ADDITIONS TO THE ORIBATID MITES FAUNA (ACARI, SARCOPTIFORMES, ORIBATIDA) AND THEIR COMMUNITY STRUCTURE IN THE DANUBE DELTA BIOSPHERE RESERVE

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Abstract

The present study is part of some recent ecological investigations carried out in the Danube Delta Biosphere Reserve in order to assess the risks to biodiversity and the impact of natural and anthropogenic factors on characteristic ecosystems. Meadows and agro-ecosystems have been taken into study, aiming to investigate qualitatively and quantitatively the oribatid communities, diversity and distribution of species depending on the type of habitat.
In terms of fauna 60 species have been identified belonging to 43 genera and 31 families of the suborder Oribatida Dugès, 1834. The family Ctenacaridae Grandjean, 1954, genera *Ctenacarus* Grandjean, 1939 *Exochocepheus* Woolley and Higgins, 1968, also the species *Ctenacarus araneolus* (Grandjean, 1932), *Exochocepheus laticuspis* (Balogh and Mahunka, 1965) and *Oribatula (Zygoribatula) andrianovae* (Bulanova-Zachvatkina, 1967) were recorded for the first time in Romanian fauna.
The global average abundance and number of species varies widely from one sampling site to another, even in the case of similar ecosystems. However, in the non-grazing meadows, generally higher values of these parameters were observed compared to cultivated soils and pastures. From a qualitative point of view, notable differences were observed in the species composition of the oribatid communities in meadows and crops, even if they were located in the immediate vicinity. On the other hand, a degree of similarity was noted in the species composition and structure of oribatid coenoses in the agro-ecosystems, regardless of the type of crop and soil.

Key words: oribatid mites, diversity, meadow, agro-ecosystem, wetland

Danube Delta Biosphere Reserve (DDBR) is recognized as one of the places with highest biodiversity in the world. On its territory two of the European bioregions are found - the Pontic and the Steppe one, hence some particular features of both flora and fauna. The deltaic biome comprises various natural habitats, most of them protected at the European Union level within the Natura 2000 network, and besides some anthropogenic habitats (Nicula G. *et al*, 2012; Gâştescu P., 2009). The management of this wetland of international interest is focused on the conservation of the natural heritage, but it must at the same time take into account the vulnerabilities and risks induced by human activities (Gâştescu P., Driga B., 2005).

On the other hand, oribatid mites have little capacity to respond numerically to short-term environmental alterations, because of their low metabolic rates, slow development, and low fecundity (Behan-Pelletier, 1999), thus the agroecosystems are not favorable environment for these microarthropods.

Based on these premises, but also on the results of previous research (Vasiliu N. *et al*, 1994; Vasiliu N., Ivan O., 1995) the present study aims to update the knowledge of the fauna and the oribatid communities in some characteristic ecosystems of the Danube Delta, as well as to investigate the possible influence of agricultural practices on the surrounding natural ecosystems. The study was conducted as part of an extensive ecological research carried out both in some core areas under full protection regime, as well as in economic zones of DDBR.

MATERIAL AND METHOD

Field research and sampling was carried out in the period 2015-2018 in 10 localities on the territory of the DDBR (Tulcea county), both in natural and anthropogenic ecosystems (*table 1*).

Series of 100 cm^2 soil samples have been taken over in each sampling site – 130 samples in all. Edaphic mesofauna has been extracted from samples through the Tullgren - Berlese method (the variant proposed by Balogh, 1958) and selected by systematic groups. The oribatid mites were subjected to microscopic study, in order to identify the species. The abundance of species

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was noted in each sample, and immature oribatids were globally counted. The primary data thus obtained have been processed using some analytic and synthetic ecological estimators: average abundance of each species (ā) and global average abundance (Ā), expressed as individuals/100cm^2 and, respectively, m^2; number of taxa – families (F), genera (G), species (S); average number of species/sample (S') frequency (C) and relative density (D.r.) of each species; index of ecological significance (W), expressed as classes: V and IV-edifying species, III-influential species, II and I-accompanying species; specific diversity (H(s)max, H(s), H.r.), estimated by the Shannon - Wiener equation; the adults/juvenile ratio.

