

## **New and rare species of the Gamasida (Acari) in the Polish fauna, recorded in ‘Bagno Stawek’ Reserve (Tuchola Forest, northern Poland)**

TOMASZ MARQUARDT and SŁAWOMIR KACZMAREK

Kazimierz Wielki University, Institute of Environmental Biology, Department of Zoology,  
Ossolińskich 12, PL-85-094 Bydgoszcz, Poland; e-mail: [slawkacz@ukw.edu.pl](mailto:slawkacz@ukw.edu.pl), [tmarq@ukw.edu.pl](mailto:tmarq@ukw.edu.pl)

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**Abstract:** As a result of 3-year studies of gamasid mites (Acari) from ‘Bagno Stawek’ Reserve (in the Zaborski Landscape Park), 4 rare species were identified: *Platyseius subglaber* (Oudemans, 1903), *Stylochirus giganteus* (Willmann, 1938), *Uroobovella minima* (Koch, 1841), and *Veigaia transisalae* (Oudemans, 1902). Among them, *S. giganteus* is new to the fauna of Poland.

**Keywords:** Acari, Gamasida, new species, rare species, Polish fauna, Zaborski Landscape Park, Tuchola Forest

### INTRODUCTION

The Tuchola Forest is one of the largest forests in Poland. This precious natural area is protected within the Tuchola Forest National Park, as well as the Tuchola, Wda, Wdzydze, and Zaborski Landscape Parks. The last one includes ‘Bagno Stawek’ Reserve. The first scientific paper concerning its interesting vegetation (also peat-forming communities) was published in 1965 (Lisowski et al. 1965). There are relatively few studies involving the researched area. The geological structure of the reserve was documented by Kowalewski et al. (1997). A teledetective change analysis based on aerial photographs taken in 1951–1995 was performed by Kowalewski & Tobolski (1997). The reserve’s avifauna was recorded by Bednorz (1982). To date, the only acarological studies within that area were conducted by Kaczmarek (2002), Kaczmarek & Marquardt (2004, 2006, 2007a, 2007b), and Kaczmarek et al. (2006a, 2006b).

This paper describes the distribution and ecology of rare and new gamasid mite species found within the studied reserve, including a species that is new to Polish fauna.

## STUDY AREA

The mites were collected from litter and soil in 3 types of Scots Pine forest (the dry *Leucobryo-Pinetum*, the moist *Molinio-Pinetum* and the wet *Vaccinio uliginosi-Pinetum*) and in a poor fen (*Caricetum lasiocarpae*) in the 'Bagno Stawek' Reserve within the Zaborski Landscape Park. The reserve is dominated by peaty soils and muck-gley soils. The dry pine forest (*Leucobryo-Pinetum*) was characterized by a high degree of crown closure (80%), a poor shrub layer (*Juniperus communis*, coverage ca. 30%), and a ground layer dominated by grasses and mosses (coverage 50–60%). In the moist pine forest (*Molinio-Pinetum*), the coverage reached 60% in the tree layer, 30% in the herb layer, and 60% in the moss layer. The dominant species were the purple moor-grass (*Molinia coerulea*), interrupted clubmoss (*Lycopodium annotinum*), and the mosses *Sphagnum palustre* and *Polytrichum commune*. The wet pine forest (*Vaccinio uliginosi-Pinetum*) was characterized by a higher coverage in the tree layer (80%) and a scanty shrub layer (mainly *Ledum palustre* and *Vaccinium uliginosum*). The moss and herb layers covered 90–100% of the area. In the poor fen (*Caricetum lasiocarpae*), both the herb layer and the moss layer were well-developed, covering 100% of the area. *Sphagnum* mosses were absent, and the dominant moss species were characteristic of poor fens: *Campylium stellatum* and *Drepanocladus revolvens*. Also the relic moss species *Cinclidium stygium* was found there. The herb layer was composed mostly of *Carex lasiocarpa* and *Menyanthes trifoliata*. Also, the protected *Drosera rotundifolia* and *Drosera anglica* occurred there.

