MITES (ACARI: MESOSTIGMATA) OF THE BIRDS' NESTS ON THE WATER IN SOUTHWESTERN SLOVAKIA

Peter Fenďa & Erika Schniererová

Department of Zoology, Faculty of Natural Sciences, Comenius University, Mlynská dolina B–1, 842 15 Bratislava, Slovakia [fenda@fns.uniba.sk]

Fenďa P & Schniererová E, 2010: Mites (Acari: Mesostigmata) of the birds' nests on the water in Southwestern Slovakia. *Folia faunistica Slovaca*, 15 (8): 55–60.

Abstract: We obtained 1,997 mite specimens of 49 mesostigmatid species from 50 birds' nests situated on the water (*Cygnus olor*, *Emberiza schoeniclus*, *Fulica atra*, *Ixobrychus minutus*, *Locustella luscinioides*, *Podiceps cristatus*, *Porzana parva*, and *Tachybaptus ruficollis*) in 8 study sites of southern Slovakia. The hygrophilous free-living ascids *Lasioseius confusus* (47.27%), *Leioseius minusculus* (18.93%) and *Cheiroseius cassiteridium* (7.51%) were eudominant species. Parasitic haematophagous mites formed neglected portion of the mite material only. These nests are usually destroyed very quickly and the richest nidofauna is present at the end of vegetation period.

Key words: Acari, mites, Mesostigmata, birds nests, nidofauna, Slovakia.

INTRODUCTION

In spite of fact that mesostigmatid mites in birds' nests are often the aim of faunistic studies, knowledge of mite communities in the nests of species nesting in hardly accessible places is rather insufficient (Mašán & Krištofík 1995). Nests situated on the water or near the water level belong just to this group. These nests are destructed very quickly, so possibility of their collecting is limited by time (Cyprich & Krumpál 1995).

Nordberg (1936) presented basic quantitative analyse of nest biocoenoses and divided nests according to microclimatic conditions and character of nidicole fauna. He defined one group as nests located on the „wet ground and floating nests". Also Ambros et al. (1992) marked a group of „free nests situated on water and in wet habitats".

The first records of mesostigmatid mites from birds and their nests in Slovakia originate in 50's (Mrciak & Rosický 1956). In Slovakia, more than 40 studies have been already published, all in some way focused on mesostigmatid mite fauna in birds' nests. But in fact nests situated near the water level are mentioned only by Ambros et al. (1992) [2 nests *Cygnus olor* (Gmelin, 1789), 2 nests *Netta rufina* (Pallas, 1773), and 12 nests *Larus ridibundus* Linnaeus, 1766)] and the nests of warblers [*Acrocephalus arundinaceus* (Linnaeus, 1758), *A. scirpaceus* (Hermann, 1804) and *A. palustris* (Bechstein, 1798)] were studied by Krištofík et al. (2001, 2005) and Fenďa & Schniererová (2004). The similar situation is in the world, except of records about nests of sea-gulls (Yakimenko et al. 1990) and loons (Storer 2002).

One portion of presented study material has been already published (Fenďa 1999, Fenďa & Schniererová 2000, Fenďa & Kalúz 2009, Mašán & Fenďa 2010). The aim of this paper is to describe the qualitative and quantitative composition of mesostigmatid mites in the nests situated near water surface.

MATERIAL AND METHODS

Altogether we have collected 50 nests situated near water surface or directly on water level [Mute Swan *Cygnus olor* (Gmelin, 1789); Reed Bunting *Emberiza schoeniclus* (Linnaeus, 1758); Common Coot *Fulica atra* Linnaeus, 1758; Little Bittern *Ixobrychus minutus* (Linnaeus, 1766); Savi's Warbler *Locustella luscinioides* (Savi, 1824); Great Crested Grebe *Podiceps cristatus* (Linnaeus, 1758); Little Crake *Porzana parva* (Scopoli, 1769) and Little Grebe *Tachybaptus ruficollis* (Pallas, 1764)]. Nests were identified and

© Faunima, Bratislava, 2010

marked during the nesting time at the beginning of the vegetation period, because these nests are often quickly destroyed and it is very difficult to find abandoned nests and almost impossible to determine nesting bird taxon during the vegetation period.

