štúdií, zaoberajúcich sa hniezdami, strapky ešte stále nie sú dostatočne preskúmané. Preto tento výskum 252 hniezd stavovcov 38 vtáčich a 5 cicavčích druhov, pozitívnych na výskyt strapiek, priniesol originálne a zaujímavé údaje v netradičnom poli thysanopterológie. Zaznamenaných bolo 1135 strapiek 38 druhov patriacich do čeľadí Thripidae a Phlaeothripidae. Dominantnými druhmi boli *Limothrips denticornis* (Haliday, 1836) (35,96 %), *Chirothrips manicatus* (Haliday, 1836) (14,09 %) a *Thrips viminalis* (Uzel, 1895) (9,60 %). V entomologickom materiáli sme zaznamenali 2 nové druhy pre faunu Slovenska: *Cryptaplothrips famelicus* (Priesner, 1926) a *Limothrips angulicornis* (Jablonski, 1894). Najvyššie hodnoty frekvencie výskytu strapiek (41,7 %) sme pozorovali v hniezdach situovaných pri vode alebo priamo na vodnej hladine (*Acrocephalus arundinaceus*, *Acrocephalus palustris*, *Anas platyrhynchos*). Keďže strapky netvorí typickú nidokolnú faunu, resp. nie sú hniezdne parazity, ich výskyt v hniezdom materiáli pravdepodobne súvisí s pasívnym transportom na stebľoch rôznych tráv, ktoré slúžia ako materiál na stavbu hniezd. Aktívny transport mobilných druhov však nemôžeme vylúčiť.