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FIRST DATA ON MOSS MITE (ACARI: ORIBATIDA) COMMUNITIES IN THE CALCAREOUS FEN APŠUCIEMS, LATVIA

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Oribatid fauna was investigated in the fen of Apšuciems (Latvia) in 20th of May 2009. Thirty sampling plots were chousen and soil samples were collected using soil borer. Vegetation cover was registered. Oribatids were extracted on Tullgren funnels. In total, 55 species and 9 morphospecies were recorded. 24 species were recorded for the first time in the fauna of Latvia. The mean density of adult mites were 19,496 (103 ind/m^2). The most dominant species were *Trhypochthoniellus longisetus* forma *longiseta*, *Steganacarus (Atropocarus) striculus*, *Malacanothrus monodactylus*, *Nanhermannia comitalis* and *Limnozetes ciliatus*. 37% of collected 9352 mites were juveniles. Proportional relation between adults and juveniles widely varied among oribatid species. In many cases significant correlations between oribatid species were detected. Correlations also between oribatids and plants and mosses were calculated.

Key words: Oribatida, species, fauna, calcareous fen, Latvia.

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INTRODUCTION

Calcareous fens are semi-aquatic habitats with plant species like *Cladium mariscus*, *Carex dawalliana*, *C. elata*, *Carex lasiocarpa*, *Schoenus ferrugineus*, *Phragmites australis*, and mosses *Calliergonella cuspidata*, *Scorpidium scorpidiodes*. Its sintaksonomical affiliation is *Cladietum marisci* and *Magnocarision elatae*. These fens by plant composition correspond to the protected EU habitats calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* (Code 7210) and Alkaline fens (Code 7230) (Annonymous 2007, Auniņš 2010). High ground water level is one of the most important aspect that sustains calcareous fens. A source of calcium can be high abundance of bedrock close to the fen's surface as well as continuous supply of calcium-rich groundwaters (Tabaka 1960, Kabucis 2000, Pakalne 2008).

Oribatid mites in fens are the most abundant and

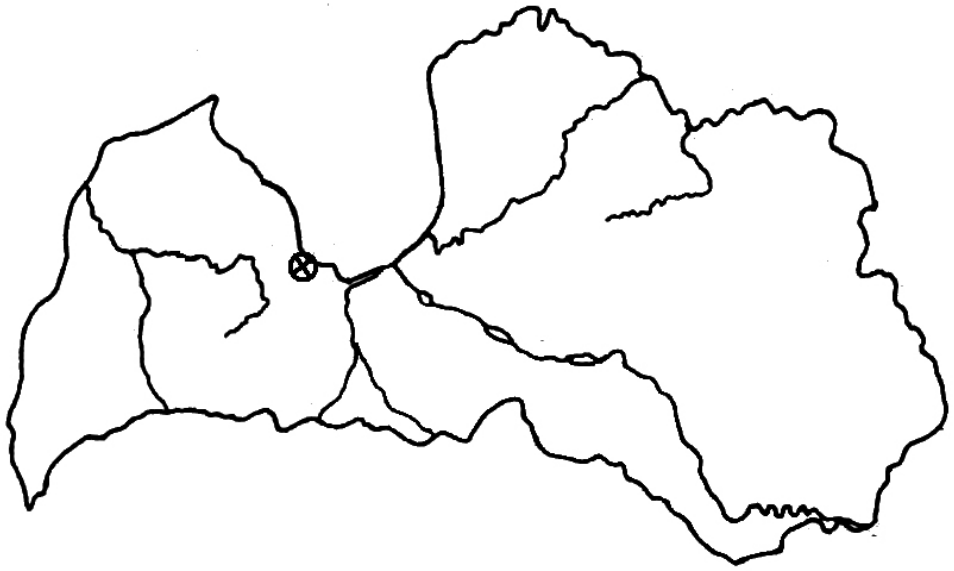

Fig.1. Location (marker - ⊗) of the Apšuciems fen in Latvia.