The faunistic list of oribatid mites follows mainly the classification of Subías (Subías L. S., 2004, updated version 2019) and includes autecological peculiarities (according to Mahunka S., Mahunka-Papp L., 2004; Subías L. S., Arillo A., 2001; Vasiliu N. et al., 1993; Weigmann G., 2006) and world distribution of each species (Subías L. S., 2004, updated version 2019). Also, for each species is pointed the occurrence in different sampling sites (locality indicated by the corresponding number, and habitat type abbreviated as in *table 1*) , as well as ecological significance, as follows: +++ edifying species, ++ influential species, + accompanying species; * indicates first record in Romanian fauna.

Table 1

Location of sampling sites

Locality	Coordinates	Habitat type (abbreviation)	Sampling dates
1. Letea bank (near Hăşmacul Mare forest) #	45°18'53" N 29°34'22" E	mesophilous meadow (mm) #	22.07.2015
			11.05.2016
	45°18'54"N 29°33'18"E	meadow between dunes (dm) #	11.05.2016
2. Chilia Veche	45˚18'51" N 29˚14'09" E	maize (m)	10.05.2016
	45°22'46" N 29°14'22" E	rape (r)	10.05.2016
3. Tătaru Islet	45˚18'39" N 29˚03'27" E	wheat (w)	10.05.2016
4. Pardina	45˚19'33" N 28˚58'01" E	barley (b)	10.05.2016
5. Beştepe	45˚05'15" N 29˚02'27" E	xerophilous meadow (xm)	12.07.2018
		maize (m)	12.07.2018
		sunflower (s)	12.07.2018
		rape (r)	12.07.2018
6. Murighiol #	45°01′41″ N 29°09′32″ E	halophilous meadow (hm)#	09.05.2016
			13.07.2018
	45˚01'55" N 29˚08'12" E	barley (b)	06.06.2017
		sunflower (s)	13.07.2018
		lucerne (l)	13.07.2018
7. Plopu	45°01′23″ N 29°06′34″ E	halophilous meadow (hm) - pasture	13.07.2018
		wheat (w)	07.06.2017
			13.07.2018
8. Sarinasuf	45°00′51″ N 29°04′53″ E	halophilous meadow (hm) - pasture	13.07.2018
		lucerne (l)	07.06.2017
			13.07.2018
		sunflower (s)	07.06.2017
		wheat (w)	13.07.2018
9. Sarichioi	44°55′35″ N 28°6′13″ E	pea (p)	07.06.2017
10. Enisala	44°52′42″ N 28°49′7″ E	xerophilous meadow (xm)	23.09.2015

Legend: # fully protected areas

RESULTS AND DISCUSSIONS

Investigation on the oribatid mite fauna resulted in identification of 60 species belonging to 43 genera and 31 families of the suborder Oribatida Dugès, 1834, as listed below:

Fam. Ctenacaridae Grandjean, 1954*
<u>*Ctenacarus*</u> Grandjean, 1939*
-*C. araneolus* (Grandjean, 1932)*: 8-s (+); prefers forest humus; pantropical, subtropical

Fam. Brachychthoniidae Thor, 1934
<u>*Brachychthonius*</u> Berlese, 1910
-*B. pius* Moritz, 1976: 5-xm (+); silvicolous, xerophilous; Holarctic
<u>*Liochthonius (Liochthonius)*</u> Hammen, 1959
-*L. (L.) sellnicki* (Thor, 1930): 1-dm (+), 5-xm (+); eurytopic, prefers forest soils; Holarctic, SE China
-*L. (L.) simplex* (Forsslund, 1942): 6-hm (+); silvicolous species; semi-cosmopolitan

Poecilochthonius Balogh, 1943
- *P. italicus* (Berlese, 1910): 6-hm (+); meso-xerophilous; Holarctic
Sellnickochthonius Krivolutsky, 1964
-*S. immaculatus* (Forsslund, 1942): 2-m (+), 5-xm (+), 6-hm (++), 7-hm (+); eurytopic, prefers forest soils; Holarctic, Neotropical

