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A new species of *Pachyseius* Berlese (Acari: Pachylaelapidae) from South Siberia (Russia), with a key to the species known from Asia

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Abstract

Pachyseius anisimovi sp. nov. is described based on specimens from soil and litter in the Altai Mountains and the West and East Sayan Mountains in South Siberia, Russia. A key to ten *Pachyseius* species known from Asia is provided.

Key words: Acari, Mesostigmata, Pachylaelapidae, *Pachyseius*, new species, Russia, Siberia

Introduction

The small genus *Pachyseius* Berlese, 1910 belongs to the family Pachylaelapidae, which includes 16 genera and about 250 species world-wide (Mašán, 2007; Mašán & Halliday, 2014). Mites of the genus *Pachyseius* are free-living representatives of the soil fauna in the temperate zone of the northern hemisphere (Mašán, 2008). The genus currently includes 20 recognised species distributed mainly throughout the Palaearctic Region, except that *P. humeralis* may have been introduced into Australia by human activities (Halliday, 2001) and unidentified species have been collected in northern Australia (Lindquist *et al.*, 2009) and Canada (Broadbent & Tomlin, 1979).

To the present 13 species of the genus *Pachyseius* have been described from Europe: Italy (Berlese, 1910), France (Willmann, 1935), Great Britain (Hyatt, 1956), Romania (Solomon, 1982; Mašán & Fend'a, 2014), Netherlands (Afifi & Nasr, 1984), Spain (Moraza, 1993), Slovakia (Mašán, 2007), Bulgaria (Mašán & Mihál, 2007) and Germany (Mašán, 2008). Seven species have been described from Asia: Russia (Nikolsky, 1982), China (Yin *et al.*, 1986; Ma & Yin, 2000; Chen *et al.*, 2009), Japan (Ishikawa, 1989), and Turkey (Özbek & Halliday, 2014). Two species have been recorded from West Asia—Iran, Caucasus: *P. humeralis* Berlese, 1910 and *P. angustus* Hyatt, 1956 (Nefedov, 1966; Ohandjanian, 1978; Babaeian & Kazemi, 2011; Kazemi & Rajaei, 2013). *Pachyseius orientalis* Nikolsky, 1982 was described from Primorsky Krai, and also been recorded in other Asian regions of Russia: Sakhalin Island, Khabarovsk Krai, mountains of South Siberia, East Sayan and Altai (Marchenko, 2002, 2011, 2012 and collections at the Institute of Systematics and Ecology of Animals, examined by author) and in Jilin Province, China (Yin *et al.*, 1986).

Most descriptions of the known *Pachyseius* species refer only to females. Very few publications have described or illustrated the males and juvenile stages (Karg, 1965, 1971, 1993, Moraza, 1993, Gwiazdowicz & Stănesku, 2005). The new species described here is based on the female, male, deutonymph and protonymph.

Material and methods

Mites were extracted from soil and litter using a Berlese funnel and mounted in Hoyer's medium. The specimens were examined under a Zeiss Axioscop 40 microscope. Taxonomically relevant structures were illustrated using a Canon Power Shot G 11 camera and measured with the use of a graded ocular. Measurements of important characters are given in micrometres (µm) as a range representing the variation among all individuals examined. The nomenclature of dorsal and ventral idiosomal setae is based on Lindquist & Evans (1965) as adapted by Mašán (2007) for Pachylaelapidae. The idiosomal adenotaxy and poroidotaxy are based on Johnston & Moraza (1991).

metapodal shields and ventri-anal shield well separated; peritrematal shield at level of stigmata is narrow.
. *P. siranensis* Özbek & Halliday, 2014; Turkey

Discussion

Following the observations by Karg (1965, 1971, 1993) and Costa (1966), protonymphs of *Pachylaelaps* and *Pachyseius* have a total number of 27 pairs of dorsal setae; three pairs of dorsal setae are added in the deutonymphs by addition of the *r*-*R*-row of setae. According to comments of Moraza & Peña (2005a) these dorsal setae are indicated as “*z1*, *r2* and *S1*”. The protonymph of *Pachyseius anisimovi* also bears 27 pairs of dorsal setae, three pairs are added in deutonymph on dorsal shield (*z1*, *r2*, *S1*) and five pairs on ventro-marginal soft integument (*r6*, *R1*, *R3*, *R4*, *R6*, *R7*). Thus, the total number of dorsal and marginal setae (*r*-*R*-row) in the deutonymph of *Pachyseius anisimovi* is 36 pairs, as in adults (female and male). The following reductions occur in the leg chaetotaxy of some segments of *Pachyseius anisimovi* adults (in all examined specimens): trochanter I with five setae (1 1/2 1), one ventral seta absent, that is not typical for *Pachyseius* and *Pachylaelapidae* (Mašán, 2007); femur I with 12 setae (2 5/3 2), one ventral seta is absent. Tarsus IV of all examined specimens of females has 17 setae, and the one male examined has 18 setae. The leg chaetotaxy of deutonymph shows the same reductions as in the male: trochanter I with five setae, femur I with 12 setae; tarsus IV with a full complement of 18 setae in all examined specimens.