diverse group of microarthropods (Seniczak et al. 2010, after Belanger 1976). Not only fens but also bogs in river valleys, lakes, raised bogs, wet meadows and various types of wet forests are highly moist semi-aquatic ecosystems (Popp 1962). In studies of oribatology semi-aquatic habitats have been compared using oribatid communities (Macfadyen 1952, Popp 1962, Weigmann 1982, Weigmann 1991, Kehl 1997, Weigmann 1997, Sidorchuk 2008, Seniczak et al. 2010). But still, data are very diverse and slightest change in habitat results in a difference in oribatid species composition. Some of the most convincing publications investigating indicators for fens and similar habitats have been written by G. Weigmann (1991, 1997).

In Belgium, a group of oribatologists have studied changes in oribatid species subsets following different ecological and behavioural patterns, accordingly to various soil types they inhabit. It was indicated that oribatid spatial distribution as well as species composition can be highly specific in calcareous mull soils (Lebrun et al. 1989).

C. Kehl (1997) observed Malaconothridae Berlese, 1916 mites from various types of fens in Germany. It was proved that Malaconothrid mites can indicate differences between closelly related fens. *Malaconothrus monodactylus* (Michael, 1888) also was stated to be the most dominant oribatid species.

In Latvia, despite the fact that oribatids have been investigated since 19th sentury (Grube 1859), studies in fen ecosystems have not been organized. Brief research was carried out during the investigation in rised bogs by V. Spuņģis (2008). However there hasn't been done any moss mite research in the Latvian fens till now.

The aim of this investigation is to describe oribatid community in the Apšuciems calcareous fen.

MATERIAL AND METHODS

The fen is situated at Engure municipality, Latvia (N 57°05'29", E 23°31'69") (Fig. 1). Apšuciems fen represent calcareous fens of EU importance (Habitat directive Annex I). The fen is also Natura 2000 site because of specific composition of vegetation, soil structure and hydrological conditions.

Investigation was curried out on May 20th, 2009 in the Apšuciems fen. 60 meters long transect with 30 sampling plots (area – 1m^2) were chosen (distance between samples were two meters).

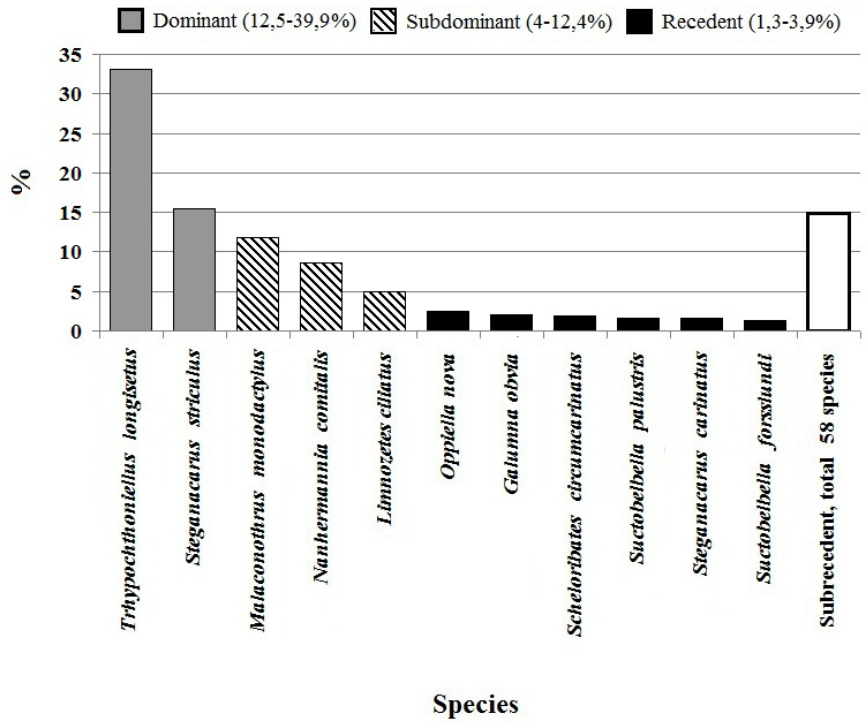

Fig. 2. Dominance (%) of different oribatid taxa sampled in the fen of Apšuciems, on May 20th, 2009.

