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## Article

# New records of three species of the superfamily Pygmephoroidea (Acari: Heterostigmata) from Asia

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### Abstract

A survey to study of mites associated with pomegranate in Mahvelat region, Khorasan Razavi province, northeastern Iran, in 2013 led to find three species of the superfamily Pygmephoroidea (Acari: Prostigmata: Heterostigmata) new to mite fauna of Asia. The materials have been collected from soil samples. These three species belong to three families of the mentioned superfamily as follows: *Premicrodispus longicaudus* Khaustov, 2006 (Microdispidae), *Kerdabania variabilis* Khaustov, 2009 (Neopygmephoridae), *Neositeroptes opacus* Livshits, Mitrovanov & Sharonov, 1986 (Pygmephoridae). A key to Iranian Pygmephoroidea (excluding Scutacaridae) recovered from soil samples is provided.

**Key words:** Mite, Microdispidae, Neopygmephoridae, Pygmephoridae, soil, Iran.

### Introduction

One of the largest superfamilies of heterostigmatic mites (Acari: Prostigmata) is Pygmephoroidea containing about 1469 described species till 2011 (Zhang *et al*. 2011). Based on Khaustov (2004, 2008), this superfamily encompasses a monophyletic group with three families Neopygmephoridae, Scutacaridae and Microdispidae, and the family Pygmephoridae as a sister group with the mentioned three families, however, Walter *et al*. (2009) classified these four families in two separate superfamilies Scutacaroidea (including Scutacaridae and Microdispidae) and Pygmephoroidea (including Siteroptidae and Pygmephoridae). These mites are primarily free-living fungivorous and inhabit in soil, litter, humus, compost, manure, nests of birds and small mammals, decaying vegetation, rotting woods, moss beds and, many of them are associated with arthropods, particularly insects or their nests. They may sometimes show a phoretic and non-phoretic female dimorphism (Kaliszewski *et al*. 1995; Walter *et al*. 2009).

Many pygmephoroid mites recorded from Iran, particularly in recent years, have been recovered from insects (Hajiqanbar *et al*. 2011; Rahiminejad *et al*. 2011; Hosseininaveh *et al*. 2014; Loghmani *et al*. 2014). Heretofore, the non-scutacarid pygmephoroid mites collected from soil samples from Iran are 12 species: 1 from

Microdispidae, 5 from Neopygmephoridae and 6 from Pygmephoridae. These are *Premicrodispus lineatus* (Mahunka, 1986) from Microdispidae (Hajiqanbar *et al*. 2012); *Kerdabania quadrata* (Ewing, 1917), *Kerdabania inconspicuus* (Berlese, 1904), *Pseudopygmephorus tarsalis* (Hirst, 1921), *Bakerdania delanyi* (Evans, 1952) and *Bakerdania graciloides* Sevastianov, 1974 from Neopygmephoridae (Haddad Irani-Nejad *et al*. 2005; Hajiqanbar 2002; Kazemi & Khaustov 2008; Mirjamali *et al*. 2008); *Siteroptes cerealium* (Kirchner, 1864), *Sevastianovella bohemicus* (Mahunka, 1963), *Neositeroptes crossi* (Mahunka, 1969), *Pediculaster manicatus* (Berlese, 1904), *Pediculaster pseudomanicatus* Camerik, 2001, *Pediculaster mesembrinae* (Canestrini, 1881) from Pygmephoridae (Kamali *et al*. 2001; Haddad Irani-Nejad *et al*. 2005; Baharlou *et al*. 2006; Mirjamali *et al*. 2008; Lotfollahi *et al*. 2009).

The purpose of this paper is to provide new records of three soil-dwelling pygmephoroid species which are new to mite fauna of Asia including Iran. A key to Iranian Pygmephoroidea (excluding Scutacaridae) from soil samples is also provided.

## Materials and methods

The study was conducted during 2013 in Mahvelat region, Khorasan Razavi province, northeastern Iran. The mite specimens were extracted using Berlese' funnel from soil samples collected from pomegranate orchards. Mites were cleared in lactophenol, mounted in Hoyer's medium and studied with a phase contrast BX51 Olympus microscope. All mites were adult females and all materials were collected by the senior author. We follow the systematics of Pygmephoroidea proposed by Khaustov (2008). Collected materials are deposited in the Acarological Collection, Department of Entomology, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran.