Fam. Cosmochthoniidae Grandjean, 1947
Cosmochthonius (Cosmochthonius) Berlese, 1910
-*C. (C.) lanatus* (Michael, 1885): 8-l (+); eurytopic, xerophilous; cosmopolitan

Fam. Haplochthoniidae Hammen, 1959
Haplochthonius (Haplochthonius) Willmann, 1930
-*H. (H.) simplex* (Willmann, 1930): 5-m (++), 9-p (++); recorded in dry, xerothermic habitats; semi-cosmopolitan

Fam. Sphaerochthoniidae Grandjean, 1947
Sphaerochthonius Berlese, 1910
-*S. splendidus* (Berlese, 1904): 5-xm (+++), 10-xm (+); thermo-xerophilous; pantropical

Fam. Lohmanniidae Berlese, 1916
Lohmannia (Lohmannia) Michael, 1898
-*L. (L.) turcmenica* Bulanova-Zachvatkina, 1960: 8-s (+), 8-w (+); xerophilous; tropical (SE China, Argentina, S Palaearctic)

Fam. Epilohmanniidae Oudemans, 1923
Epilohmannia Berlese, 1910
-*E. cylindrica* (Berlese, 1904): 3-w (+++), 4-b (++), 5-xm (++), 6-b (++), 6-l (+++), 6-hm (+), 7-w (++), 8-l (+), 8-s (++), 8-w (+++), 9-p (++); eurytopic, grassland species; cosmopolitan

Fam. Euphthiracaridae Jacot, 1930
Acrotritia Jacot, 1923
-*A. ardua* (Koch, 1841): 6-l (++), 8-l (+); mainly silvicolous, eurytopic; cosmopolitan

Fam. Crotoniidae Thorell, 1876
Heminothrus (Platynothrus) Berlese, 1913
-*H. (P.) peltifer* (Koch, 1839): 6-hm (+); eurytopic, mesophilous, salt tolerant; semi-cosmopolitan

Fam. Neoliodidae Sellnick, 1928
Poroliodes Grandjean, 1934
-*P. farinosus* (Koch, 1839): 5-xm (+++); silvicolous; Palaearctic, Nepal

Fam. Gymnodamaeidae Grandjean, 1954
Adrodamaeus Paschoal, 1984
-*A. siculus* (Berlese, 1910): 5-xm (++); South and Central Europe

Fam. Damaeidae Berlese, 1896
Belba Heyden, 1826
-*B. (B.) dubinini* Bulanova-Zachvatkina, 1962: 3-w (+), 5-xm (+), 8-l (+); Palaearctic

Fam. Liacaridae Sellnick, 1928
Birsteinius Krivolutsky, 1965
-*B. clavatus* Krivolutsky, 1965: 5-xm (++); in Romania occurs in dry, xerothermic habitats; European part of Russian Federation, Romania
Liacarus (Liacarus) Michael, 1898
-*L. (L.) coracinus* (Koch, 1841): 5-xm (+); eurytopic; Palaearctic, Ethiopian
Liacarus (Dorycranosus) Woolley, 1969
-*L. (D.) punctulatus* Mihelčič, 1956: 6-hm (+); in Romania recorded mostly in grasslands; Palaearctic