Braun-Blanquet method was used to describe vegetation cover in each plot.

Plant species *Myrica gale*, *Schoenus ferrugineus*, *Cladium mariscus*, *Molinia caerulea*, *Carex panicea*, *Potentilla erecta*, *Parnassia palustris*, *Succisa pratensis* and *Scirpus tabernaemontani* and mosses *Campylium stellatum*, *Calliergonella cuspidata* and *Fissidens adianthoides* had the largest cover in the Apšuciems fen.

Soil samples were collected in the center of the plot using a soil borer (sample area – 0,01m^2). Mites were extracted on Tullgren funnels for seven days (25W light bulbs) (Dunger et al. 1997). Specimens were mounted in Hoyer's medium (Krantz 1978) and observed under the transmited light microscope Olympus BX41 combined with digital camera Olympus DP12. Species were identified after Weigmann's (2006) determination key and correctness was confirmed by G.Weigmann (Germany) and R.Pentinenn (Finland). Some of taxonomical elements also was incorporated from H. Schatz (2003). Material is deposited in the Institute of Biology, University of Latvia.

Dominance classes were chosen according to the A.D. Engelmann (1978) classification. Correlations among oribatid and plant species and correlations among oribatid species were calculated only to dominant, subdominant or recedent species. Mean/average number V, dominance (D = % of total oribatid mites), constancy (C = % of samples), abundance (A, in 10^3 ind/m^2) (Seniczak et al. 2010), age structure ratio (R = division of adult and juvenile mites) were calculated. Species diversity was expressed as Shannon index (Crebs 1999).

RESULTS

In total, 5849 oribatid adults and 3503 juveniles representing 55 identified species (including two

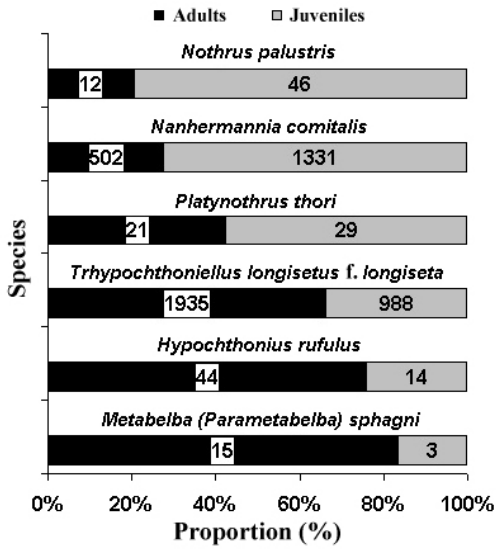

Fig. 3. Age structures of oribatid mites of six species sampled in the fen of Apšuciems, on May 20th, 2009. Number of individuals ir indicated on the bars.

subspecies and three forms), 9 morphospecies and 7 unidentified taxa were recorded. Mean density of was 31713 ind/m^2, of them 19496 adult ind/m^2 and 11676 juvenile ind/m^2. Shannon index was 3,59, and evaluated as comparatively high. More detailed characteristics of oribatid species is given in the table (Table 1). 24 species were registered for the first time to the fauna of Latvia and are published recently (Kagainis 2011).

Two species were dominant – *Trhypochthoniellus longisetus* forma *longiseta* 33,08% and *Steganacarus (Atropacarus) striculus* 15,39%. Three subdominant and six recedent species were registered. The other 58 species were subrecedent (Fig. 2).

37% of the collected 9352 mites were determined as juvenile instars. They showed different dominance among identified six species (Fig. 3). For example, 80% of *Nothrus palustris* individuals were juveniles while of *Metabelba (Parametabelba) sphagni* – only 27%.