## MATERIAL AND METHODS

Samples were collected between October 2002 and May 2005. Mites were extracted in modified Tullgren funnels, preserved in 70% ethyl alcohol, and mounted in Hoyer's medium. The gamasid mites, both mature and immature specimens, were identified to the species level, using universally applied keys (KARG 1993, BREGETOVA 1977). Specimens were marked as: L = larva; P = protonymph; D = deutonymph; ♀ and ♂.

## RESULTS AND DISCUSSION

The gamasid mites found in the study area include the following species that are rare or new in the Polish fauna.

Family: Veigaiidae Oudemans, 1939  
*Veigaia transisalae* (Oudemans, 1902)

Material investigated: *Leucobryo-Pinetum* 2P; *Molinio-Pinetum* 17♀♀; *Vaccinio uliginosi-Pinetum* 11P, 7D, 80♀♀

This species chooses moderately humid and very humid substrates. To date, it was collected from forest litter, under pine and fir bark, from rotten wood, tree hollows (lime, hornbeam), rotten sporocarps of Polyporales, rotten roots in an alder

forest, nests of bark beetles, and soil of ski slopes (BREGETOVA 1977, KIELCZEWSKI & WIŚNIEWSKI 1983, KARG 1993, SKORUPSKI & GWIAZDOWICZ 1996, GWIAZDOWICZ 1999, 2002, GWIAZDOWICZ & KLEMT 2004, SŁOMIAN & MADEJ 2006). In the studied reserve, *V. transisalae* was extremely rare in *Leucobryo-Pinetum* (dominance  $D = 0.01\%$ , constancy  $C = 1\%$ ) and *Molinio-Pinetum* ( $D = 0.22\%$ ,  $C = 3\%$ ), and more frequent in *Vaccinio uliginosi-Pinetum* ( $D = 5.19\%$ ,  $C = 13\%$ ).

Family: Ascidae Oudemans, 1905  
*Platyseius subglaber* (Oudemans, 1903)

Material investigated: *Vaccinio uliginosi-Pinetum* 1L, 7P, 1D, 16♀♀, 1♂; *Caricetum lasiocarpae* 2L, 5P, 8♀♀

To date, this species was found in Poland only in mosses within the Narew National Park (GWIAZDOWICZ & SZADKOWSKI 2000), in humid microhabitats of the Połoniny NP (FENĎA & MAŠÁN 2003), in the soil of the area flooded by the Oder River (GRIEGEL 1999, 2000), and in nests of *Apodemus flavicollis* (STANKO 1987, 1988, 1995, STANKO et al. 1992, FENĎA & MAŠÁN 2003). In 'Bagno Stawek' Reserve, *P. subglaber* occurred in the *Vaccinio uliginosi-Pinetum* ( $D = 0.08\%$ ,  $C < 1\%$ ) and *Caricetum lasiocarpae* ( $D = 1.67\%$ ,  $C = 5\%$ ).

Family Urodinychidae Berlese, 1917  
*Uroobovella minima* (Koch, 1841)

Material investigated: *Vaccinio uliginosi-Pinetum* 22D, 23♀♀, 10♂♂

According to WIŚNIEWSKI (1993), this species prefers meadow biotopes, but MAŠÁN & FENĎA (2002) found it in the moist soil of a peaty habitat in North Slovakia, in soil detritus, and in moss. Within the studied reserve, *U. minima* occurred only in the ecotone zone between *Vaccinio uliginosi-Pinetum* and *Caricetum lasiocarpae*.

Family Rhodacaridae Oudemans, 1902  
*Stylochirus giganteus* (Willmann, 1938)

Material investigated: *Leucobryo-Pinetum* 3♀♀

According to KARG (1993), it is a rare species recorded so far in coniferous and deciduous forests, in litter and humus, so it prefers relatively dry microhabitats. *Stylochirus giganteus* has never been reported from Poland before. In 'Bagno Stawek' Reserve, this species occurred only in the dry pine forest, with very low dominance ( $D = 0.03\%$ ) and constancy ( $C = 1\%$ ).

