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MITES (*ACARI*, *MESOSTIGMATA*) FROM SELECTED MICROHABITATS OF THE "BORY TUCHOLSKIE" NATIONAL PARK

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Abstract. The character of this work is faunistic and its main aim is to present the largest spectrum of mite species. As a result of acarologic examination on territory of the "Bory Tucholskie" National Park, 42 samples were collected, from which 77 mite species of *Mesostigmata* order were separated. The greatest numbers of species were represented by the families *Ascidae* (16 species), *Laelapidae* (13) and *Parasitidae* (10). The most plentiful species that occurred in the collected material were *Trichouropoda rafalskii*, *T. ovalis*, *Veigaia nemorensis*, *Trachytes aegrota* and *Zercon triangularis*, while in the greatest number of samples *T. ovalis*, *V. nemorensis*, *Z. triangularis* and *T. aegrota* were recorded.

Key words: mites, *Acari*, *Mesostigmata*, "Bory Tucholskie" National Park

INTRODUCTION

The Bory Tucholskie make up one of the largest compact forest complexes in Poland. Natural uniqueness of this territory is related among others to high naturalness of water reservoirs, the presence of lobelian lakes, as well as lack of anthropogenical sources of environment pollution. This valuable nature of the Bory Tucholskie is protected by foundation of nature reserves, landscape parks and the national park.

Established in 1996 the "Bory Tucholskie" National Park is one of the youngest national parks in Poland. So far it has not been an object of intensive acarological investigations and so far only 24 mite species of *Mesostigmata* order have been recorded [Seniczak et al. 2000, Kaczmarek 2002]. Therefore the state of mites recognition is rather scarce as compared with other national parks.

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MATERIAL AND METHODS

The character of this work is faunistic and its main aim is to present the largest spectrum of mite species occurring on the territory of the "Bory Tucholskie" National Park, as well as analysis of dependence between species composition and chosen microhabitats.

During the ground works performed in days 1- 4 July 2002, forty two samples (Tab. 1) were collected. The samples were collected from various, randomly chosen microhabitats as for example litter, rot wood and moss. The collected material was roused in Tullgren funnels and then stored in 90% alcohol. The next stage of examination was selection of *Mesostigmata* order mites and making moist specimen in lactofenol. The specimen prepared in such a way enabled indication of mites. The individuals difficult to identify, as well as those seldom occurring in our country, were preserved as persistent preparations in PVA. A list of species was made in the systematic order compliant to register of animals in Poland [Błaszak and Madej 1997, Wiśniewski 1997]. According to the frequency of listed species in particular samples, constancy of occurrence and domination were determined and a preliminary analysis of selectiveness was presented.

Table 1. List of collected samples
Tabela 1. Wykaz zebranych prób

Stand – Drzewostan	Number of samples (number of compartment) Numer próbki (oddział)
1	2
Litter – Ściółka	
Fresh pine forest – Bór świeży	1 (120), 4 (105), 15 (88), 19 (58), 30 (130), 32 (139)
Typical alder swamp forest – Ols typowy	6 (88), 7 (87), 16 (89)
Fresh mixed coniferous forest – Bór mieszany świeży	9 (87)
Spruce forest – Las świerkowy	18 (90)
Boggy pine forest – Bór bagienny	20 (59)
Moist coniferous forest – Bór wilgotny	34 (139)
Moist mixed coniferous forest – Bór mieszany wilgotny	37 (139)
Fresh mixed hardwood forest – Las mieszany świeży	38 (150)
Fresh broadleaved forest – Las świeży	39 (150)
Rot – Korzenie z wywrotu	
Fresh pine forest – Bór świeży	2 (120), 3(121), 26 (152)
Typical alder swamp forest – Ols typowy	8 (87)
Boggy pine forest – Bór bagienny	11 (103), 13 (103),
Pear tree near road – Grusza przy drodze	17 (88)
Moist coniferous forest – Bór wilgotny	36 (139)
Moist broadleaved forest – Las wilgotny	40 (150)

