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Pseudopygmephorellus mazandaranicus sp. nov. (Acari: Heterostigmata: Pygmephoridae), phoretic on scarabaeid dung beetles (Coleoptera: Scarabaeidae) from Iran

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Abstract

The mite species *Pseudopygmephorellus mazandaranicus* Katlav and Hajiqanbar **sp. nov.** (Acari: Prostigmata: Pygmephoridae) is described and illustrated from northern Iran. This new species was discovered phoretic on three different scarabaeid dung beetles: *Onthophagus* sp., *Aphodius depressus* (Kugelann, 1792), *Aphodius varians* Duftschmid, 1805. This finding presents the first record of the genus *Pseudopygmephorellus* Khaustov, 2008 from Asia. The host range/habitat and world-wide distribution of species of the genus *Pseudopygmephorellus* is reviewed and a key to world species of the genus is provided.

Key words: mite, dung beetles, phoresy, host range, Prostigmata

Introduction

Excrement of mammals, especially livestock provides a suitable habitat for wide range of coprophilous arthropods including the adults and larvae of dung beetles, flies and various dung-inhabiting mites. Dung beetles are among the most important species in this ecosystem due to their significant role in decomposition of ruminant excrement of various mammals, nutrient recycling, seed dispersal and the control of vertebrate parasites by removal of dung, which can be a source of infection (Bornemissza 1960; Hanski & Krikken 1991). Dung beetles are generally utilized by many dung-inhabiting mites as vectors for phoretic dispersal purposes (Peck & Forsyth 1982). As for the members of the Pygmephoridae, one of the largest families of Heterostigmata (Trombidiformes: Prostigmata), representatives of five genera are documented to be phoretic on dung beetles: *Pediculaster* Vitzthum, 1927; *Geotrupophorus* Mahunka, 1970; *Pygmephorellus* Cross and Moser, 1971; *Spatulaphorus* Rack, 1993; and *Pseudopygmephorellus* Khaustov, 2008 (see Khaustov & Trach 2012).

Khaustov (2008) established the genus *Pseudopygmephorellus* after detailed analysis of different species of the genus *Pygmephorellus* (sensu Cross, 1974). He described his new species, *Pseudopygmephorellus reductus* Khaustov, 2008 from Russia and transferred the two previously described species, *Pygmephorellus szekessyi* (Mahunka, 1970) and *Pygmephorellus artemjevi* Sevastianov, 1981 to this genus for the following reasons: presence of three setae on genu I and two setae on genu II in adult females (in contrast to four and three setae on genu I and II respectively in *Pygmephorellus*).Recently, Khaustov and Trach (2014) described another new species, *Pseudopygmephorellus troxi* from the Far East of Russia and correctly transferred *Pygmephorellus pinguisetus* Mahunka and Philips, 1978 to this genus.

In the course of preliminary research on dung-beetle associated heterostigmatic mites in Mazandaran province, northern Iran, several colonies of a new species of the genus *Pseudopygmephorellus* were discovered phoretic on three different species of dung-inhabiting scarabaeid. This finding presents the first record of the genus *Pseudopygmephorellus* from Asia. In this paper the new species is described and a review of the known host / habitat range and current world-wide distribution of *Pseudopygmephorellus* is presented.

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This study presents the first record of a phoretic relationship between mites of the genus *Pseudopygmephorellus* and dung beetles of the family Scarabaeidae. Table 1 highlights the potential role of saprophage beetles of the superfamily Scarabaeoidea (including Scarabaeidae, Geotrupidae and Trogidae) in the ecology of these mites. It is noteworthy that there are a few records of these mites in the litter within mammal and birds nests and littoral debris, and it presumably shows that mites of this genus can utilize many insect hosts frequenting such microhabitats. The first record of association with an insect in this genus was documented for *P. szekessyi* as phoretic on the dung beetles *Geotrupes vernalis* L. (Kaluz 1992). Apparently, this species is more common and cosmopolitan than other congeners, as it shows a wider distribution (Palaearctic and Nearctic) and has a greater host/habitat spectrum in comparison to other congeners, having been recovered several times from geotrupid and trogid beetles and also being found in the litter of a *Microtus* nest (Rodentia; Cricetidae) (Mahunka 1970; Kaluz 1992; Mašan 1993; Philips 2009).

Key to world species of the genus *Pseudopygmephorellus* (Females)

1. Tarsus IV with claws; posterior margin of the prodorsum nearly straight 2
- Tarsus IV without claws; posterior margin of the prodorsum elongate and rounded (ligula-shaped) . . . . . *P. reductus* Khaustov, 2008
2. Epimeral setae 1*a*, 1*b*, 2*a*, 2*c* modified and distinctly thickened basally 3
- Epimeral setae 1*a*, 1*b*, 2*a*, 2*c* unmodified and setiform 4
3. Lateral parts of prodorsum with microsculpture; setae *d* and c_1 subequal; setae 3*a* and 4*a* distinctly thickened basally . . . . . *P. pinguisetus* (Mahunka and Philips, 1978)
- Lateral parts of prodorsum without microsculpture; setae *d* distinctly longer than c_1; setae 3*a* and 4*a* uniformly slender, not thickened basally . . . . . *P. troxi* Khaustov and Trach, 2014
4. Setae v_1 situated posterior to the level of setae v_2 5
- Setae v_1 situated anterior to the level of setae v_2 . . . . . *P. artemjevi* (Sevastianov, 1981)
5. Apodemes 5 developed; solenidia ω_1, ω_2, φ_1 and φ_2 on TiTaI 10, 8, 7and 6 respectively; seta TaII*tc'* thickened, somewhat pilose, with blunt apex; seta FeIV*v'* rod-like and blunt-ending . . . . . *P. szekessyi* (Mahunka, 1970)
- Apodemes 5 considerably reduced; solenidia ω_1, ω_2, φ_1 and φ_2 on TiTaI 6, 3, 5 and 3 respectively; seta TaII*tc'* seta-like, with pointed apex; seta FeIV*v'* seta-like and pointed . . . . . *P. mazandaranicus* **sp. nov.**

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