Fam. Oppiidae Sellnick, 1937
Graptoppia (Graptoppia) Balogh, 1983
-*G. (G.)* cf. *neonominata* Subias, 2004: 4-b (+++), 5-xm (+); xerophilous, euedaphic; Ethiopian, S Palaearctic
Multioppia (Hammeroppia) Vasiliu et Ivan, 2009
-*M. (H.) moritzi* Mahunka et Topercer, 1983: 2-m (+++), 2-r (+++), 3-w (+++), 4-b (++), 6-b (+++), 6-l (++), 6-s (+++), 6-hm (+), 7-w (+++), 9-p (++); recorded in cultivated soils; Central Europe
Ramusella (Ramusella) Hammer, 1962
-*R. (R.) clavipectinata* (Michael, 1885): 5-r (+), 5-xm (+++), 8-l (++), 8-s (+), 8-w (+); eurytopic; semi-cosmopolitan
-*R. (R.) sengbuschi tokyoensis* (Aoki, 1974): 5-xm (++), 6-b (++), 6-s (+++), 7-w (+++), 10-xm (+); recorded mostly in cultivated soils; S Palaearctic
Ramusella (Insculptoppia) Subías, 1980
-*R. (I.) elliptica* (Berlese, 1908): 2-m (+++); recorded in various habitats, halophilous; tropical and subtropical
-*R. (I.) insculpta* (Paoli, 1908): 1-dm (+); eurytopic, thermo-xerophilous; Palaearctic, Vietnam
-*Ramusella (I.)* sp.: 2-m (+), 4-b (++), 8-l (++), 8-s (++), 8-w (+++)
Microppia Balogh, 1983
-*M. minus minus* (Paoli, 1908): 1-dm (+), 2-r (++), 6-s (+), 6-hm (++), 8-w (+), 10-xm (+); eurytopic, euedaphic; cosmopolitan
Rhinoppia (Rhinoppia) Balogh, 1983
-*R. (R.) obsoleta obsoleta* (Paoli, 1908): 2-m (+); eurytopic; Palaearctic, Greenland, Australia
-*R. (R.) oblongata* Gordeeva et Melamud, 1991: 3-w (+); SE Europe
Oppiella (Oppiella) Jacot, 1937
-*O. (O.) nova nova* (Oudemans, 1902): 3-w (++); eurytopic; cosmopolitan
Corynoppia Balogh, 1983
-*C. kosarovi* (Jeleva, 1962): 5-xm (+); Mediterranean, Iran, Panama

Fam. Suctobelbidae Jacot, 1938
Suctobelbella (Suctobelbella) Jacot, 1937
-*S. (S.) subcornigera subcornigera* (Forsslund, 1941): 3-w (+); eurytopic; semi-cosmopolitan

Fam. Tectocepheidae Grandjean, 1954
Tectocepheus Berlese, 1896
-*T. velatus* (Michael, 1880): 1-mm (+++), 1-dm (+), 5-xm (+++), 6-l (++), 6-hm (+++); eurytopic; cosmopolitan

Fam. Scutoverticidae Grandjean, 1954

Exochocepheus Woolley et Higgins, 1968*
-*E. laticuspis* (Balogh et Mahunka, 1965)*: 1-dm (+++); S Palaearctic
Scutovertex Michael, 1879
-*S. sculptus* Michael, 1879: 1-mm (++), 1-dm (++), 5-xm (+), 7-hm (++), 8-l (+); eurytopic, grassland species, salt tolerant; Palaearctic, New Zealand

Fam. Passalozetidae Grandjean, 1954
Bipassalozetes (Bipassalozetes) Mihelčič, 1957
-*B. (B.) reticulatus* (Mihelčič, 1957): 1-mm (+++), 10-xm (+++); xerophilous; S Palaearctic

Fam. Phenopelopidae Petrunkevitch, 1955
Peloptulus (Peloptulus) Berlese, 1908
-*P. (P.) montanus* Hull, 1914: 1-mm (+), 1-dm (+), 6-hm (+), 7-hm (+++); recorded in fresh and moist meadows; Palaearctic
-*P. (P.) phaenotus* (Koch, 1844): 5-xm (+); eurytopic, grassland species, salt tolerant; Palaearctic

Fam. Microzetidae Grandjean, 1936
Berlesezetes Mahunka, 1980
-*B. ornatissimus ornatissimus* (Berlese, 1913): 8-l (+), 8-s (+), 8-w (+); pantropical, subtropical

Fam. Tegoribatidae Grandjean, 1954
Tectoribates Berlese, 1910
-*T. ornatus* (Schuster, 1958): 2-m (+++), 6-b (++), 7-hm (++), 8-l (+++), 8-hm (+); thermo-xerophilous, grassland species, salt tolerant; Palaearctic, Neotropical

Fam. Oribatellidae Jacot, 1925
Oribatella (Oribatella) Banks, 1895
-*O. (O.) reticulata* Berlese, 1916: 1-mm (+); silvicolous; S Holarctic