## CONCLUSIONS

Three out of the 4 gamasid mite species presented in this paper prefer habitats characterised by high (*Platyseius subglaber*, *Uroobovella minima*) or medium and high (*Veigaiia transisalae*) humidity. Simultaneously, their complete or almost complete absence within the microhabitats characterised by lower humidity proves their

low tolerance to this environmental factor. *Stylochirus giganteus*, which was recorded within the studied reserve, is new to the Polish fauna. This species most probably prefers dry microhabitats, but on account of its very rare occurrence, we currently have very little information on its environmental requirements.

The presence of very rare species (including one that is new in the national fauna) within a relatively small nature reserve, confirms the natural value of this area and justifies the continuation of its protection.

#### REFERENCES

- BEDNORZ J. 1982. Awifauna lęgowa rezerwatu torfowiskowego 'Bagno Stawek' koło Chojnic na Pomorzu [Breeding avifauna of peatbog reserve 'Bagno Stawek' near Chojnice in Pomerania]. *Bad. Fizj. nad Polską Zach.* 33C: 129–138. (In Polish)
- BREGETOVA I. G. 1977. Opredelitel obitayushchikh v pochve kleshchei [Identification key to soil-inhabiting mites Mesostigmata]. AN SSSR, Leningrad. 718 pp. (In Russian)
- FENĎA P., MAŠAN P. 2003. Roztoče – Acari (Parasitiformes, ex. Uropodina) [Mites – Acari Parasitiformes, ex. Uropodina]. In: Pavúkovec Národného parku Poľoniny. Štátna ochrana prírody SR Baňská Bystrica a Správa Národného parku Poľoniny (MAŠAN P., SVATOŇ J., Eds.), pp. 143–205, Snina. (In Slovak)
- GRIEGEL A. 1999. Räumliche Verteilung und jahreszeitliche Dynamik von Kleinarthropoden (Collembola, Gamasida) in den Auen des Unteren Odertals [Spatial distribution and seasonal dynamics of small arthropods (Collembola, Gamasida) in the floodplain of the Lower Oder Valley]. *Limnologie aktuell* 9, pp. 211–228, Stuttgart. (In German)
- GRIEGEL A. 2000. Auswirkungen von Überflutungen auf die Zönosen der Collembolen und der Gamasiden (Insecta: Collembola, Acari: Gamasida) in der Flussaue des Unteren Odertals [Effects of flooding on the zoocoenoses of the Collembola and the Gamasida (Insecta: Collembola, Acari: Gamasida) in the flood plain of the Lower Oder Valley]. Berlin Freie Univ., PhD Thesis, dissertation.de, pp. 244, Germany. (In German)
- GWIAZDOWICZ D.J. 1999. Mites (Acari, Gamasida) occurring in tree-hollows in the Białowieża National Park. *Scientific Papers of Agricultural University of Poznań AR Poznań, Forestry.* 2: 47–55.
- GWIAZDOWICZ D.J. 2002. The effect of ski runs on the fauna of mites (Acari, Gamasida) in the Karkonosze Mountains. *AR Poznań, Forestry.* 5: 21–29.
- GWIAZDOWICZ D.J., KLEMT J. 2004. Mesostigmatic mites (Acari, Gamasida) in selected microhabitats of the Biebrza National Park (NE Poland). *Biol. Lett.* 41: 11–19.
- GWIAZDOWICZ D.J., SZADKOWSKI R. 2000. Mites (Acari, Gamasida) of the Narew National Park. *Fragm. Faun.* 43: 91–95.
- KACZMAREK S. 2002. Materiały do poznania roztoczy (Acari, Gamasida) glebowych Borów Tucholskich [Contribution to the research on soil mites (Acari, Gamasida) of Tuchola Pinewoods]. In: *Park Narodowy 'Bory Tucholskie' na tle projektowanego rezerwatu biosfery* (BANASZAK J., TOBOLSKI K., Eds.), pp. 253–281, Wyd. Homini, Kraków. (In Polish)
- KACZMAREK S., MARQUARDT T. 2004. Contribution to the biodiversity of gamasid soil mites (Acari) in the 'Bagno Stawek' reserve within a planned biosphere reserve (Tuchola Forest, Poland). *Proceedings of the 5<sup>th</sup> Symposium of the European Association of Acarologists, July 26–30, 2004, Germany, Phytophaga* 14: 237–242.
- KACZMAREK S., MARQUARDT T. 2006. Fauna roztoczy (Gamasida, Acari) w rezerwacie 'Bagno Stawek' (Zaborski PK) [Mite fauna (Gamasida, Acari) in "Bagno Stawek" reserve (Zaborski