The nests were collected on 8 sites in three orographical units in Slovakia. The nests were collected in the years 1983, 1995, 1997–1999 in a different time. Locality specification:

I. Borská nížina lowland: **Jakubovské rybníky** fish-ponds (48° 24‘ N, 16° 57‘ E, 150 m a. s. l.), **Nová Šutrovňa** dredging pool (48° 24‘ N, 16° 55‘ E, 146 m a. s. l.), **Vojenské rybníky** fish-ponds (48° 25‘ N, 17° 03‘ E, 175 m a. s. l.).

II. Trnavská pahorkatina wold: **Trnavské rybníky** fish-ponds (48° 22’ N, 17° 34’ E, 142 m a. s. l.).

III. Podunajská rovina plain: **Šúrsky rybník** fish-pond (48° 14’ N, 17° 13’ E, 131 m a.s.l.), oxbows of the Danube river **Čičovské mŕtve rameno** (47° 46’ N, 17° 44’ E, 112 m a. s. l.) and **Lyon** (47° 45’ N, 17° 43’ E, 114 m a. s. l.).

The nests was kept in plastic polyethylene bags. Mites were extracted from the nests to 70% ethylalcohol solution by Tullgren’s apparatus with a 40W light bulb as a heat source. The material was processed to yield microscopic preparations using chloralhydrate medium Liquid de Swan.

RESULTS AND DISCUSSION

From the material we obtained 1,997 individuals of 49 mite species (Tab. 1). These species can be classified into following ecological groups (sensu Mašán & Krištofík 1995):

– obligatory haematophags of birds: *Ornithonyssus sylviarum* (only in 2 nests of *Ixobrychus minutus*), *Dermanyssus gallinae*, and *D. hirundinis* (only in 3 nests of *Fulica atra*)

– facultative haematophags: *Haemogamasus nidi*

– predators living on plants: *Neoseiulus cucumeris* (12 positive nests – 23.53%), and other members of the family Phytoseiidae (Tab. 1)

– coprophilous predators: *Gamasodes bispinosus*, *G. spiniger*, *Cornigamasus lunaris*, *Holostaspella neglecta*, *Macrocheles glaber*, *M. muscaedomesticae*, *M. penicilliger*, *Dendrolaelaps latior*

– soil predators: *Lasioseius confusus* (16 positive nests – 31.37% and 844 individuals – 49.21%), *Leioseius minusculus* (13 positive nests – 25.49% and 294 individuals – 17.14%), *Cheiroseius cassiteridium* (9 positive nests – 17.65% and 146 individuals – 8.51%), *Arctoseius semiscissus* (9 positive nests – 17.65% and 90 individuals – 5.25%), and other species from genera *Ameroseius*, *Arctoseius*, *Blattisocius*, *Cheiroseius*, *Neojordensia*, and *Proctolaelaps* (Tab. 1).

Ambros et al. (1992) defined group of free nests situated on water and in wet habitats by high number of nonparasitic species. Direct contact with surrounded soil microfauna leads to increase of portion of saprophagous and coprophagous species in these nests. In our nest material there was no direct contact with soil, because the majority of nests were situated right on the water level in reed or sedge stands. Despite of that the soil predators were the most abundant group. The presence of other species in the nests was occasional (including haematophagous species). Occurrence of the predators living on plants (family Phytoseiidae) can be explained by direct contact of nests with reed stands. The hygrophilous species pre-dominated in occurrence in observed nests. Nikolskii et al. (1981) affirmed, that especially saprophilous and coprophilous species or on the other hand strictly hygrophilous species foreticly occur on biting midges (Diptera, Ceratopogonidae). In our material we found the same species: *Arctoseius cetratus* (phoresy on biting midges was recorded by Mašán & Országh 1995), *Arctoseius semiscissus* (phoresy was recorded by Nikolskii et al. 1981), *Cornigamasus lunaris* and *Gamasodes bispinosus* (both recorded by Nikolskii et al. 1981 and Mašán & Országh 1995). Another species are known from nests in wet habitats from Slovakia: *Lasioseius confusus* (Mašán & Krištofík 1995, Fenďa et al. 1998), and *Cheiroseius cassiteridium* (Fenďa et al. 1998). According to Karg (1993) the soil predators *Cheiroseius curtipes*, *Leioseius minusculus*, and *Plesiosejus major* live in wet substrates, *Neojordensia sinuata* and *Cheiroseius mutilus* inhabit shores and moor areas. The species previously recorded on reed stands was *Dendrolaelaps latior* (Fenďa & Schniererová 2000). Coprophilous predator *Macrocheles glaber* was found in the nests of *Cygnus olor*, *Macrocheles muscaedomesticae* in the nests of *Larus ridibundus* and another one *Macrocheles penicilliger* was found in the nests of *Netta rufina* and *Larus ridibundus* (Ambros et al. 1992), facultative haematophag *Haemogamasus nidi* was found in the nests of *Cygnus olor* and *Netta rufina* (Ambros et al. 1992).