Fam. Ceratozetidae Jacot, 1925
Trichoribates (Trichoribates) Berlese, 1910
- *T. (T.) berlesei* (Jacot, 1929): 10-xm (++); xerophilous, arboricolus, muscicolous; Holarctic, Cambodia
Trichoribates (Latilamellobates) Shaldybina, 1971
-*T. (L.) incisellus incisellus* (Kramer, 1897): 1-mm (+), 5-xm (+); grassland species; Holarctic
-*T. (L.) naltschicki* (Shaldybina, 1971): 1-dm (+), 6-b (+), 10-xm (+); thermo-xerophilous, grassland species; E Mediterranean, SE Palaearctic
Zetomimus (Protozetomimus) Perez – Iñigo, 1990
-*Z. (P.) acutirostris* (Mihelčič, 1957): 1-mm (+), 3-w (+++), 4-b (+), 7-w (+), 8-w (++), 9-p (+++); grassland species; Mediterranean

Fam. Chamobatidae Thor, 1937
Hypozetes Balogh, 1959
-*H. bulgaricus* Jeleva, 1962: 8-l (+++); S Europe, India

Fam. Humerobatidae Grandjean, 1971
Humerobates Sellnick, 1928
-*H. rostrolamellatus rostrolamellatus* Grandjean, 1936: 7-hm (+++), 8-l (+), 8-hm (+++); arboricolous, halophilous; semi-cosmopolitan

Fam. Punctoribatidae Thor, 1937
Punctoribates (Punctoribates) Berlese, 1908
-*P. (P.) minimus* Shaldybina, 1969: 1-mm (++), 6-hm (+++); S Palaearctic
-*P. (P.) punctum* (Koch, 1839): 6-l (++), 6-s (+), 7-w (+); eurytopic, grassland species; semi-cosmopolitan

Fam. Oribatulidae Thor, 1929
Oribatula (Oribatula) Berlese, 1895
-*O. (O.) amblyptera* (Berlese, 1916): 2-m (+), 2-r (++); meso-hygrophilous; Central and South Europe
Oribatula (Zygoribatula) Berlese, 1916
-*O. (Z.) andrianovae* (Bulanova-Zachvatkina, 1967)*: 1-mm (+++), 1-dm (++), 7-hm (++); South of European Russia, Mongolia
-*O. (Z.) connexa connexa* Berlese, 1904: 3-w (++), 4-b (+++), 5-m (+++), 5-s (+), 5-r (+++), 5-xm (+), 8-l (++); eurytopic, recorded in cultivated soils; Mediterranean
-*O. (Z.) undulata* Berlese, 1916: 1-mm (+), 6-b (++), 6-hm (+++), 8-hm (+); xerophilous, halophilous; pantropical, subtropical

Fam. Hemileiidae J. et P. Balogh, 1984
Hemileius (Urubambates) Hammer, 1961
-*H. (U.) romanicus* (Vasiliu et Călugăr, 1981): 10-xm (+); xerophilous; Romania

Fam. Scheloribatidae Grandjean, 1933
Scheloribates (Scheloribates) Berlese, 1908
-*S. (S.) fimbriatus fimbriatus* Thor, 1930: 8-hm (+++); recorded in meadows, in cultivated soils; pantropical, subtropical
-*S. (S.) labyrinthicus labyrinthicus* Jeleva, 1962: 1-mm (+++), 3-w (++), 5-xm (+++), 6-b (+++), 6-l (++), 6-s (+), 6-hm (+++), 7-hm (+++), 8-l (+++), 8-s (+), 8-hm (+++), 10-xm (+++); eurytopic, grassland species; S Palaearctic
-*S. (S.) pallidulus* (Koch, 1841): 1-mm (+++), 1-dm (+++), 3-w (++), 5-r (+), 6-b (++), 6-l (++), 6-s (+++), 7-w (++), 8-l (++), 8-s (+++), 8-w (++), 9-p (++); eurytopic; cosmopolitan

Fam. Protoribatidae J. et P. Balogh, 1984
Protoribates (Protoribates) Berlese, 1908
-*P. (P.) capucinus capucinus* Berlese, 1908: 2-m (+++), 4-b (+), 6-b (+++), 6-l (++), 6-s (++), 8-w (+); eurytopic, mesophilous; cosmopolitan

Fam. Galumnidae Jacot, 1925
Pergalumna (Pergalumna) Grandjean, 1936
-*P. (P.) nervosa* (Berlese, 1914): 1-mm (+), 5-xm (+); eurytopic, mesophilous ; Holarctic
-*P. (P.) obvia* (Berlese, 1914): 6-hm (+++); eurytopic, mesophilous; semi-cosmopolitan.

