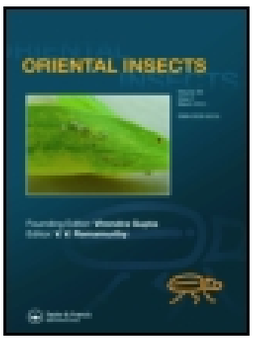

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Eichinaphis Narzikulov (Hemiptera: Aphididae), a new record genus from Mongolia

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ABSTRACT

Aphid genus *Eichinaphis* Narzikulov and *Eichinaphis pamirica* Narzikulov are new records in Mongolia, based on the materials of apterous and alate viviparous females from south-west Mongolia. Detailed morphological redescription, illustrations and photographs are provided. Notes on its host plants and distribution are also included.

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KEYWORDS
Aphididae; *Eichinaphis*; new record; morphology; distribution

Introduction

Narzikulov (1963) described the aphid genus *Eichinaphis* based on a single species, *E. pamirica*, collected from Central Asia. Narzikulov and Ibraimova (1975) recorded the species from Kyrgyzstan. Kadyrbekov (1992) described the other species, *E. turanica*, from Kazakhstan. The variation of some morphological characters in the second species is within the range of *E. pamirica*, so it seems likely that only one reliable species is involved in the genus (Blackman and Eastop 2006). *Eichinaphis* Narzikulov is one of the eremic groups of Macrosiphini with more thick setae, sclerotised and smooth cuticle. It was distinguished by the siphunculi strongly swollen at the middle, with developed flange, well-developed dorsal setae with capitate apices and rostrum distinctly elongate, sharp wedge shaped.

Eichinaphis pamirica has been described and illustrated poorly based on apterous viviparous females collected from Pamir Plateau, Tajikistan by Narzikulov (1963). At the same time, some important characters were omitted in the previous descriptions. Here, the genus *Eichinaphis* Narzikulov and *E. pamirica* Narzikulov are recorded for the first time from Umnogovi Province, Mongolia and redescribed. Morphological descriptions, host plants, photographs, geographical distributions and biology of the species are also provided.

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Material and methods

Specimens examined in this study were collected from Southern Mongolia (Umnogovi Province) in July 2012 and are deposited in the National Zoological Museum of China, Institute of Zoology, Chinese Academy of Sciences, Beijing. Aphid terminology in this paper generally follows Narzikulov (1963). The unit of measurements in this paper is millimetres (mm).

The following abbreviations have been used in descriptions and table: Ant., antennae; Ant.I, Ant.II, Ant.III, Ant.IV, Ant.V, Ant.VI and Ant.VIb, antennal segments I, II, III, IV, V, VI and base of VI, respectively; Ant.IIIBD, basal diameter of antennal segment III; PT, processus terminalis; URS, ultimate rostral segment; BL, length of body; 2HT, second hind tarsal segment; SIPH, siphunculi; BW SIPH, basal width of siphunculus; MW SIPH, middle width of siphunculus; DW SIPH, distal width of siphunculus; BW Cauda, basal width of cauda; GP, genital plate.

Eichinaphis Narzikulov

Eichinaphis Narzikulov, 1963: 259. Type species. *Eichinaphis pamirica* Narzikulov 1963, by original designation.

Eichinaphis Narzikulov: Narzikulov & Ibraimova, 1975: 60; Kadyrbekov, 1992: 59; Remaudière & Remaudière, 1997: 96; Kadyrbekov, Renxin & Shao, 2002: 29; Blackman and Eastop 2006: 1153.

Diagnosis. Apterous viviparous female: body elliptical, medium size. Antennal tubercles poorly developed, median frontal tubercle developed, higher than antennal tubercles. Body dorsum sclerotised completely. Dorsal setae of body long, thick, stiff and capitate at apices, with developed setal tubercle at base; ventral setae sparse, short and pointed at apices. Rostrum elongate, sharp wedge-shaped. Antennae six-segmented, shorter than body, without secondary rhinaria; processus terminalis longer than base of the segment, antennal setae long and pointed; primary rhinaria with long cilia. Mesosternal furca with an elongate stem. First tarsal chaetotaxy: 2, 2, 2. Siphunculi short barrel-shaped, swollen medially, flange developed and with distinct indent below the flange. Cauda tongue-shaped. Genital plate transversely oval. Alate viviparous female: Abdominal tergites each with one pair of marginal patches and one transverse band. Antennal segment III with large and round secondary rhinaria, distal portion of segment III slightly constricted. Forewing median vein with two-forked, hind wing with two oblique veins.

