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Thrips (Thysanoptera) in Nests of the Tree Sparrow, *Passer montanus* (L.)

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As part of the ornithological research on the breeding biology of the tree sparrow *(Passer montanus)* in the Jurský šúr National Nature Reserve (SW Slovakia), many specimens of the nidicolous fauna were collected from wooden nest boxes. Six species of Thysanoptera were predominantly represented by *Limothrips denticornis* (54.8%). Bark dwelling thrips *(Hoplothrips semicaecus)* migrate very actively on trunks and are able to invade the canopy and its bird nests. Woods surrounded by agricultural fields are often invaded by wind-blown graminicolous thrips (e.g. *Limothrips cerealium*) which when abundant may infiltrate less suitable habitats. Zoochorous transport by birds (nest material) plays an important role in increasing the diversity of nest invertebrates. We assume that these thrips usually leave nests as their food source declines.

Keywords: Thysanoptera, thrips, nests, tree sparrow, *Passer montanus.*

The idea for writing this paper was prompted by the analysis of the breeding biology of the tree sparrow (Országhová and Puchala, 2002), which was not only relevant to ornithologists. Nests form suitable ecological conditions for numerous invertebrates, particularly ectoparasites (fleas, ticks, etc.), and their predators. Thrips (Thysanoptera) occur in nests rather more sporadically than regularly and their presence is probably accidental.

The first extensive data on nidicolous fauna from both the entomological as well as the ornithological point of view is from Hicks (1959). As Ellis Hicks writes in his monograph on the occurrence of insects in birds´ nests, the work represents an attempt to assort and consolidate information for the convenience of the user. The check-lists include eighteen orders of Insecta and twenty-six orders of Aves. Thrips were undisputedly recorded in nests of at least seven fully determined bird species including *Passer montanus montanus* (L.) (Boyd, 1932, 1935). Due to some degree of inaccuracy and uncertainty in older data some hosts are mentioned in their original nomenclature as robin or field sparrow. Four Phlaeothripidae and three Thripidae species were recorded in these previous investigations as part of the nidicolous fauna (Hicks, 1959).

In the relatively long period from 1975–1998, zoologists at the Faculty of Natural Sciences, Comenius University in Bratislava collected samples of diverse nidicolous fauna

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from more than 1,500 nests of birds and mammals throughout Slovakia. In 252 nests 'positive' for thrips we recorded 1,135 specimens of Thysanoptera, which were analysed and determined by Jaroslav Pelikán, Peter Fedor and Wojciech Sierka as 38 species of the Thripidae and Phlaeothripidae. The data obtained were published by Pelikán et al. (2002).

It would be misleading to state that thrips have been an evolutionary part of nest fauna for a long period, but as mentioned above worldwide many birds share their microhabitats with tiny Thysanoptera.

Materials and Methods

Study area

The study area Jurský šúr represents a unique nature reserve just 12 km NE of Bratislava (SW Slovakia, geographically N 48° 42′, E 17° 16′, *Fig. 1*). On the tertiary bedrock covered by Pleistocene gravel terraces and Holocene sands and gravels, an original association of Carici elongatae – Alnetum glutinosae has developed, surrounded by hygrophilous meadows and peatbogs. The rare vegetation community determined by alder *(Alnus glutinosa)* and elm *(Ulmus laevis)* stands has been established as a result of intensive floods which appear regularly. Although the reserve is situated in northern parts of the Danube lowland and is "shadowed" by the southern slopes of the Carpathians it still belongs to warm regions with an average annual temperature of 9.8 °C and annual precipitation of 611 mm (Petrovič, 1968; Országhová and Puchala, 2002). In the past the continuous alder