As can be noted in the list of fauna, the family Oppiidae is best represented as number of taxa (7 genera, 12 species), followed by Brachychthoniidae (4 genera, 5 species). Furthermore, some oppiid species are widely

distributed, being present in many of the investigated sites, alongside of representatives of the families Scheloribatidae and Oribatulidae. Zoogeographical analysis of the oribatid fauna shows that cosmopolitan and semi-cosmopolitan elements are the most numerous (33.3% of the total number of species), followed by the Palaearctic (23.3%), the European (16.7%), and Holarctic species (13.3%). The species with southern distribution represent about 1/3 of the total number, noteworthy being the high share of pantropical and subtropical species (11.7%).

In terms of ecological spectrum the eurytopic, less exigent species, besides those that prefer grassland soils represent the most numerous groups (each representing 23.3% of the total number of species), followed by sylvicolous species (13.3%). Noteworthy is that xerophilous or thermo-xerophilous species represent about 25% of the total, which illustrates the peculiarity of fauna in this region.

In this context the family Ctenacaridae Grandjean, 1954, the genera *Ctenacarus* Grandjean, 1939 and *Exochocepheus* Woolley and Higgins, 1968, and also the species *Ctenacarus araneolus* (Grandjean, 1932), *Exochocepheus laticuspis* (Balogh and Mahunka, 1965) and *Oribatula (Zygoribatula) andrianovae* (Bulanova-Zachvatkina, 1967) are recorded for the first time in Romanian fauna (Vasiliu *et al*, 1993). In addition some rare species were identified e.g., *Lohmannia (L.) turcmenica* Bulanova-Zachvatkina, 1960, *Birsteinius clavatus* Krivolutsky, 1965, *Corynoppia kosarovi* (Jeleva, 1962), *Berlesezetes ornatissimus* (Berlese, 1913), *Hypozetes bulgaricus* Jeleva, 1962, *Hemileius (U.) romanicus* (Vasiliu et Călugăr, 1981), some of them recorded only in Dobrogea (Vasiliu N. *et al*, 1993).