There were no differences in presence or absence of ectoparasitic species in the nests of nidicolous bird species (*E. schoeniclus*, *L. luscinioides* and *I. minutus*) and other nests. Occurrence of *Ornithonyssus sylviarum* in the nests of *Ixobrychus minutus* can be explained by nest construction – Little Bittern nests are built of firm blades of reed and in comparison with another studied nests these nests are relatively the driest ones.

In the older nest material the nidofauna was richer from the quantitative as well as qualitative point of view. Nests of *Fulica atra* are less inhibited in May and June, when there are the eggs laid in the nest. In August, when the nest material is in decay, all the studied nests were positive in mites. This trend appears to be more considerable in the nests of *Podiceps cristatus* – mites inhibit as late as the August

Table 1. Survey of mesostigmatid mites found in the examined nests.
Legend: A – average number of individuals in all nests; D – dominance, E – percentage of the positive nests; JR – Jakubovské rybníky, JN – Jakubov-Nová Šutrovňa, VR – Vojenské rybníky, TR – Trnavské rybníky, ŠR – Šúrsky rybník, ČR – Číčovské mŕtve rameno, ČL – Číčov – Lyon.

Taxon	*Fulica atra*	*Porzana parva*	*Ixobrychus minutus*	*Locustella luscinio-ides*	*Cygnus olor*	*Emberiza schoeniclus*	*Podiceps cristatus*	*Tachybaptus ruficollis*	total	A	D [%]	E [%]	site	month
Ameroseiidae														
Ameroseius lidiae Bregetova, 1977	5	1	–	–	–	–	–	–	6	0.12	0,3	10	ČR, ŠR	VI
Ascidae														
Arctoseius cetratus (Sellnick, 1940)	3	–	–	–	–	–	–	–	3	0.06	0.15	4	JR, ŠR	V,VI
Arctoseius insularis (Willmann, 1952)	5	–	–	–	–	–	–	–	5	0.1	0.25	2	ŠR	VI
Arctoseius semiscissus (Berlese, 1892)	70	3	1	–	–	–	22	–	96	1.92	4.81	22	ČR, JN, JR, ŠR, VR	V, VI, IX
Blattisocius dentriticus (Berlese, 1918)	1	–	–	–	–	–	–	–	1	0.02	0.05	2	ŠR	VI
Cheiroseius curtipes (Halbert, 1923)	–	–	–	–	4	–	5	–	9	0.18	0.45	4	ŠR, VR	VI, VIII
Cheiroseius cassiteridium (Evans et Hyatt, 1960)	103	16	–	–	3	1	27	–	150	3.0	7.51	24	ČR, JR, ŠR, TR	VI, VIII
Cheiroseius mutilus (Berlese, 1916)	–	–	2	–	–	1	2	–	5	0.1	0.25	8	ČR,JR	VI, VIII
Gamasellodes bicolor (Berlese, 1918)	4	–	–	–	–	–	–	–	4	0.08	0.2	2	ŠR	VI
Lasioseius confusus Evans, 1958	677	181	66	–	1	1	18	–	944	18.8	47.27	40	ČR, JN, JR, ŠR, TR, VR	V, VI, VIII, IX
Leioseius minusculus (Berlese, 1904)	325	5	20	–	–	9	19	–	378	7.56	18.93	34	ČR, JN, JR, ŠR, TR, VR	V, VI, VIII
Neojordensia sinuata Athias-Henriot, 1973	–	–	2	–	–	–	73	–	75	1.5	3.75	6	JN, VR	VI, VIII, IX
Platyseius major (Halbert, 1923)	2	–	2	–	–	–	15	–	19	0.38	0.95	6	JN, JR	VIII, IX
Platyseius sp.	6	–	–	–	–	–	1	–	7	0.14	0.35	6	JR, ŠR	VI, VIII
Proctolaelaps pygmaeus (J. Müller, 1860)	–	–	1	–	–	–	–	–	1	0.02	0.05	2	ČR	VI
Digamasellidae														
Dendrolaelaps latior Leitner, 1949	19	–	–	–	–	–	–	–	19	0.38	0.95	2	JR	V
Dendrolaelaps sp.	6	–	–	–	–	–	–	–	6	0.12	0.3	6	JR, ŠR	V, VI