Many correlations between oribatid species were calculated. The most significant connections were calculated between species like *Steganacarus (Atropacarus) striculus*, *Nanhermannia comitalis*, *Suctobelbella palustris* and *Oppiella (Oppiella) nova* ($p<0,05$). Correlation between oribatid adults and juveniles was significant ($r=0,92$, $p<0,001$, $n=30$) and in some cases between oribatids and plant and moss species (Table 2).

DISCUSSION

Numbers of mites and mite species from Apšuciems fen are somehow bigger than in other four similar fens studied earlier (Table 3), and the number of species is nearly twice as big. Abundance range of oribatid mites is more variable than it has been registered in similar studies (Table 3). That could be explained by the number of samples that have been taken in studied fens (Weigmann 1991, Seniczak et al. 2010). 30 samples were collected in this study, while five samples in fens on Norway and six samples in fens of Germany (Weigmann 1991, Senizcak et al. 2010). This explains differences among obtained results.

G. Weigmann (1991, 1997) proposed oribatid indicators to the fens – *Punctoribates sellnicki*, *Scheloribates (Topobates) circumcarinatus*, *Zetomimus furcatus*, *Suctobelbella palustris* and *Malaconothrus monodactylus*. G. Weigmann (1991) also listed oribatid species that can be found in grate numbers but are not to be the indicators: *Suctobelbella subcornigera*, *Oppiella (Opppiella) nova* and *Steganacarus (Atropacarus) striculus*. Data on dominant oribatids in semi-aquatic habitats also can be found in the work of *Seniczak and colleagues (2010)*. They mention species like *Limnozetes ciliatus* (A = 15'930 ind/m^2, D = 31%), *Trimalaconothrus angulatus* (A = 1'780 ind/m^2, D = 6%) and *Limnozetes rugosus* (A = 880 ind/m^2, D = 3%).

Dominant oribatid fauna of Apšuciems fens differs from the other fens studied earlier. *Malaconothrus monodactylus*, *Limnozetes ciliatus*, *Scheloribates (Topobates) circumcarinatus* and *Steganacarus (Atropacarus) striculus* are species found to be dominant not only in the Apšuciems but also in the other investigated fens (Table

Table 1. Characteristic of the material of oribatid mites from 30 samples collected in Apšuciems calcareous fen on May 20th, 2009. N – total number of adult individuals; D – dominance (% of total oribatid mites); C – constancy (% of samples); V – mean number in samples; A – abundance (in 10^3 ind/m^2); M – max. number (in the sample); P – number of populated samples; n – total number of juvenile individuals