Host plants: Kraschenninnikovia ceratoides and *Kraschenninnikovia* spp. (Amaranthaceae).

Distribution: Central Asia (Iran, Kazakhstan, Kyrgyzstan and Tajikistan), East Asia (Mongolia).

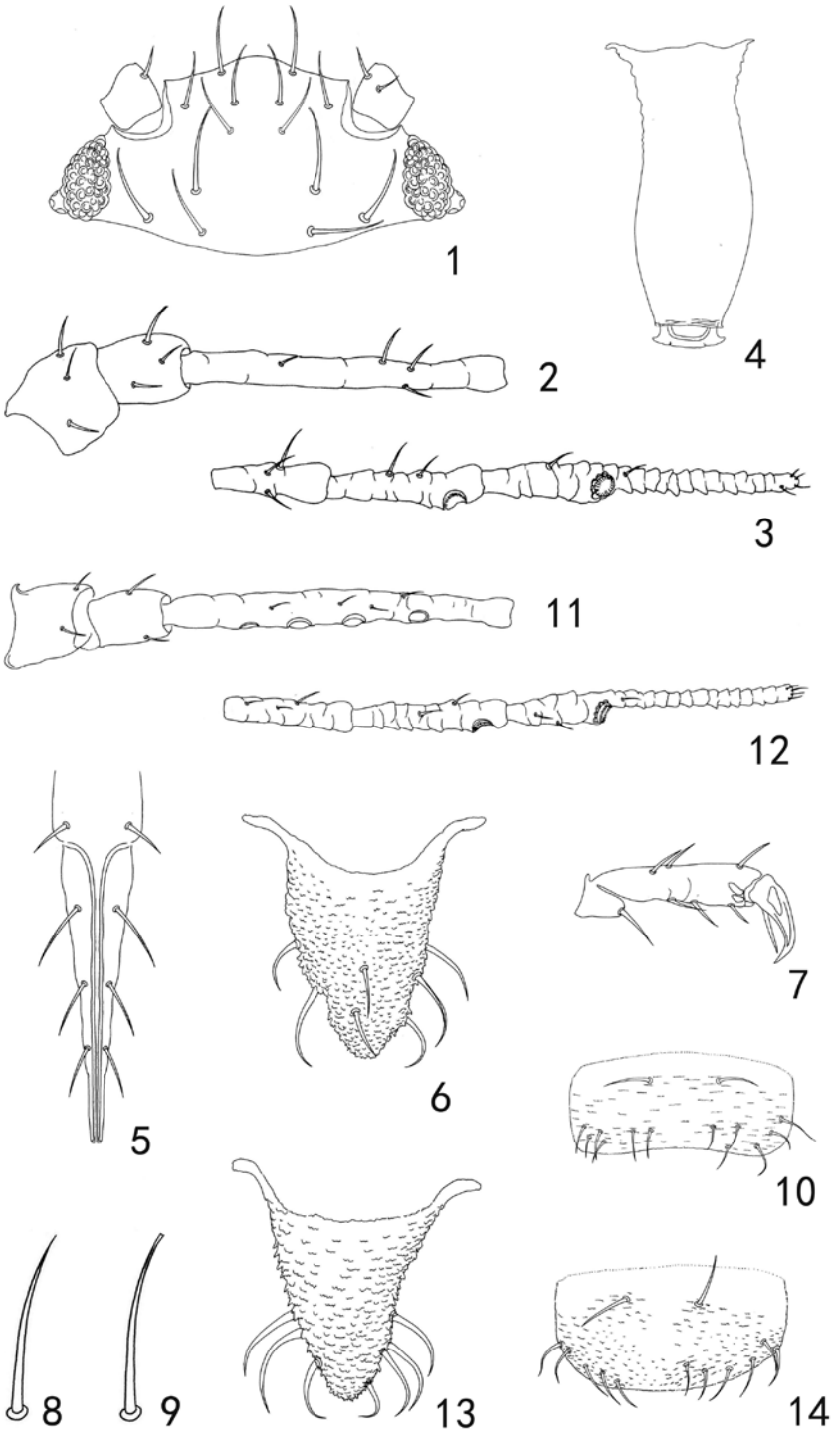

Figure 1–14. *Eichinaphis pamirica* Narzikulov. 1–10. Apterous viviparous female: 1. Dorsal view of head; 2. Antennal segments I–III; 3. Antennal segments IV–VI; 4. Siphunculus; 5. Ultimate rostral segment; 6. Cauda; 7. Hind tarsal segment; 8. Frontal setae of head; 9. Dorsal setae of head; 10. Genital plate. 