- Landscape Park)]. In: Park Narodowy Bory Tucholskie u progu nowej dekady (BANASZAK J., TOBOLSKI K., Eds.), pp. 277–284. (In Polish)
- KACZMAREK S., MARQUARDT T. 2007a. Soil Gamasida (Acari) in various pine forests and in ecotones between them in the ‘Bagno Stawek’ Reserve, Tuchola Forest (N Poland). In: Contributions to Soil Zoology in Central Europe II. (TAJOVSKÝ K., SCHLAGHAMERSKÝ J., PIŽL V., Eds.), pp. 83–86, ISB AS CR, Ceske Budejovice. Proceedings of the 8<sup>th</sup> Central European Workshop on Soil Zoology, April 20–22, 2005.
- KACZMAREK S., MARQUARDT T. 2007b. Gamasida communities (Acari) in the Caricetum lasiocarpae fen of the Bagno Stawek Reserve, Tuchola Forest (N Poland). In: Contributions to Soil Zoology in Central Europe II. (TAJOVSKÝ K., SCHLAGHAMERSKÝ J., PIŽL V., Eds.), pp. 79–82, ISB AS CR, Ceske Budejovice. Proceedings of the 8<sup>th</sup> Central European Workshop on Soil Zoology, April 20–22, 2005.
- KACZMAREK S., MARQUARDT T., MARCYSIAK K. 2006a. Preliminary research on communities of soil gamasid mites (Acari) in three different pine forests in the ‘Bagno Stawek’ reserve (Tuchola Forest, N Poland). In: Advances in Polish Acarology (GABRYŚ G., IGNATOWICZ S., Eds.), pp. 137–148, SGGW, Warszawa.
- KACZMAREK S., MARQUARDT T., MARCYSIAK K. 2006b. Diversity of gamasid soil mites (Acari) in the ecotone between moist and wet pine forests, in the ‘Bagno Stawek’ reserve (Tuchola Forest, N Poland). In: Advances in Polish Acarology (GABRYŚ G., IGNATOWICZ S., Eds.), pp. 149–159, SGGW, Warszawa.
- KARG W. 1993. Acari (Acarina), Milben Parasitiformes (Anactinochaeta) Cohors Gamasina Leach. Raubmilben [Predatory mites, Acari (Acarina), Parasitiformes (Anactinochaeta) Cohors Gamasina Leach.] Die Tierwelt Deutschlands 59: 1–523. (In German)
- KIELCZEWSKI B., WIŚNIEWSKI J. 1983. Bark beetle acarofauna in different types of forest habitat. Part I and II. Introduction and Mesostigmata. Fol. Forest. Pol. A(25): 129–162.
- KOWALEWSKI G., LANDOWSKA J., LANDOWSKI J. 1997. Zarys budowy geologicznej torfowiska w rezerwacie ‘Bagno Stawek’ [Outline of the geological structure in the wetland reserve ‘Bagno Stawek’]. In: Ochrona gatunkowa na obszarach chronionych (KRASICKA-KORCZYŃSKA E., Eds.), pp. 81–88, Tow. Miłośników Borów Tucholskich. (In Polish)
- KOWALEWSKI G., TOBOLSKI K. 1997. Teledetekcyjna analiza zmian w obrębie rezerwatu ‘Bagno Stawek’ [Remote sensing analysis of changes within the reserve ‘Bagno Stawek’]. In: Ochrona gatunkowa na obszarach chronionych (KRASICKA-KORCZYŃSKA E., Eds.) pp. 71–79, Tow. Miłośników Borów Tucholskich. (In Polish)
- LISOWSKI S., SZAFRAŃSKI F., TOBOLSKI K. 1965. Interesujące torfowisko nad jeziorem Stawek w powiecie chojnickim (woj. bydgoskie). [Interesting peatbog at Stawek lake in Chojnice district (Bydgoszcz voivodship)]. Bad. Fizjogr. nad Polską Zach. 15: 199–205. (In Polish)
- MAŠÁN P., FENĎA P. 2002. Description of the deutonymph of *Uroobovella minima* (Acarina, Mesostigmata, Uropodina). Ent. Probl. 32: 169–170.
- SKORUPSKI M., GWIAZDOWICZ D.J. 1996. Roztocze (Acari, Mesostigmata) Pienin [Mites (Acari, Mesostigmata) of Pieniny]. Fragm. Faun. 39: 223–243. (In Polish)
- SŁOMIAN S., MADEJ G. 2006. A preliminary results on mites (Acari, Gamasida) occurring in decaying wood. In: Advances in Polish Acarology (GABRYŚ G., IGNATOWICZ S., Eds.), pp. 375–384, SGGW, Warszawa.
- STANKO M. 1987. Fauna roztočov (Acarina, Mesostigmata) drobných cicavcov východnej časti Volovských vrchov (Slovenské rudohorie) [Mite fauna (Acarina, Mesostigmata) of small mammals of Volovské Eastern Hills (Slovak Ore Mountains)]. Proceedings of Košice Museum, Science 28: 133–151. (In Slovak)
- STANKO M. 1988. Príspevok k poznaniu ektoparazitov (Mesostigmata, Ixodidae, Siphonaptera) drobných cicavcov Hermanovskej doliny (Slanské vrchy) [Contribution to the knowledge of ectoparasites (Mesostigmata, Ixodidae, Siphonaptera) of small mammals Hermanovce Valley (Slanske Hills)]. In: CIBULKOVÁ S. & VOSKÁR J. (eds.) Proceedings of 11<sup>th</sup> conservation-