No.	Species	N	D	C	V	A	M	P	n
1	2	3	4	5	6	7	8	9	10
	Paleosomata Grandjean, 1969 spp	2	0,03	6,67	0,07	0,01	1	2	
	Brachiochthoniidae Thor, 1934 spp	2	0,03	6,67	0,07	0,01	1	2	
1.	*Liochthonius furcillatus* (Willmann, 1942)	1	0,02	3,33	0,03	0,00	1	1	
2.	*Liochthonius hystricinus* (Forsslund, 1942)	21	0,36	36,7	0,7	0,07	5	11	
3.	*Liochthonius tuxeni* (Forsslund, 1957)	1	0,02	3,33	0,03	0,00	1	1	
4.	*Hypochthonius rufulus* C.L. Koch, 1835	44	0,75	56,7	1,47	0,15	6	17	14
5.	*Eniochthonius minutissimus* (Berlese, 1903)	1	0,02	3,33	0,03	0,00	1	1	
6.	*Haplophthiracarus illinoisensis* (Ewing, 1909)	25	0,43	50	0,83	0,08	5	15	
7.	*Phthiracarus ferrugineus* (C.L. Koch, 1841)	37	0,63	66,7	1,23	0,12	6	20	
8.	*Phthiracarus globosus* (C.L. Koch, 1841)	5	0,09	6,67	0,17	0,02	4	2	
	Phthiracarus Perty, 1841 sp4	32	0,55	56,7	1,07	0,11	5	17	
9.	*Steganacarus (Atropacarus) striculus* (C.L. Koch, 1835)	900	15,4	100	30	3,00	122	30	
10.	*Steganacarus (Tropocarus) carinatus* f. *carinata* (C.L. Koch, 1841)	94	1,61	83,3	3,13	0,31	10	25	
11.	*Steganacarus (Tropocarus) carinatus* f. *pulcherrima* (Berlese, 1887)	1	0,02	3,33	0,03	0,00	1	1	
12.	*Steganacarus spinosus* (Sellnick, 1920)	37	0,63	53,3	1,23	0,12	7	16	
13.	*Microtritia minima* (Berlese, 1904)	1	0,02	3,33	0,03	0,00	1	1	
14.	*Rhysotritia ardua* (C.L. Koch, 1841)	1	0,02	3,33	0,03	0,00	1	1	
15.	*Malaconothrus monodactylus* (Michael, 1888)	695	11,9	93,3	23,2	2,32	75	28	
16.	*Trimalaconothrus angulatus* Willmann, 1931	66	1,13	60	2,2	0,22	15	18	29
17.	*Trimalaconothrus maior* (Berlese, 1910)	2	0,03	3,33	0,07	0,01	2	1	
18.	*Trhypochthoniellus longisetus* f. *longiseta* (Berlese, 1904)	1935	33,1	100	64,5	6,45	207	30	988
19.	*Nothrus palustris* C.L. Koch, 1839	12	0,21	26,7	0,4	0,04	3	8	46
20.	*Platynothrus thori* (Berlese, 1904)	21	0,36	33,3	0,7	0,07	7	10	29
21.	*Nanhermannia comitalis* Berlese, 1916	502	8,58	93,3	16,7	1,67	69	28	1331
22.	*Hermanniella dolosa* Grandjean, 1931	30	0,51	46,7	1	0,10	5	14	
23.	*Metabelba (Parametabelba) sphagni* Strenzke, 1950	15	0,26	26,7	0,5	0,05	4	8	3
24.	*Xenillus tegeocranus* (Hermann, 1804)	1	0,02	3,33	0,03	0,00	1	1	
25.	*Ceratoppia quadridentata* (Haller, 1882)	2	0,03	6,67	0,07	0,01	1	2	
26.	*Carabodes femoralis* (Nicolet, 1855)	1	0,02	3,33	0,03	0,00	1	1	
27.	*Carabodes labyrinthicus* (Michael, 1879)	1	0,02	3,33	0,03	0,00	1	1	
28.	*Tectocepheus velatus sarekensis* Tragardh, 1910	3	0,05	3,33	0,1	0,01	3	1	
29.	*Tectocepheus velatus velatus* (Michael, 1880)	75	1,28	43,3	2,5	0,25	14	13	
30.	*Quadroppia hammerae* Minguez et al., 1985	6	0,1	13,3	0,2	0,02	3	4	