11–14. Alate viviparous female: Antenna: 11. Antennal segments I–III; 12. Antennal segments IV–VI; 13. Cauda; 14. Genital plate.

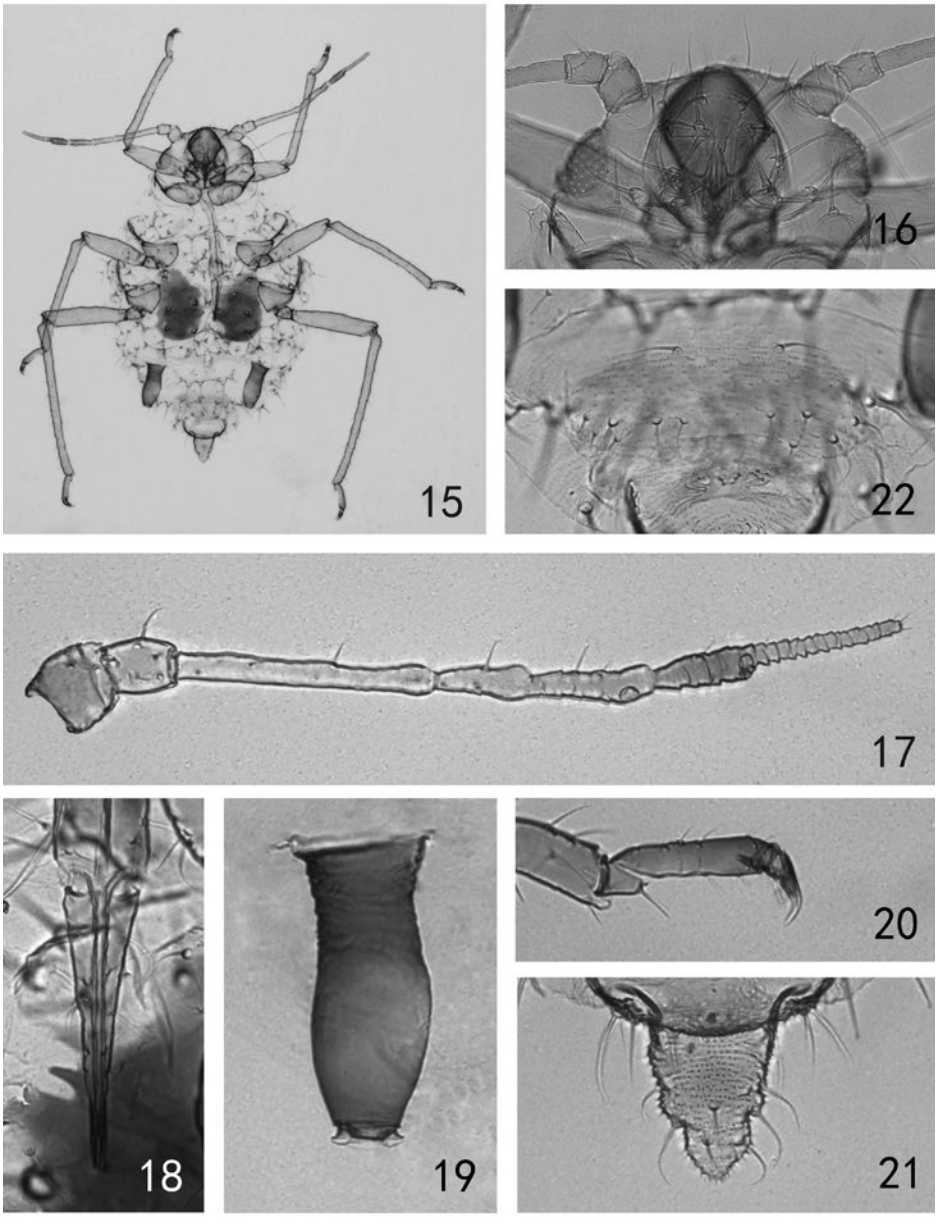

Figure 15–22. *Eichinaphis pamirica* Narzikulov. Apterous viviparous female: 15. Body; 16. Dorsal view of head; 17. Antenna; 18. Ultimate rostral segment; 19. Siphunculus; 20. Hind tarsal segment; 21. Cauda; 22. Genital plate.