Table 1. Continued.

Taxon	*Fulica atra*	*Porzana parva*	*Ixobrychus minutus*	*Locustella luscinio-ides*	*Cygnus olor*	*Emberiza schoeniclus*	*Podiceps cristatus*	*Tachybaptus ruficollis*	total	A	D [%]	E [%]	site	month
Dermanyssidae														
Dermanyssus gallinae (De Geer, 1778)	2	–	–	–	–	–	–	–	2	0.04	0.1	2	ŠR	VI
Dermanyssus hirundinis (Hermann, 1804)	13	–	–	–	–	–	–	–	13	0.26	0.65	4	TR, VR	VI, VIII
Eviphididae														
Alliphis halleri (G. et R. Canestrini, 1881)	1	–	–	–	–	–	–	–	1	0.02	0.05	2	ŠR	VI
Laelapidae														
Androlaelaps casalis (Berlese, 1887)	–	–	–	1	–	–	–	–	1	0.02	0.05	2	ČR	VI
Gaeolaelaps aculeifer (G. Canestrini, 1884)	2	–	–	–	–	–	–	–	2	0.04	0.1	2	ŠR	VI
Haemogamasus nidi Michael, 1892	–	–	1	–	–	–	–	–	1	0.02	0.05	2	ČR	VI
Hypoaspis sp.	1	–	–	–	–	–	–	–	1	0.02	0.05	2	JR	V
Macrochelidae														
Holostaspella exornata Filipponi et Pegazzano, 1967	1	–	–	–	–	–	–	–	1	0.02	0.05	2	ŠR	VI
Holostaspella neglecta Krauss, 1970	6	–	–	–	–	–	–	–	6	0.12	0.3	4	JR, ŠR	VI
Macrocheles glaber (J. Müller, 1859)	1	–	–	–	–	–	–	–	1	0.02	0.05	2	JR	VI
Macrocheles muscaedomesticae (Scopoli, 1772)	14	–	–	–	–	–	–	–	14	0.28	0.7	4	JR	VI
Macrocheles penicilliger (Berlese, 1903)	–	–	1	–	–	–	–	–	1	0.02	0.05	2	JN	VIII
Macrocheles slovacus Mašán et Fenďa, 2003	8	–	–	–	–	–	–	–	8	0.16	0.4	2	ŠR	VI
Macronyssidae														
Ornithonyssus sylviarum (Canestrini et Fanzago, 1877)	–	–	27	–	–	–	–	–	27	0.54	1.35	4	ČR, JN	VI, VIII
Parasitidae														
Cornigamasus lunaris (Berlese, 1882)	4	–	1	–	–	–	–	–	5	0.1	0.25	6	ČR, JR	V, VI
Gamasodes bispinosus (Halbert, 1915)	16	–	–	–	–	–	8	–	24	0.48	1.2	6	JR, ŠR	VI, VIII

Table 1. Continued.