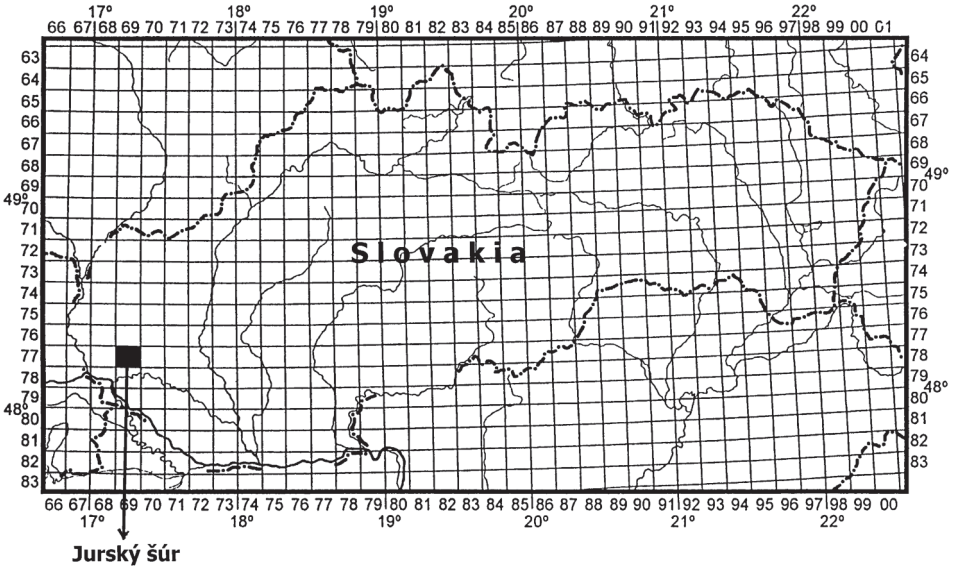

Fig. 1. Location of the study area

forest joined the Carpathians with large lowland ecosystems, but for more than a century this site has become rather discontinuous and isolated. Thus it has been managed as a rare conservation area, an official status it was given in 1952.

Recently the biological station of the university has been established in the conservation area to develop nature conservation projects. Plenty of artificially planted trees (e.g. *Populus alba, P. canescens, P. nigra, Fraxinus* sp., *Tilia cordata, T. platyphyllos, Salix alba*) and shrubs have enriched the local vegetation, actually offering new possibilities for nest building by birds.

Sampling and analyses

As part of the ornithological research on the breeding biology of the tree sparrow *(Passer montanus)* in Jurský šúr National Nature Reserve, rich material of the nidicolous fauna was collected from wooden nest boxes *(Fig. 2)* installed at two sites (alder forest and biological station) (Országhová and Puchala, 2002). The wooden boxes were usually installed on trunks to offer a suitable artificial microhabitat for nesting, and checked once a week during the whole growing season from 2000–2004. Soon after the nesting cycle we took a nest into a plastic bag and put it in the xeroeclectic Tullgren's apparatus to separate and successively analyse nidicolous Thysanoptera. Standard preparation techniques were used for mounting: specimens were collected into AGA, macerated for a short period in warm 10% KOH, dehydrated in alcohol and clove oil, and mounted on microscope slides in Canada balsam. The material was identified by the first and second author and is deposited in the collection of the Comenius University at Bratislava and the University of Silesia at Katowice.

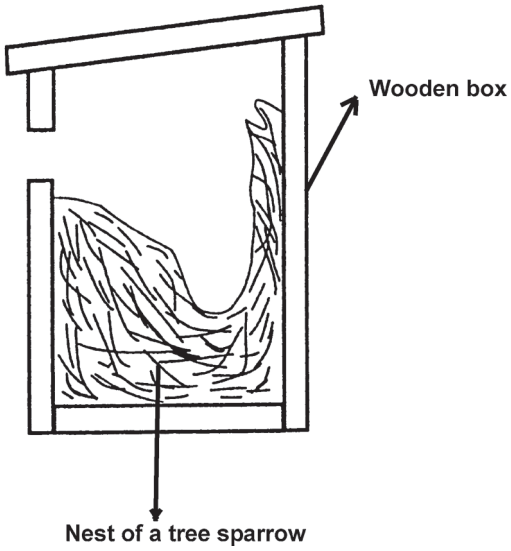

Fig. 2. Sketch of a transverse section through the middle of a wooden box with a nest

Results

As a result of research by ornithologists on the breeding biology of the tree sparrow, we were inspired to develop, confirm or refute our previous hypotheses on some qualitative aspects of thrips species in birds' nests and migration of thrips to these nests. The collected 62 specimens were determined to six species of two families *(Table 1):* Thripidae (*Chirothrips pallidicornis* Priesner, *Limothrips denticornis* Haliday, *Limothrips cerealium* Haliday, *Thrips albopilosus* Uzel and *Thrips major* Uzel) and Phlaeothripidae (*Hoplothrips semicaecus* [Uzel]).