1	2
Bark – Kora	
Fresh pine forest – Bór świeży	5 (121)
Moss – Mech	
Fresh mixed coniferous forest – Bór mieszany świeży	10 (87)
Boggy pine forest – Bór bagienny	12 (103), 21 (59)b
Dry pine forest – Bór suchy	28 (142)
Moist mixed coniferous forest – Bór mieszany wilgotny	35 (139)
Sporocarp – Chuba sosny	
Fresh pine forest – Bór świeży	14 (104)
Sod – Darń	
Meadow – Łąka	22 (46)
Typical alder swamp forest – Ols typowy	24 (57)
Fresh mixed coniferous forest – Bór mieszany świeży	31 (140)
Moist mixed coniferous forest – Bór mieszany wilgotny	33 (139)
Scrubs over water – Zarośla obok zbiornika z wodą	41 (151)
Lichens – Porosty	
Dry pine forest – Bór suchy	23 (47)
Nest of bird – Gniazdo ptaka	
Moist coniferous forest – Bór wilgotny	25 (57)
Soil cover – Wrzosowisko	
Dry pine forest – Bór suchy	27 (153)
Fresh pine forest – Bór świeży	29 (131)
Anthills – Mrowisko	
Fresh pine forest – Bór świeży	42 (160)

RESULTS

As a result of acarologic examination on the territory of the "Bory Tucholskie" National Park 77 mite species of *Mesostigmata* order were recorded. They were assigned to 4 suborders, 19 families and 41 genus (Tab. 2). According to the accessible literature, 11 species were determined only to the genus, however in the analysis they were treated as one separate species.

The highest number of species was represented by *Ascidae* families (16 species) then *Laelapidae* (13) and *Parasitidae* (10). The most plentiful species that occurred in the collected material were *Trichouropoda rafalskii* (474 specimens; 25.6%), *T. ovalis* (234; 12.6%), *Veigaia nemorensis* (230; 12.4%), *Trachytes aegrota* (112; 6.0%) and *Zercon triangularis* (94; 5.1%), while in the greatest number of samples *T. ovalis* (22 samples), *V. nemorensis* (20), *Z. triangularis* (16) and *T. aegrota* (12) were recorded.

Table 2. List of mesostigmatic mites
Tabela 2. Wykaz roztoczy z rzędu *Mesostigmata*

Suborder, family, species Podrząd, rodzina, gatunek	Number of samples (numbers of individuals and sex or developmental stages) Numer próby (płeć lub stadia rozwoju)
1	2
ANTENNOPHORINA	
CELAENOPSIDAE	
Celaenopsis badius C.L. Koch, 1839	5(1F,2P); 14(2M,1D); 33(1D); 34(1F); 36(1F); 38(1D)
SEJINA	
SEJIDAE	
Sejus togatus C.L . Koch, 1836	6(1F); 12(2D); 36(1M); 40(1F)
GAMASINA	
ZERCONIDAE	
Parazercon radiatus (Berlese, 1914)	1(4F); 8(7F,1M,2D); 13(4F); 15(2F); 33(6F,1D)
Prozercon fimbriatus C.L. Koch, 1839	22(5F)
Prozercon kochi Sellnick, 1943	12(1F); 13(7F); 20(1M); 34(1F)
Zercon curiosus Trägårdh, 1910	1(6F,2M); 2(2F); 4(8F,2M); 12(1F); 21(6F); 27(7F,2M); 31(3F,1D)
Zercon triangularis C.L. Koch, 1836	5(6F); 6(4F); 8(2F); 18(3F,1D); 22(5F); 27(5F); 29(3F,1M); 30(1F); 31(1F,1D); 32(3F,1M); 33(2F); 35(7F,2M); 37(18F,5M,1D); 38(2F); 39(10F,1M); 42(8F,1M)
PARASITIDAE	
Parasitus fimetorum (Berlese, 1904)	10(1M)
Porrhostaspis lunulata Müller, 1859	5(2F,1M); 6(2F,1M); 15(1F); 22(2F,1M)
Vulgarogamasus kraepelini (Berlese, 1904)	6(3F,1M); 8(2F,1D); 21(1F); 29(1F); 34(1F)
Holoparasitus calcaratus (C.L. Koch, 1839)	19(1F); 20(1M); 21(1F); 35(1F,1M); 37(4F); 38(1F); 39(1F); 42(2F)
Paragamasus (*Anidogamasus*) *runcatellus* (Berlese, 1903)	6(5F,3M); 8(3F,1M); 18(3F,1M); 23(6F,2M); 29(2F); 30(2F)
Pergamasus (*Anidogamasus*) *runciger* (Berlese, 1903)	22(2F); 23(3F,1M); 30(1F); 32(2F,2M)
Paragamasus (*Anidogamasus*) *vagabundus* (Karg, 1968)	8(2F,1M); 11(2F); 23(1F); 29(1F,1M); 33(2F,2M)
Pergamasus (*Pergamasus*) *brevicornis* Berlese, 1903	5(3F,3M); 20(2F,1D); 22(1F); 31(1F)
Pergamasus (*Pergamasus*) *mediocris* Berlese, 1904	4(2F); 6(1F,3M); 23(8F,2M); 24(3F); 29(3F,2M); 37(1F,1D); 39(6F,1M)
Pergamasus sp.	8(1F)
MACROCHELIDAE	
Geholaspis (*Geholaspis*) *longispinosus* (Kramer, 1876)	20(1F); 33(1F)
Geholaspis (*Longicheles*) *mandibularis* (Berlese, 1904)	6(1F); 13(2F)
EVIPHIDIDAE	
Eviphis ostrinus (C.L. Koch, 1836)	5(2F); 20(1D); 22(1F); 29(1F); 32(1F); 35(1F); 37(2F); 39(2F)