The new species *P. anisimovi* inhabits all types of habitats in the Altai Sayan Mountain Region: floodplains, different types of forests and alpine tundra from 500 m to 2,500 m a.s.l. No species of *Pachyseius* has yet been found in the West Siberian Plain (Davydova & Nikolsky, 1986).

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References

- Affi, A.M. & Nasr, A.K. (1984) Description of *Pachyseius wideventris*, a new species from Holland (Acari – Gamasida – *Pachylaelapidae*). *Bulletin of the Zoological Society of Egypt*, 34, 5–10.
- Babaeian, E. & Kazemi, S. (2011) Mites of the family *Pachylaelapidae* (Mesostigmata: Eviphidoidea) in Shahrekord region, Iran. In: Kazemi, S. & Saboori, A. (Eds.), *Abstract and Proceeding Book of the First Persian Congress of Acarology, Kerman*, pp. 43. [Iran]
- Berlese, A. (1910) Lista di nuove specie e nuovi generi di Acari. *Redia*, 6, 242–271.
- Broadbent, A.B. & Tomlin, A.D. (1979) Species list of Acari recovered from soil of Guelph cornfield and a London pasture. *Proceedings of the Entomological Society of Ontario*, 110, 101–103.
- Chen, W.-P., Bei, N.-X. & Gao, P. (2009) Two new species of the family *Pachylaelapidae* Berlese, from China (Acari, Mesostigmata). *Acta Zootaxonomica Sinica*, 34, 25–27.
- Costa, M. (1966) Descriptions of the juvenile stages of *Pachylaelaps hispani* Berlese (Acari; Mesostigmata). *Acarologia*, 8, 9–22.
- Davydova, M.S. & Nikolsky, V.V. (1986) *Gamasid mites of West Siberia*. Novosibirsk, Nauka, 123 pp. [in Russian]
- Gwiazdowicz, D.J. & Stănescu, M. (2005) Description of deutonymph of *Pachyseius humeralis* Berlese, 1910 (Acari: *Pachylaelapidae*) from Romania. *Travaux du Muséum National d'Histoire Naturelle “Grigore Antipa”*, 58, 21–24.
- Halliday, R.B. (2001) Mesostigmatid mite fauna of Jenolan Caves, New South Wales (Acari; Mesostigmata). *Australian Journal of Entomology*, 40, 299–311.
<http://dx.doi.org/10.1046/j.1440-6055.2001.00247.x>
- Hyatt, K.H. (1956) British mites of the genus *Pachyseius* Berlese, 1910 (Gamasina– Neoparasitidae). *Annals and Magazine of Natural History*, Series 12, 9, 1–6.
<http://dx.doi.org/10.1080/00222935608655716>
- Johnston, D.E. & Moraza, M.L. (1991) The idiosomal adenotaxy and poroidotaxy of Zerconidae (Mesostigmata, Zerconina).