Eichinaphis pamirica Narzikulov

(Figure 1–30)

Eichinaphis pamirica Narzikulov, 1963: 260.

Eichinaphis pamirica Narzikulov: Narzikulov & Ibraimova, 1975: 60; Kadyrbekov, 1992: 59; Remaudière & Remaudière, 1997: 96;

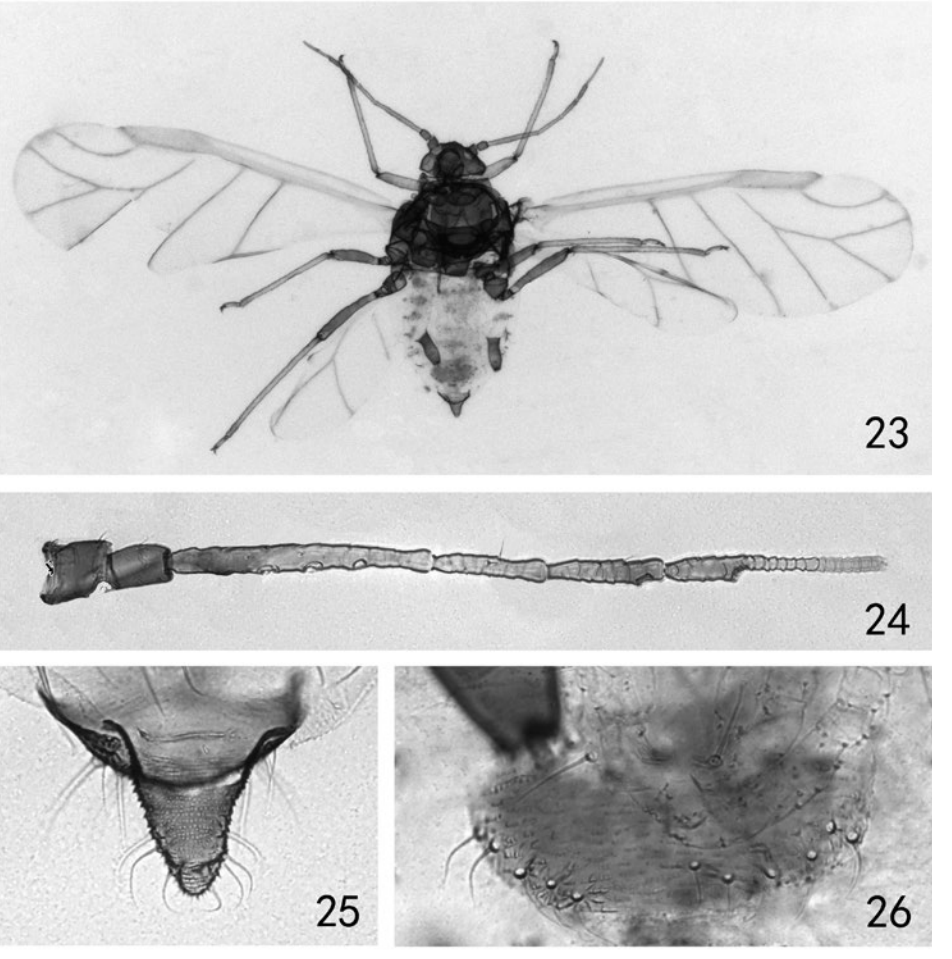

Figure 23–26. *Eichinaphis pamirica* Narzikulov. Alate viviparous female: 23. Body; 24. Antenna; 25. Cauda; 26. Genital plate.

Kadyrbekov, Renxin & Shao, 2002: 29; Blackman and Eastop 2006.