Table 2

Structural parameters of the oribatid mite communities

Locality*/ sampling site / date			Ā		Number of taxa (F/G/S)	S'	Adults/ immatures	Specific diversity		
			total	adults				$H(s)_{max}$	H(s)	H.r.
1	mesophilous meadow	22.07.2015	2820	2300	9/9/11	5.7	4.42	3.4594	2.5492	73.69
		11.05.2016	2420	2200	8/9/9	4	10	3.1699	1.8686	58.94
	meadow between dunes	11.05.2016	4520	4300	8/10/10	4.2	19.5	3.3219	1.3324	40.11
2	maize	10.05.2016	3700	3460	5/7/8	4.6	14.4	2.9999	1.8951	63.17
	rape	10.05.2016	120	120	2/3/3	0.8	-	1.5849	1.251	78.93
3	wheat	10.05.2016	840	820	7/9/10	4.4	41	3.3219	2.902	87.36
4	barley	10.05.2016	1480	1280	5/7/7	3	6.4	2.8073	1.9081	67.97
5	xerophilous meadow	12.07.2018	17340	13780	15/21/22	11.8	3.9	4.4594	3.0399	68.17
	maize	12.07.2018	120	120	2/2/2	0.4	-	0.9999	0.6936	69.36
	sunflower	12.07.2018	40	20	1/1/1	0.2	1	-	-	-
	rape	12.07.2018	2680	2380	3/3/3	1.2	7.9	1.5849	0.3574	22.55
6	halophilous meadow	09.05.2016	4260	4160	6/6/6	3.4	41.6	2.5849	1.541	59.62
		13.07.2018	15740	15080	9/12/12	7.2	22.8	3.5849	1.6972	47.34
	barley	06.06.2017	1900	1300	7/8/9	4	2.17	3.1699	2.6881	84.8
	sunflower	13.07.2018	880	880	4/6/7	2	-	2.8073	2.1901	78.02
	lucerne	13.07.2018	320	320	7/7/8	2	-	2.9999	2.521	84.03
7	halophilous meadow	13.07.2018	4000	3880	7/7/7	4.4	32.3	2.8073	2.039	72.63
	wheat	07.06.2017	20	20	1/1/1	0.2	-	-	-	-
		13.07.2018	1220	1220	4/5/5	3.2	-	2.3219	1.5241	65.64
8	halophilous meadow	13.07.2018	4820	4700	4/4/5	3.4	39.17	2.3219	1.5898	68.47
	lucerne	07.06.2017	2440	1620	4/4/5	1.6	1.97	2.3219	1.3556	58.38
		13.07.2018	2800	2480	12/12/13	4.6	7.75	3.7004	2.2831	61.7
	sunflower	07.06.2017	3160	1740	6/6/7	3	1.22	2.8073	1.4347	51.11
	wheat	13.07.2018	2740	2640	7/8/9	2.4	26.4	3.1699	1.9692	62.12
9	pea	07.06.2017	300	280	5/5/5	1.2	14	2.3219	1.8064	77.8
10	xerophilous meadow	23.09.2015	4760	4240	6/8/8	3.8	8.2	2.9999	1.0122	33.74

Legend: Ā – global average abundance (individuals/m^2); number of taxa: F-families, G-genera, S-species; S'- average number of species/sample; H(S)max – maximum specific diversity; H(S) – real specific diversity; H.r. - relative diversity (%); *1-10 localities (see Table 1)

Regarding the species distribution, it can be observed that some species occur in the most of the investigated sites, often with high ecological significance, as *Scheloribates labyrinthicus*, *S.*

pallidulus, Epilohmannia cylindrica, Multiopia (H.) moritzi, Oribatula (Z.) connexa, Zetomimus (P.) acutirostris. Other species have a high ecological significance only in certain habitats: *Exochocepheus laticuspis, Bipassalozetes reticulatus, Hypozetes bulgaricus, Birsteinius clavatus, Sphaerochthonius splendidus.*

Analysis of the global structural parameters of oribatid communities reveals large variations in global average abundance, especially depending on site conditions and less on the habitat type (*table 2*). However, the highest values were recorded in natural meadows, especially at Beştepe and Murighiol, although wide variations were observed depending on the sampling season.

The number of species generally varies in the same direction as the global abundance, but not proportionally (*table 2*). Thus, the highest species richness was observed in the xerophilous meadow at Beştepe, and also at Murighiol, while in the pastures at Sarinasuf and Plopu the number of species was lower, even compared to some agroecosystems. Immature stages are generally underrepresented, so the adult / immature ratio is high, therefore large population fluctuations are expected in most investigated sites. Specific diversity has generally lower values in agroecosystems compared to meadows, but the real and relative diversity are relatively low in all investigated sites, indicating a reduced self-regulation capacity and a poor stability of the oribatid communities.

CONCLUSIONS

The faunistic investigation led to the identification of 60 species of oribatid mites, *Ctenacarus araneolus* (Grandjean, 1932), *Exochocepheus laticuspis* (Balogh and Mahunka, 1965) and *Oribatula (Zygoribatula) andrianovae* (Bulanova-Zachvatkina, 1967) being recorded for the first time in Romanian fauna.

The global average abundance and number of species varies widely from one sampling site to another, even in the case of similar ecosystems. In the non-grazing meadows generally higher values of these parameters were observed compared to cultivated soils and pastures.

From a qualitative point of view, notable differences were observed in the species composition of the oribatid communities in meadows and crops, even if they were located in the immediate vicinity. On the other hand, a degree of similarity was noted in the species composition and structure of oribatid coenoses in the agroecosystems.

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