No.	Species	N	D	C	V	A	M	P	n
1	2	3	4	5	6	7	8	9	10
	Quadroppia Jacot, 1939 sp1	5	0,09	6,67	0,17	0,02	3	2	
31.	*Oppiella (Oppiella) nova* (Oudemans, 1902)	145	2,48	46,7	4,83	0,48	27	14	
32.	*Oppiella (Rhinoppia) hygrophila* (Mahunka, 1987)	48	0,82	40	1,6	0,16	13	12	
	Oppiella Jacot, 1937 sp1	8	0,14	10	0,27	0,03	5	3	
	Oppiella Jacot, 1937 sp2	1	0,02	3,33	0,03	0,00	1	1	
	Oppiella Jacot, 1937 sp3	3	0,05	3,33	0,1	0,01	3	1	
	Oppioidea Grandjean, 1951 spp	2	0,03	6,67	0,07	0,01	1	2	
	Suctobelba Paoli, 1908 sp1	2	0,03	3,33	0,07	0,01	2	1	
33.	*Suctobelbella forsslundi* (Strenzke, 1950)	81	1,38	46,7	2,7	0,27	24	14	
34.	*Suctobelbella palustris* (Forsslund, 1953)	98	1,68	73,3	3,27	0,33	26	22	
35.	*Suctobelbella subcornigera* (Forsslund, 1941)	57	0,97	53,3	1,9	0,19	10	16	
	Suctobelbella Jacot, 1937 sp1	16	0,27	26,7	0,53	0,05	6	8	
	Suctobelbella Jacot, 1937 sp2	22	0,38	33,3	0,73	0,07	6	10	
	Suctobelbella Jacot, 1937 sp3	7	0,12	6,67	0,23	0,02	6	2	
	Suctobelbella Jacot, 1937 spp	2	0,03	6,67	0,07	0,01	1	2	
36.	*Conchogneta traegardhi* (Forsslund, 1947)	1	0,02	3,33	0,03	0,00	1	1	
37.	*Bankinosoma lanceolata* (Michael, 1885)	3	0,05	6,67	0,1	0,01	2	2	
38.	*Limnozetes ciliatus* (Schrank, 1803)	290	4,96	83,3	9,67	0,97	123	25	
39.	*Limnozetes rugosus* (Sellnick, 1923)	5	0,09	6,67	0,17	0,02	4	2	
40.	*Micreremus brevipes* (Michael, 1888)	5	0,09	6,67	0,17	0,02	4	2	
41.	*Eupelops plicatus* (C.L. Koch, 1835)	1	0,02	3,33	0,03	0,00	1	1	
42.	*Achipteria coleoptrata* (Linne, 1758)	1	0,02	3,33	0,03	0,00	1	1	
43.	*Anachipteria deficiens* Grandjean, 1932	42	0,72	60	1,4	0,14	8	18	
44.	*Parachipteria willmanni* van der Hammer, 1952	5	0,09	13,3	0,17	0,02	2	4	
45.	*Galumna obvia* (Berlese, 1915)	123	2,1	90	4,1	0,41	12	27	
46.	*Pilogalumna tenuiclava* (Berlese, 1908)	41	0,7	70	1,37	0,14	5	21	
47.	*Ceratozetes peritus* Grandjean, 1951	12	0,21	23,3	0,4	0,04	3	7	
48.	*Fuscozetes fuscipes* (C.L. Koch, 1844)	40	0,68	63,3	1,33	0,13	6	19	
49.	*Trichoribates novus* (Sellnick, 1928)	2	0,03	6,67	0,07	0,01	1	2	
50.	*Minunthozetes pseudofusiger* (Schweizer, 1922)	6	0,1	13,3	0,2	0,02	3	4	
51.	*Minunthozetes semirufus* (C.L. Koch, 1841)	1	0,02	3,33	0,03	0,00	1	1	
52.	*Punctoribates sellnicki* Willmann, 1928	11	0,19	20	0,37	0,04	3	6	
53.	*Scheloribates (Topobates) circumcarinatus* Weigmann et Miko, 1998	115	1,97	76,7	3,83	0,38	13	23	
54.	*Scheloribates laevigatus* (C.L. Koch, 1836)	74	1,27	86,7	2,47	0,25	9	26	
	Scheloribates Berlese, 1908 spp	1	0,02	3,33	0,03	0,00	1	1	
55.	*Zygoribatula frisiae* (Oudemans, 1916)	1	0,02	3,33	0,03	0,00	1	1	
	juvenile ind. spp			96,7	35,4	11,7	129	29	1063
	Total number	**5849**	**100**	**100**		**19,5**		**30**	**3503**

Table 2. Statistically significant correlations ($p<0{,}05$) among oribatid, plant and moss species investigated in calcareous fen of Apšuciems, on May 20th, 2009. Remarks: * - significance at $p<0{,}01$, N=30; ** significance at $p<0{,}001$, N=30