- ists eastern camp July 25 – August 01, 1987, KÚŠPSOP & ONV OK, Prešov, Vranov nad Topľou, pp. 166–179. (In Slovak)
- STANKO M. 1995. Sučasný stav poznania fauny ektoparazitov (Siphonaptera, Anoplura, Ixodida, Mesostigmata) drobných cicavcov územia biosférickej rezervácie Východné Karpaty [The current state of knowledge of ectoparasites fauna (Siphonaptera, Anoplura, Ixodida, Mesostigmata) of small mammals in Biosphere Reserve territory (East Carpathians)]. *Natura Carpatica* 36: 61–70. (In Slovak)
- STANKO M., AMBROS M., DUDICH A. 1992. Ektoparazity drobných zemných cicavcov (Insectivora, Rodentia) projektovanej CHKO Volovské vrchy. 2. Mesostigmata [Ectoparasites of small mammals (Insectivora, Rodentia) of projected reserve Volovské Hills. 2. Mesostigmata]. *Proceedings of 15<sup>th</sup> Stos-Porča, July 28 – August 02, 1991* pp. 99–110. (In Slovak)
- WIŚNIEWSKI J. 1993. Gangsystematik der Parasitiformes. Teil 549. Die Uropodiden der Erde nach zoogeographischen Regionen und Subregionen geordnet [Classification of Parasitiformes, part 549, World Uropodina in order of zoogeographic regions and subregions] *Acarologie, Schriftenreihe für vergleichende Milbenkunde, Folge 40*, pp. 221–291, Hirschmann-Verlag. (In German)