Taxon	*Fulica atra*	*Porzana parva*	*Ixobrychus minutus*	*Locustella luscinio-ides*	*Cygnus olor*	*Emberiza schoeniclus*	*Podiceps cristatus*	*Tachybaptus ruficollis*	total	A	D [%]	E [%]	site	month
Gamasodes spiniger (Trägårdh, 1910)	1	–	2	–	–	–	–	–	3	0.06	0.15	4	ČR, JR	VI
Gamasodes sp.	1	–	–	–	–	–	–	–	1	0.02	0.05	2	ŠR	VI
Lysigamasus sp.	2	–	–	–	–	–	–	–	2	0.04	0.1	2	ŠR	VI
Parasitus fimetorum (Berlese, 1903)	–	–	–	–	19	–	–	–	19	0.38	0.95	2	ŠR	VI
Phytoseiidae														
Amblyseius neobernhardi Athias-Henriot, 1966	2	–	3	–	–	–	–	–	5	0.1	0.25	6	ČR, JR	VI
Neoseiulus alpinus (Schweizer, 1922)	4	–	–	–	–	–	–	–	4	0.08	0.2	2	TR	VIII
Neoseiulus barkeri Hughes, 1948	1	–	–	–	–	–	–	–	1	0.02	0.05	2	ŠR	VI
Neoseiulus cucumeris (Oudemans, 1930)	49	–	35	–	–	2	–	–	85	1.7	4.26	28	ČR, JR, ŠR, TR, VR	V, VI, VIII
Neoseiulus reductus (Wainstein, 1962)	2	–	–	–	–	–	–	–	2	0.04	0.1	2	ŠR	VI
Neoseiulus umbraticus (Chant, 1956)	2	–	–	–	–	–	–	–	2	0.04	0.1	2	ŠR	VI
Proprioseiopsis levis (Wainstein, 1960)	3	–	1	–	–	–	–	–	4	0.08	0.2	6	ČR, ŠR	VI
Typhlodromus bakeri (Garman, 1948)	–	–	–	–	–	2	–	–	2	0.04	0.1	4	ČR	VI
Trematuridae														
Trichouropoda ovalis (C. L. Koch, 1839)	1	–	–	–	–	–	–	–	1	0.02	0.05	2	ŠR	VI
Urodinychidae														
Dinychus sp.	–	–	–	–	1	–	–	–	1	0.02	0.05	2	ŠR	VI
Veigaiaidae														
Veigaia nemorensis (C. L. Koch, 1839)	1	–	–	–	–	–	–	–	1	0.02	0.05	2	JR	VI
Zerconidae														
Zercon peltatus peltatus C. L. Koch, 1836	27	–	–	–	–	–	–	–	27	0.54	1.35	2	ŠR	VI
Total	1391	206	165	1	28	16	190	0	1997					
Number of nests / positive	26/17	1/1	5/4	2/1	3/1	1/1	11/3	1/0	50/28					
A	53.5	206	41.3	0.5	9.3	16	17.3		39.9					

nests (2 positive nests – 100% and 53 individuals – 5 species). The only positive nest from June was not situated on water, because of low water level in pond. This nest was formed of about 1 m high pile of very wet plant material (137 individuals – 5 absolutely different species). These different species (*Arctoseius semiscissus*, *Cheiroseius curtipes*, *Leioseius minusculus*, *Lasioseius confusus*, *Neojordensia sinuata*) probably prefer very wet substrates rather than wet ones (sensu Karg 1993). As for another nesting birds we didn't gather sufficient amount of nests to be able to explain relationship between age of nest and inhibiting nests by mites.

Differences in quantitative and qualitative structure of nidofauna among individual study sites were neglected.

ACKNOWLEDGEMENTS

The authors wish to thank to Rudolf Jureček, Dušan Cyprich, Miroslav Krumpál, and Peter Rác for collection and identification of some birds' nests. This study was fully supported by the Scientific Grant Agency of the Ministry of Education of Slovak Republic and the Slovak Academy of Sciences [VEGA Grant No. 2/0054/08: Dermanyssoid mites (Acari, Mesostigmata) associated with small mammals (Micromammalia) in Slovakia, with consideration on taxonomy, ecology and chorology of individual species].

REFERENCES

Ambros M, Krištofík J & Šustek Z, 1992: The mites (Acari, Mesostigmata) in the birds nests' in Slovakia. *Biologia (Bratislava)*, 47: 369–381.

Cyprich D & Krumpál M, 1995: Fleas (Siphonaptera) in nests of birds nesting in the crowns of trees and shrubs in Slovakia. *International Studies Sparrows (Instytut Ekologii PAN)*, 20–21: 27–40.