Mite species		*Steganacarus (Tropacarus) carinatus* f. *carinata*	*Suctobelbella palustris*	*Scheloribates (Topobates) circumcarinatus*	*Galumna obvia*	*Oppiella (Oppiella) nova*	*Nanhermannia comitalis*	*Malaconothrus monodactylus*	*Steganacarus (Atropacarus) striculus*	*Trhypochthoniellus longisetus* f. *longiseta*	Juveniles	Adults
Plant and moss species	*Schoenus ferrugineus*		0,42			0,58**	0,44		0,4		0,42	0,36
	Carex panicea						0,52*					0,38
	Potentilla erecta						0,53*					
	Molinia caerulea		0,44			0,55*			0,45	0,41	0,58**	0,51*
	Cladium mariscus			-0,43		-0,45	-0,4				-0,46	-0,42
	Campylium stellatum					-0,4	-0,36			-0,45	-0,38	-0,42
	Adults										0,92**	
Mite species	*Trhypochthoniellus longisetus* f. *longiseta*								0,37			
	Steganacarus (Atropacarus) striculus	0,44	0,74**		0,44	0,80**	0,77**	0,70**				
	Malaconothrus monodactylus	0,49*	0,47*			0,63**	0,46					
	Nanhermannia comitalis	0,49*	0,48*	0,48*	0,37	0,66**						
	Oppiella (Oppiella) nova	0,37	0,49*		0,4							
	Galumna obvia											
	Scheloribates (Topobates) circumcarinatus											
	Suctobelbella palustris											
	Steganacarus (Tropacarus) carinatus f. *carinata*											

Table 3. Characteristics of species number, mean abundance, abundance range, dominance (*Limnozetes ciliatus* (c), *L. rugosus* (r) and *Trimalaconothrus angulatus* (a)) and adult-juvenile ratio of oribatids studied by various authors in the fens

Oribatid characteristics		**Reference**				
		Seniczak et al. 2010 (Blamansvannet fen)	Seniczak et al. 2010 (Higher Lake)	Weigmann 1991 (mesotrophic fen)	Weigmann 1991 (oligotrophic fen)	Present study (Apšuciems fen)
Number of species		37	26	20	22	56
Mean abundance, 10^3 ind/m^2		28,140	51,160	24,000	22,000	31,713
Abundance range, 10^3 ind/m^2		21,250-33,830	34,270-83,250			3,800-92,200
Dominance of species		a=6%, r=3%	c=31%			c=5%, a=1%, r=0,1%
Adult-juvenile ratio	*Trhypochthoniellus longisetus* f. *longiseta*	0,754				1,941
	Nothrus sp.	0,408				0,286
	Platynothrus sp.	0,176				0,724

Table 4. Most dominant species of oribatid mites from fen ecosystems studied by various authors

	Reference						
	Seniczak et al. 2010 (Blamansvannet fen)	Seniczak et al. 2010 (Higher Lake)	Weigmann 1991 (mesotrophic fen)	Weigmann 1991 (oligotrophic fen)	Macfadyen 1952 (*Molinia* fen)	Kehl 1997 (various fens)	Present study (Apšuciems fen)
Species	*Trimalaconothrus maior, Liochthonius pedunculariis, Limnozetes ciliatus, Nanhermannia* cf. *coronata*	*Limnozetes ciliatus, Liochthonius alpestris, Platynothrus punctatus*	*Punctoribates sellnicki*, *Scheloribates (T.) circumcarinatus*, *Zetomimus furcatus*, *Suctobelbella palustris*, *Malaconothrus monodactylus*, *Suctobelbella subcornigera*, *Oppiella (O.) nova*, *Steganacarus (A.) striculus*		*Minunthozetes. Semirufus*, *Nanhermannia elegantula*, *Eniochthonius minutissimus*, *Oppiella (M.) neerlandica*, *Malaconothrus monodactylus*, *Semirufus latipes*	*Malaco-nothrus monodactylus*	*Trhypochthonius longisetus* forma *longiseta, Steganacarus (A.) striculus*, *Malaconothrus monodactylus*, *Nanhermannia comitalis*, *L. ciliatus*, *O. (O.) nova*, *G.obvia*, *Scheloribates (T.) circumcarinatus*

4). Species composition can vary depending on calcium density and soil type (Lebrun et al. 1989). These characteristics can also influence vegetation cover (Tabaka 1960, Kabucis 2000, Pakalne 2008). Vegetation of Apšuciems fen differs from other earlier investigated areas (Weigmann 1991, Seniczak et al. 2010). That could explain the differences in species composition and dominance. The vegetation of *Molinia* fen at Cothill (Macfadyen 1952) is more similar to the fen of Apšuciems, but dominant species still are different (Table 4). It is believed that species composition and dominance can depend on specific factors other than vegetation. However, there have not been done enough studies to proove this assumption.