Table 1

Thrips in nests of *Passer montanus* in the Jurský šúr National Nature Reserve

Sampling date	*Chirothrips pallidicornis*	*Limothrips denticornis*	*Limothrips cerealium*	*Thrips albopilosus*	*Thrips major*	*Hoplothrips semicaecus*	Total
July 1, 2000		1					1
May 24, 2000		1					1
August 8, 2000						1	1
June 1, 2001		2					2
June 25, 2001				1		1	2
June 26, 2001		2					2
June 30, 2001		1					1
July 9, 2001	1		1				2
July 22, 2001		8				1	9
May 23, 2002		1					1
May 26, 2002			1				1
June 8, 2002						4	4
June 27, 2002	1	4					5
June 27, 2002		2	1			3	6
June 30, 2002		1					1
July 3, 2002		1					1
Sept. 19, 2002						1	1
May 22, 2003			1			1	2
June 20, 2003		2	1				3
July 20, 2003				1			1
May 16, 2004		1					1
June 30, 2004		1			1		2
July 28, 2004		6	3			2	11
August 2, 2004					1		1
Total	2	34	8	2	2	14	62
Dominance	3.2%	54.8%	12.9%	3.2%	3.2%	22.7%	100%

Discussion

In terms of proportions, the extracted thrips specimens were predominantly represented by *L. denticornis* (54.8%, *Table 1*), an eurypotent graminicole, common and dominant in most of the nearby sites (e.g. Pelikán et al., 2002; Sierka and Halgoš, 2003). Tree sparrows build their nests mainly from grass giving rise to a logical assumption that graminicolous thrips such as *L. denticornis, L. cerealium* and *C. pallidicornis* will infiltrate the nidicolous fauna by being transported on grass leaves that form part of a nest. Zoochorous transport by birds plays an important role in increasing the diversity of nest invertebrates. We assume that these thrips mostly leave these microhabitats as their food source declines. *L. denticornis* inhabits nests very frequently and has been reported from nests of more than 30 bird species (Pelikán et al., 2002).

Surprisingly almost no arboricolous thrips were collected, even though they were expected to be present in birds' nests. *Thrips sambuci* Heeger, *Dendrothrips degeeri* Uzel, *Dendrothrips ornatus* (Jablonowsky) or *Mycterothrips salicis* (Reuter) have been frequently recorded in numerous trees and shrubs in the same locality (Sierka and Halgoš, 2003). They probably find suitable ecological conditions almost exclusively on leaves, flowers and bark. Pelikán et al. (2002) recorded four species in nests of tree sparrow: *L. denticornis, Chirothrips manicatus* Haliday, *T. major* and *Haplothrips aculeatus* Bagnall. This previous research covered almost the whole area of Slovakia with a wide range of ecological conditions, habitats and ecosystems and obviously with different diversity. On the other hand our "ad hoc sampling" may have been reflected in the absence of some other, perhaps less frequent, thrips such as *C. pallidicornis, L. cerealium, T. albopilosus* and *H. semicaecus.*

Bark-dwelling thrips very actively migrate on trunks in both horizontal as well as vertical directions, although they usually prefer south-facing exposed microhabitats and predominantly occur at a height of about 1 m above the ground (Dubovský and Masarovič, 2007; Fedor et al., 2007b). By foraging on bark they are able to invade the canopy and its bird nests. We have evidence that several Phlaeothripidae live in bird nests to avoid bad weather, increased humidity or full sun exposure (Pelikán et al., 2002). *H. semicaecus* is the only corticicolous thrips that has been recorded in nests of *P. montanus* within our research. This thrips could be expected in our samples because it was collected before from nests of *Motacilla alba* (Pelikán et al., 2002).

What are the common pathways for thrips to get into a nest? Are thrips passively transported by birds on stalks and leaves, do they actively fly in, do they forage on bark and in the canopy or are they carried by winds? Many thrips are an important component of aeroplanktonic stratocoenoses (Fedor et al., 2007a) and they are anemochorously transported for long distances at various height levels. Passive transport is often intensively supported by active flight. Lewis (1973) emphasized the relatively high mobility of *L. denticornis,* its flying ability and a vertical distribution to the height of 15 m. In nearby Danube wetland forests of Salici-Populetum more species were sampled from atmospheric assemblages (Fedor et al., 2007a), including eudominant *T. major, L. cerealium* or subdominant *L. denticornis*. Woods surrounded by agricultural fields are often invaded by wind-blown graminicolous thrips which when abundant may infiltrate into less suitable habitats.

Moreover there are some species (*Limothrips* spp.), which are supposed to overwinter in nests as they find there suitable ecological conditions and shelter against cold weather.

Acknowledgements

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