Fenďa P, 1999: First records of mites (Acarina, Mesostigmata) from Slovakia. *Biologia (Bratislava)*, 54: 528.

Fenďa P & Kalúz S, 2009: Distribution and ecology of the ascid mites in Slovakia (Acari, Mesostigmata, Ascidae). In: Tajovský K, Schlaghamerský J & Pižl V (eds.): Contributions to Soil Zoology in Central Europe III. *Institute of Soil Biology, Academy of Sciences of the Czech Republic, České Budějovice*, p. 33–40.

Fenďa P, Krumpál M & Cyprich D, 1998: The soil fauna in the birds' nests in Slovakia. In: Pižl V & Tajovský K (eds.): Soil Zoological Problems in Central Europe. *Institute of Soil Biology, Academy of Sciences of the Czech Republic, České Budějovice*, p. 23–30.

Fenďa P & Schniererová E, 2000: New records of mites (Acarina, Mesostigmata) from Slovakia. *Biologia (Bratislava)*, 55: 168.

Fenďa P & Schniererová E, 2004: Mites (Acarina: Mesostigmata) in the nests of Acrocephalus spp. and in neighbouring reeds. *Biologia (Bratislava)*, 59(Suppl.): 41–47.

Karg W, 1993: Acari (Acarina), Milben. Parasitiformes (Anactinochaeta) Cohors Gamasina, Leach, Raubmilben. (Die Tierwelt Deutschlands 59). *Gustav Fischer Verlag, Jena-Stuttgart-New York*, 523 pp.

Krištofík J, Mašán P & Šustek Z, 2001: Mites (Acari), beetles (Coleoptera) and fleas (Siphonaptera) in the nests of great reed warbler (Acrocephalus arundinaceus) and reed warbler (A. scirpaceus). *Biologia (Bratislava)*, 56: 525–536.

Krištofík J, Mašán P & Šustek Z, 2005: Arthropods in the nests of marsh warblers (Acrocephalus palustris). *Biologia (Bratislava)*, 60: 171–177.

Mašán P & Fenďa P, 2010: A review of the laelapid mites associated with terrestrial mammals in Slovakia, with a key to the European species (Acari: Mesostigmata: Dermanyssoidea). *Institute of Zoology SAS, NOI Press, Bratislava*, 187 pp.

Mašán P & Krištofík J, 1995: Mesostigmatid mites (Acarina: Mesostigmata) in the nests of penduline tit (Remiz pendulinus). *Biologia (Bratislava)*, 50: 481–485.

Mašán P & Országh I, 1995: Mites (Acarina) associated with species of genera Lithobius (Chilopoda: Lithobiidae) and Culicoides (Diptera: Ceratopogonidae). *Entomofauna Carpathica*, 7: 61–66.

Mrciak M & Rosický B, 1956: K fauně roztočů řádu čmelíkovců (Parasitiformes) z území ČSR. *Zoologické listy*, 5: 143–148.

Nikolskii VV, Mirzaeva AG & Glushchenko NP, 1981: Trophic and phoretic associations in mites and Ceratopogonidae. In: Cherepanov AI (ed.): Fauna and ecology of arthropods of Siberia. Proceedings of the 5th conference of Siberian entomologists. *Izdavatelstvo Nauka, Novosibirsk*, p. 247–251. [in Russian]

Nordberg S, 1936: Biologisch - Ökologische Untersuchungen über die Vogelnidicolen. *Acta Zoologica Fennica*, 21: 1–168.

Storer RW 2002: The metazoan parasite fauna of loons (Aves: Gaviiformes), its relationship to the birds' evolutionary history and biology, and a comparison with the parasite fauna of grebes. *Miscellaneous Publications Museum of Zoology University of Michigan* 191: 1–44.

Yakimenko VV, Bogdanov II & Tagiltsev AA, 1990: Arthropods of shelter complex in colonies of gulls in the northern forrest – steppe of the Omsk district. *Parazitologiya (St.Petersburg)*, 24: 390–395. [in Russian].

Doručené (Submitted): 2.10.2009
Prijaté (Accepted): 24.9.2010
Vyšlo (Published) online: 27.9.2010