## Results

### Superfamily Pygmephoroidea Cross, 1965
### Family Microdispidae Cross, 1965
### Genus *Premicrodispus* Cross, 1965

### *Premicrodispus longicaudus* Khaustov, 2006

*Diagnosis*

Currently, there are 7 species in the genus *Premicrodispus* with no setae 4*a* and $ps_2$. They are *P. longisetosus* (Mahunka, 1970), *P. kaliszewskii* Kaustov, 2006, *P. rackae* Kaustov, 2006, *P. brevisetus* Kaustov, 2006, *P. montanus* Kaustov, 2006, *P. krczali* Kaustov, 2006 and *P. longicaudus*. Among these 7 species, the *P. longicaudus* is readily distinctive by setae $ps_3$ distinctly longer than $ps_1$. In addition, setae $sc_2$ are longer than *d* and dorsal hysterosomal setae are pointed except setae *d* and *f* which are blunt-ended**.**

*World distribution.* Crimea (Khaustov 2006); Iran (current study).

*Material examined.* 2 females, 2 May 2013.

*Remarks*

It is the first record of the mite from Asia and second record in the World. This species was described by Khaustov (2006) from soil samples on Ay-Petri mountain pasture, Crimea. Therefore, the *P. longicaudus* is now distributed in Europe and Asia.

**Family Neopygmephoridae Cross, 1965**
**Genus *Kerdabania* Khaustov, 2009**

***Kerdabania variabilis* Khaustov, 2009**

*Diagnosis*

There are only 2 species of *Kerdabania* characterized by bifurcate setae 1*b* and tarsus II spine-like setae *tc'* and *pl"*. These species are *K. variabilis* and *K. fatmae* (Sevastianov & Abo-Korah, 1985). *Kerdabania variabilis* is readily distinctive by presence of well developed and arch-like apodeme 3 (apodeme 3 is completely absent in *K. fatmae*). Some other traits of this species are setae $c_1$ and $c_2$ subequal and both longer than *d*; setae *f* at least 3 times longer than *e*; and setae $h_1$ about 2/3 times longer than $h_2$.
*World distribution.* Crimea (Khaustov 2009); Iran (current study).
*Material examined*. 1 female, 15 March 2013; 1 female, 22 April 2013; 1 female, 15 May 2013; 1 female, 5 June 2013.

*Remarks*

This is the first record of the mite from Asia. Khaustov (2009) described this species from Crimea recovered from soil, sod, and litter under beech and willow. Therefore, the distribution of *K. variabilis* is Palaearctic (Crimea and Iran) now.

**Family Pygmephoridae Cross, 1965**
**Genus *Neositeroptes* Livshits, Mitrovanov & Sharonov, 1986**

***Neositeroptes opacus* Livshits, Mitrovanov & Sharonov, 1986**

*Diagnosis*

This species is distinguished from all congeners by setae $c_2$ two times longer than $c_1$; setae $c_1$ and *d* subequal; setae *f* about 4 times longer than *e*; setae $h_2$ longer than $h_1$; setae $v_1$, $v_2$, $c_1$, *d*, *e*, $h_1$ blunt-ended; setae $sc_2$, $c_2$, *f* and $h_2$ pointed.
*World distribution*. Crimea (Livshits *et al*. 1986); Iran (current study).
*Material examined*. 1 female, 2 May 2013; 1 female, 8 May 2013.

*Remarks*

This is the first record of the mite from Asia. This species was described by Livshits *et al*. (1986) from litter on *Carpobrotus edulis* in Crimea. Therefore, the *N. opacus* is currently distributed in Europe and Asia (Palaearctic).

**Key to Iranian Pygmephoroidea (excluding Scutacaridae) from soil**

1. Prodorsum with three pairs of setae ($v_1$, $v_2$, $sc_2$); coxal fields I usually with three pairs of setae (rarely with two); femur I with four setae (*d*, *v"*, *l'*, *l"*)..… Pygmephoridae..…9
– Prodorsum with one to two pairs of setae ($v_1$ absent); coxal fields I with two pairs of setae; femur I with three setae (*d*, *v"*, *l'*)……...…2
2. Prodorsum with two pairs of setae ($v_2$, $sc_2$); seta *d* on femur I modified ……...
…….Neopygmephoridae……...…4