1	2
Iphidosoma fimetarium (Müller, 1859)	21(1D); 39(2D)
Iphidosoma physogastris Karg, 1971	7(1D)
ASCIDAE	
Asca aphidioides (L., 1758)	1(1F); 4(12F); 12(9F); 21(1F); 27(16F); 38(4F)
Asca nova Willmann, 1939	22(8F,1M)
Gamasellodes bicolor (Berlese, 1918)	4(1F); 14(1F); 22(1F); 29(4F); 33(1F); 35(1F); 36(1F); 37(1F)
Lasioseius ometes (Oudemans, 1903)	19(2F)
Leioseius magnanalis (Evans, 1958)	6(2F)
Neojordensia levis (Oudemans et Voigts, 1904)	22(2F)
Proctolaelaps pygmaeus (Müller, 1860)	34(12F)
Proctolaelaps sp.	39(1F)
Arctoseius cetratus (Sellnick, 1940)	5(4F,2M)
Iphidozercon gibbus Berlese, 1903	16(7F,1M)
Iphidozercon poststigmatus Gwiazdowicz, 2003	41(1F)
Cheiroseius (*Posttrematus*) *curtipes* (Halbert, 1923)	41(15F,4M)
Cheiroseius (*Posttrematus*) *mutillus* (Berlese, 1916)	20 (1F,1M);41(1F)
Cheiroseius sp. 1	41(1F)
Cheiroseius sp. 2	36(1M,1D)
Platyseius italicus (Berlese, 1905)	16(1F)
LAELAPIDAE	
Androlaelaps casalis (Berlese, 1887)	14(1F)
Hypoaspis (*Alloparasitus*) *oblongus* (Halbert, 1915)	34(2F); 36(2F); 40(1F)
Hypoaspis (*Cosmolaelaps*) *vacua* (Michael, 1891)	2(1F); 6(2F); 11(28F,16M); 20(2F); 28(1F); 40(2F); 42(4F)
Hypoaspis (*Geolaelaps*) *aculeifer* (Canastrini, 1883)	18(3M); 36(1M)
Hypoaspis (*Geolaspis*) *brevipilis* Berlese, 1904	2(2F,1M); 11(6F); 40(17F,5M)
Hypoaspis (*Laelaspis*) *heselhausi* Oudemans, 1912	34(2F)
Hypoaspis (*Pneumolaelaps*) *grandiporus* Hirschmann, 1969	34(3F)
Hypoaspis (*Pneumolaelaps*) *lubrica* Voights et Oudemans, 1904	3(3F)
Hypoaspis sp. 1	11(2M)
Hypoaspis sp. 2	34(1F)
Ololaelaps placentula (Berlese, 1887)	22(2F)
Ololaelaps sellnicki Bregetowa et Koroleva, 1964	12(4F,2M)
Ololaelaps veneta (Berlese, 1903)	13(1F); 21(3F)
VEIGAIAIIDAE	
Veigaia cervus (Kramer, 1876)	8(1F); 23(1F); 30(2F); 32(1F); 33(1F); 40(1F)
Veigaia kochi (Trägårdh, 1901)	15(1F); 20(1F); 21(1F), 35(1F)