- In: Dusbábek, F. & Bukva, V. (Eds.), *Modern Acarology*. Vol. 2. SPB Academic Publishing, The Hague, Netherlands, 349–356.
- Ishikawa, K. (1989) Occurrence of *Pachyseius* (Acarina, Gamasida, Pachylaelapidae) in a limestone cave of Japan. *Journal of the Speleological Society of Japan*, 14, 28–31.
- Karg, W. (1965) Larvalsystematische und phylogenetische Untersuchung sowie Revision des Systems der Gamasina Leach, 1915 (Acarina, Parasitiformes). *Mitteilungen aus dem Zoologischen Museum in Berlin*, 41, 193–340.
<http://dx.doi.org/10.1002/mmnz.4830410207>
- Karg, W. (1971) Acari (Acarina), Milben Unterordnung Anactinochaeta (Parasitiformes). Die freilebenden Gamasina (Gamasides), Raubmilben. *Die Tierwelt Deutschlands*, 59, 1–475.
- Karg, W. (1993) Acari (Acarina), Milben. Parasitiformes (Anactinochaeta). Cohors Gamasina Leach, Raubmilben. *Die Tierwelt Deutschlands*, 59, 1–523.
- Kazemi, S. & Rajaei, A. (2013) An annotated checklist of Iranian Mesostigmata (Acari), excluding the family Phytoseiidae. *Persian Journal of Acarology*, 2, 63–158.
- Lindquist, E.E. & Evans, G.O. (1965) Taxonomic concepts in the Ascidae, with a modified setal nomenclature for the idiosoma of the Gamasina (Acarina: Mesostigmata). *Memoirs of the Entomological Society of Canada*, 47, 1–64.
- Lindquist, E.E., Krantz, G.W. & Walter, D.E. (2009) Order Mesostigmata. In: Krantz, G.W. & Walter, D.E. (Eds.), *A Manual of Acarology*. 3rd Edition. Texas Tech University Press. Lubbock, Texas, pp. 124–232.
- Ma, L.-M. & Yin, X.-Q. (2000) Two new species of the family Pachylaelaptidae (Acari: Gamasina). *Acta Entomologica Sinica*, 43, 94–97.
- Marchenko, I.I. (2002) Faunistic review of free-living Gamasina mites (Acari, Mesostigmata) from Sakhalin and Kuril islands. *Euroasian Entomological Journal*, 1, 31–48.
- Marchenko, I.I. (2011) Spatial-typological organization of the soil Gamasina mites (Acari, Mesostigmata) community of the Northeastern Altai. Communication I. *Contemporary Problems of Ecology*, 4, 379–387.
<http://dx.doi.org/10.1134/s1995425511040059>
- Marchenko, I.I. (2012) Spatial-typological organization of the soil Gamasina mites (Acari, Mesostigmata) community of the Northeastern Altai. Communication II. *Contemporary Problems of Ecology*, 5, 23–33.
<http://dx.doi.org/10.1134/s1995425512010031>
- Mašán, P. (2007) *A Review of the Family Pachylaelapidae in Slovakia, with Systematics and Ecology of European Species (Acari: Mesostigmata: Eviphidoidea)*. Institute of Zoology, Slovak Academy of Sciences, Bratislava, 247 pp.
- Mašán, P. (2008) *Pachyseius friedrichi*, spec. nov., a new pachylaelapid mite from Bavarian Prealps Mts., Germany (Acari, Mesostigmata, Gamasida, Eviphidoidea, Pachylaelapidae). *Spixiana*, 31, 177–182.
- Mašán, P. & Fend'a, P. (2014) A new edaphic mite of the genus *Pachyseius* (Acari, Mesostigmata, Pachylaelapidae) from Făgăraș Mountains (Romania), with a key to the world species. *Systematic & Applied Acarology*, 19, 137–143.
<http://dx.doi.org/10.11158/saa.19.2.3>.
- Mašán, P. & Halliday, B. (2014) Review of the mite family Pachylaelapidae (Acari: Mesostigmata). *Zootaxa*, 3776 (1), 1–66.
<http://dx.doi.org/10.11646/zootaxa.3776.1.1>
- Mašán, P. & Mihál, I. (2007) New mites of the genus *Pachyseius* Berlese from Bulgaria (Acari: Pachylaelapidae). *Zootaxa*, 1485, 59–68.
- Moraza, M.L. (1993) Two new species of *Pachyseius* Berlese, 1910 from Spain (Acari, Mesostigmata: Pachylaelapidae). *Acarologia*, 34, 89–94.
- Moraza, M.L. & Peña, M.A. (2005a) The family Pachylaelapidae Vitzthum, 1931 on Tenerife Islands (Canary Islands), with description of seven new species of the genus *Pachylaelaps* (Acari, Mesostigmata: Pachylaelapidae). *Acarologia*, 55, 103–129.
- Moraza, M.L. & Peña, M.A. (2005b) Ácaros Mesostigmata (Acari: Mesostigmata) en habitats seleccionados de la isla de Tenerife (Islas Canarias). *Revista Ibérica de Arachnología*, 11, 61–68.
<http://dx.doi.org/10.3989/graellsia.2005.v61.i1.9>
- Nefedov, V.N. (1966) The mites *Pachyseius humeralis* Berlese, 1910 (Gamasoidea, Neoparasitidae) in the USSR fauna. *Zoologicheskii Zhurnal*, 55, 1098–1099. [in Russian]
- Nikolsky, V.V. (1982) New species of gamasid mites (Gamasoidea, Parasitiformes). *Novye i Maloizvestnye Vidy Fauny Sibiri*, 16, 14–19. [in Russian]
- Ohandjanian, A.M. (1978) On the study of mesostigmatid mites of the Armenian fauna. *Biological Journal of Armenia*, 31, 948–952. [in Russian]
- Özbek, H.H. & Halliday, B. (2014) Two new species of *Pachyseius* Berlese (Acari: Pachylaelapidae) from Turkey, with a key to the world species. *Zootaxa*, 3841 (1), 107–116.
<http://dx.doi.org/10.11646/zootaxa.3841.1.5>
- Solomon, I. (1982) A new *Pachyseius* species (Acari: Mesostigmata) and a new one for the Romanian fauna. *Revue Roumaine de Biologie, Serie de Biologie Animale*, 27, 99–102.
- Willmann, C. (1935) Exploration biologique des cavernes de la Belgique et du Limbourg Hollandais. XXVe contribution: Acari. (I). *Bulletin du Musée royal d'Histoire Naturelle de Belgique*, 11 (29), 1–41.
- Yin, S.-G., Lu, C.-J. & Lan, W.-H. (1986) A new species and a new record of the genus *Pachyseius* from China (Acarina: Pachylaelapidae). *Acta Zootaxonomica Sinica*, 11, 191–193.