– Prodorsum with one pair of setae ($sc_2$); seta *d* on femur I setiform……. ……Microdispidae…….Genus *Premicrodispus*…….…..…3
3. Setae 4*a* present; setae $ps_3$ and $ps_1$ subequal; setae *f* with apodeme …….. ……...*P. lineatus* (Mahunka, 1986)
– Setae 4*a* absent; setae $ps_3$ longer than $ps_1$; setae *f* with no apodeme…… ……..…..*P. longicaudus* Khaustov, 2006
4. Posterior margin of posterior sternal plate tripartite; with one pair of cheliceral setae ($ch_1$)…….Genus *Kerdabania*……5
– Posterior margin of posterior sternal plate entire; with two pairs of cheliceral setae ($ch_1$, $ch_2$)……..…7
5. Setae 1*b* bifurcate ……..……. *K. variabilis* Khaustov, 2009
– Setae 1*b* otherwise …….……...…… 6
6. Setae *pl"* on tarsus III spine-like; all dorsal hysterosomal setae pointed…… …….....*K. inconspicuus* (Berlese, 1904)
– Setae *pl"* on tarsus III setiform; all dorsal hysterosomal setae blunt-ended…… …….....*K. quadrata* (Ewing, 1917)
7. Solenidion $\omega_1$ completely fused with tibiotarsus I…..Genus *Pseudopygmephorus*…… ……..…*P. tarsalis* (Hirst, 1921)
– Solenidion $\omega_1$ not fused with tibiotarsus I……..….Genus *Bakerdania*…….8
8. Apodeme 5 well-developed; setae $h_2$ pointed…….*B. graciloides* Sevastianov, 1974
– Apodeme 5 reduced; setae $h_2$ blunt-ended……..….*B. delanyi* (Evans, 1952)
9. Stigmata elongated ……10
– Stigmata rounded ……..……..….13
10. Setae *e* absent …….Genus *Siteroptes*……*S. cerealium* (Kirchner, 1864)
– Setae *e* present ……...…….……11
11. Coxal fields I and II with two pairs of setae each……....Genus *Sevastianovella*.… ……...*S. bohemicus* (Mahunka, 1963)
– Coxal fields I and II with three and two pairs of setae, respectively..... .....Genus *Neositeroptes*…….……12
12. Setae $h_1$ and $h_2$ subequal……...……..……*N. crossi* (Mahunka, 1969)
– Setae $h_2$ distinctly longer than $h_1$….*N. opacus* Livshits, Mitrovanov & Sharonov, 1986
13. Coxal fields II with two pairs of setae……*Pediculaster manicatus* (Berlese, 1904)
– Coxal fields II with three pairs of setae...…….....14
14. Stigmata two-chambered; setae *f* about 2.5 times as long as setae *e*……. ……...…..…*P. pseudomanicatus* Camerik, 2001
– Stigmata one-chambered; setae *f* three times longer setae *e*……. ……..…*P. mesembrinae* (Canestrini, 1881)

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# رکورد جدید سه گونه از کنه‌های بالاخانواده Pygmephoroidea (Acari: Heterostigmata) از آسیا

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## چکیده

به دنبال مطالعه کنه‌های مرتبط با انار در منطقه مه‌ولات واقع در استان خراسان رضوی، شمال شرق ایران، در سال ۱۳۹۲ سه گونه از کنه‌های بالاخانواده Pygmephoroidea (Acari: Prostigmata: Heterostigmata) جمع‌آوری شد که برای نخستین بار از آسیا گزارش می‌شوند. کنه‌های مورد مطالعه از خاک جمع‌آوری شدند. این سه گونه متعلق به سه خانواده از بالاخانواده مزبور می‌باشند که عبارتند از: *Premicrodispus longicaudus* Khaustov, 2006 از خانواده Microdispidae، *Kerdabania variabilis* Khaustov, 2009 از خانواده Neopygmephoridae، *Neositeroptes opacus* Livshits, Mitrovanov & Sharonov, 1986 از خانواده Pygmephoridae. کلیدی برای شناسایی کنه‌های بالاخانواده Pygmephoroidea (به جز خانواده Scutacaridae) جمع‌آوری شده از خاک در ایران ارایه شده است.

**واژگان کلیدی**: کنه، Microdispidae، Neopygmephoridae، Pygmephoridae، خاک، ایران.

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