1	2
Veigaia nemorensis (C.L. Koch, 1839)	1(5F,5D); 4(3F,1D); 6(29F,12D); 8(5F,27D); 10(2F); 11(1F,1D); 12(2F,1D); 15(11F,5D); 17(5D); 18(1D); 21(3F,4D); 22(8F,7D); 29(3F,4D); 30(1F); 34(5D); 35(40F,12D); 37(6F,8D); 39(1F,4D); 40(3F); 42(2F,3D)
RHODACARIDAE	
Cyrtolaelaps mucronatus (G. et R. Canestrini, 1881)	34(4D)
Euryparasitus emarginatus (C.L. Koch, 1839)	34(1D)
Gamasellus montanus (Willmann, 1936)	4(1F,1D); 5(1F); 10(1D)
HALOLAELAPIDAE	
Halodarcia sp.	16(16F,3M,3D)
PACHYLAELAPIDAE	
Pachylaelaps furcifer (Oudemans, 1903)	8(1F); 11(1F); 12(1F); 15(1F)
DIGAMASELLIDAE	
Dendrolaelaps (*Cornodendrolaelaps*) *cornutulus* Hirschmann, 1960	39(1F)
Dendrolaelaps (*Punctodendrolaelaps*) *punctatulus* Hirschmann, 1960	3(3F,2M); 15(1F); 39(1F)
Dendrolaelaps (*Multidendrolaelaps*) *spinosus* Hirschmann, 1960	3(44F,6M,1D); 39(2F,2M)
Dendrolaelaps (*Multidendrolaeleps*) *tetraspinosus* Hirschmann, 1960	10(3F,7M,3D)
Dendrolaelaps (*Multidendrolaelps*) sp.	34(2F,3M,1D)
PHYTOSEIIDAE	
Amblyseius sp. 1	9(1F); 10(2F); 14(1F); 22(2F)
Amblyseius sp. 2	9(1F); 14(1F); 22(2F); 26(2F); 39(5F)
UROPODINA	
TRACHYTIDAE	
Trachytes aegrota (C.L. Koch, 1841)	5(5F,4D); 8(3F); 12(1F); 20(6F,6D); 21(14F,5D); 22(4F,6D,2P); 24(3F); 29(7F,1D,3P); 32(16F, 2D, 1P); 33(9F,4D,1P); 35(1F,1D,1P); 37(5F); 39(1F)
POLYASPIDAE	
Polyaspis (*Dipolyaspis*) *criocephali* Wiśniewski, 1980	4(3F,4M,2D); 10(5M,9D,1P); 40(2F,5M,2D)
TREMATURIDAE	
Trichouropoda longiovalis Hirschmann et Zirngiebl-Nicol, 1961	14(1F)
Trichouropoda ovalis (C.L. Koch, 1839)	3(3F); 5(1D); 6(1M); 7(1F); 8(6F,6M,4D); 10(1F,1D); 11(4F,2M,2D,2L); 12(12F,1M); 13(1F); 15(2F,5M,3D,1P); 18(3F,2M,6D,3P,1L); 20(1F,1D); 21(1D); 29(1F); 34(1M,3D,5P,1L); 36(2F,2M,2D) 37(3F,3M,5D); 38(5F,6M,7D); 39(17F,12M,16D,3P,3L); 40(5F,12M,31D); 41(1F); 42(4F,5M,1P,1L)