A. Macfadyen (1952) has described *Molinia caerulea* fen at Cothill (Berkshire, United Kingdom) that in many ways seems to be similar to the Apšuciems. Fen at Cothill is continuously flooded with calcareous water streams. Vegetation cover is similar to the fen of Apšuciems with plants like *Molinia caerulea* and *Carex* spp. Investigation was carried out on May that also appears to be similar to the current study. Dominant oribatid species were *Minunthozetes semirufus*, *Nanhermannia elegantula*, *Eniochthonius minutissimus*, *Oppiella (Moritzoppia) neerlandica*, *Malaconothrus monodactylus* and *Scheloribates latipes* (Macfadyen 1952).

The two dominant species of the fen of Apšuciems have been found also in the semi-aquatic habitats in Lithuania. But species like *Malaconothrus monodactylus, Nanhermannia comitalis* and *Limnozetes ciliatus*, for example in Lithuania, are rare species and have not been registered in fen ecosystems. One of the possible reasons for that is absence of studies in the calcareous fens till now (Eitminavichute 2003).

A. Seniczak et al. (2010) calculated adult-juvenile ratios where 0,408 for *Nothrus pretensis* and 0,754 for *Trhypochthoniellus longisetus* forma *longiseta*. Variation in age structuer can depend mainly on variation in soil type (Seniczak et Seniczak 2010). Scientists were using modifyed Tullgren funnel apparatus. G. W. Krantz (1978) described the aspects of use of different extracting methods and their advantages and dissadvantages of extracting nymphs and larvae. It can be useful to modify extracting apparatus in porpose of collecting more juvenile instars that are highly sensitive on heat and sudden changes of temperature (Krantz 1978).

Results of this study show various models of age structure (Figure 3). However, proportions can depend on different factors, such as e.g. type of soil that are inhabited (Seniczak et Seniczak 2010). Age structure of oribatids have been studied by Seniczak et al. (2010). *Trhypochthoniellus longisetus* f. *longiseta* can be compared with the present investigation. In the Norwegian fen this species shows domination of juvenile instars (57%) while in the Apšuciems fen much more adults (66%) were registered (Table 3) and age structure ratio is completelly different: 0,754 and 1,941, respectively. Norwegian fen was investigated on June 6th (Seniczak et al. 2010) and Apšuciems fen was studied on May 20th. It means that there are no significant seasonal diferences. It may be possible that dissmillarity in age structure is becouse of various extracting methods. During the investigation of norvegian fens modifyed Tullgren funnels were used to extract more immatures. Moreover, A. Seniczak et al. (2010) identified oribatid juveniles to the species level for most of the species. What is more interesting, in two cases of species from the same genera, similarity were registered. Adult-juvenile ratio of *Nothrus palustris* from the Apšuciems fen and *Nothrus pratensis* from the fens of Norwey are more similar (Table 3).

Vegetation in the Apšuciems fen differs from other fens used in comparision during this analysis. And still, there have been found some interactions between oribatid mites and vegetation cover. Correlations between mites and vegetation cover in Apšuciems fen were registered several times (Table 2) but hardly can be somehow explained. Positive as well as negative correlations were calculated and may be explained as the result of oribatid adaptations to the specific ecological conditions and trophical needs. Investigations by using indicators done so far also have proved

that mites can be closelly related to the specific conditions, including plant species and vegetation cover (Weigmann 1991, Kehl 1997, Gergocs, Hufnagel 2009).

It is prescribed that studies in Apšuciems will be continiued and more results will be obtained for detailed analisys and discussions.

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