1	2
Trichouropoda rafalskii Wiśniewski et Hirschmann, 1984	26(87F,68M,87D,81P,151L)
URODINYCHIDAE	
Dinychus arcuatus (Trägårdh, 1943)	11(3F,2M,3D); 13(1M)
Dinychus carinatus Berlese, 1903	8(5F,1M,1D); 41(3F)
Urodiaspis tecta (Kramer, 1876)	18(1F); 20(1F); 22(1F); 33(1F); 37(2F)
Uroobovella pyriformis (Berlese, 1920)	4(1F); 11(2F,2D); 15(2F); 34(7F); 39(4F); 40(2F,1M)
Uroobovella sp.	6(1F)
UROPODIDAE	
Uropoda minima Kramer, 1882	21(1F,1D); 22(10F,2M,10D); 32(1F,1D); 34(1F,2D); 37(4F,2D); 39(1F)

F – female, M – male, D – deutonymph, P – protonymph, L – larva.
F – samica, M – samiec, D – deutonimfa, P – larwa.

DISCUSSION AND CONCLUSIONS

Litter was a microhabitat where 15 samples were collected and 54 mite species recorded. The most frequently occurring were *T. ovalis* (21.2%) and *V. nemorensis* (17.6%) which are eudominants and *Z. triangularis* (8.9%), *T. aegrota* (6.8%) classified as dominants. The highest rate of constant occurrence was noted at *T. ovalis* (60.0%) and *V nemorensis* (53.3%) which were classified as constants. *Z. triangularis* (40%) and *T. aegrota* (26.7%) were classified as accessorial.

Moss and sod were the next tested microhabitats where 12 samples were collected and 45 mite species recorded. It turned out that the eudominants were *V. nemorensis* (20.8%) and *T. aegrota* (15.3%), and the dominants: *Z. triangularis* (6.5%), *Asca aphidioides* (6.3%) and *Uropoda minima* (5.8%). Taking into account constancy of occurrence as constants were classified *T. aegrota* (58.3%), and as accesorial *V. nemorensis* (50.0%) and *Z. triangularis* (50.0%), while to accidents *A. aphidioides* (25.0%) and *U. minima* (16.7%).

Then eight samples were collected from rot and 33 mites species recorded. The definite dominant was *T. rafalskii* (53.6%) which is eudominant. *T. ovalis* (9.5%) was classified as dominant, as well as *Dendrolaelaps spinosus* (5.7%), *Cosmolaelaps vacua* (5.2%) and *V. nemorensis* (4.8%). The highest constancy of occurrence was noted at *T. ovalis* (75.0%) which is euconstant. The rest of species were classified as accidents. A few samples from other microhabitats are not suitable for analysis and can only widen the list of species recorded from the study area.

A little is known about acarofauna of the "Bory Tucholskie" National Park comparing to other Polish national parks as the Białowieża National Park [Gwiazdowicz 2000] or the Wielkopolska National Park [Skorupski 2001], where acarologic studies have been run for dozen years and resulted in about 270 mesostigmatic mite species. Former investigation in "Bory Tucholskie" National Park comprised mainly mites occurring in litter while some microhabitats as insects' feeding grounds, anthills or bird nests were omitted. Therefore acarologic studies in the territory of this park should be continued,

especially in formerly disregarded microhabitats and floral clusters next to water reservoirs.

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ROZTOCZE (*ACARI*, *MESOSTIGMATA*) WYBRANYCH MIKROŚRODOWISK PARKU NARODOWEGO „BORY TUCHOLSKIE"

Streszczenie. Praca ma charakter faunistyczny, a jej głównym celem było wykazanie jak największego spektrum gatunków roztoczy. W wyniku badań akarologicznych prowadzonych na terenie „Borów Tucholskich" zebrano 42 próby, w których stwierdzono 77 gatunków roztoczy z rzędu *Mesostigmata*. Najliczniej pod względem gatunków były reprezentowane rodziny *Ascidae* (16 gatunków), *Laelapidae* (13) oraz *Parasitidae* (10). W zebranym materiale gatunkami najliczniej występującymi okazały się: *Trichouropoda rafalskii*, *T. ovalis*, *Veigaia nemorensis*, *Trachytes aegrota* i *Zercon triangularis*, z kolei w największej liczbie prób odnotowano *T. ovalis*, *V. nemorensis*, *Z. triangularis* i *T. aegrota*.

Słowa kluczowe: roztocze, *Acari*, *Mesostigmata*, Park Narodowy „Bory Tucholskie"

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