Redescription: Apterous viviparous female: Body elliptical; greenish or reddish brown to dark brown in life, with a pair of dark spots on abdominal tergum (Figure 15).

Mounted specimens: Body dorsum pale brown (Figure 15). Antennal segments I–VI pale brown but base of segment VI brown (Figure 17). Siphunculi (Figure 15, 19) brown to pale brown. Genital plate brown. For morphometric data see Table 1.

Head: Smooth dorsally. Median frontal tubercle developed, distinctly higher than antennal tubercles (Figure 1). Head dorsum sclerotised completely. Frontal setae thick, stiff and pointed at apices (Figure 8). Dorsal setae of head long, thick, stiff and capitate at apices (Figure 9), with developed setal tubercle at base. Head with one pair of frontal setae, three pairs of dorsal setae between antennae and three pairs of dorsal setae between eyes (Figure 1 and 16). Frontal setae, 2.6–3.3

Figure 27–30. Photos of ***Eichinaphis pamirica*** Narzikulov in the field. 27. Habitats; 28. Host plant, *Kraschenninnikovia* sp. (Amaranthaceae); 29, 30. Colony of *Eichinaphis pamirica*.

times as long as basal width of antennal segment III. Ventral setae of head short, sparse and pointed at apices, distinctly shorter than dorsal ones.

Antennae six-segmented (Figure 2, 3, 17), segments I–II slightly rough, segments III–V with weak imbrications, segment VI with distinctly transverse imbrications; 0.4–0.5 times as long as body length; length in proportion of segments I–VI: 30–31, 28–31, 100, 37–56, 48–54 and 37–45 + 58–71, respectively. Processus terminalis 1.2–1.6 times as long as base of the segment. Antennal setae very long, pointed at apices, segments I–VI each with 3–4, 4, 3–5, 2–3, 2 and 1–2 + 1, respectively, apex of processus terminalis with three or four setae; length of setae on segment III 1.1–1.3 times as long as basal width of the segment. Primary rhinaria ciliated, secondary rhinaria absent (Figure 2, 3, 17). Rostrum reaching hind coxae, ultimate rostral segment thin and long, –wedge-shaped (Figure 5, 18), 3.7–4 times as long as its basal width, 1.5–1.8 times as long as second hind tarsal segment, with three pairs of primary setae and two pairs of accessory setae.

Thorax: Dorsal cuticle smooth. Dorsal setae capitate at apices, on developed setal tubercle. Pronotum with two pairs of spinal, one pair of pleural and one pair of marginal setae; meso and metanotum each with numerous pairs of capitate setae, one pair of marginal setae, respectively. Leg long, hind femur 1.8–2 times as long as antennal segment III; hind tibia 0.4–0.5 times as long as body length. Setae on legs sparse, long and pointed at apices, length of setae of hind tibia 1.1–1.2 times as long as mid-diameter of the segment. First tarsal chaetotaxy: 2, 2, 2.

Table 1. Biometric data (mean, range and standard division) of the apterous viviparous female of *Eichinaphis pamirica* Narzikulov (in mm).

Part (for abbreviations see Materials and Methods)		Apterous viviparous females, $n = 5$		
		Mean	Range	SD
Length (mm)	Body length	1.26	1.15–1.39	0.104
	Body width	0.76	0.66–0.88	0.089
	Antenna	0.58	0.55–0.65	0.041
	Ant.I	0.05	0.05–0.06	0.004
	Ant.II	0.05	0.04–0.05	0.004
	Ant.III	0.16	0.15–0.18	0.012
	Ant.IV	0.08	0.06–0.1	0.015
	Ant.V	0.08	0.08–0.09	0.007
	Ant.VIb	0.07	0.06–0.08	0.005
	PT	0.1	0.09–0.11	0.005
	Length of setae on Ant. III	0.02	0.02–0.025	0.002
	Ant.IIIBD	0.02	0.018–0.021	0.001
	URS	0.15	0.14–0.17	0.012
	BW URS	0.04	0.036–0.044	0.003
	Hind femur	0.31	0.29–0.36	0.028
	Hind tibia	0.57	0.53–0.63	0.039
	MW hind tibia	0.03	0.025–0.029	0.002
	2HT	0.09	0.087–0.094	0.003
	Length of setae on hind tibia	0.03	0.028–0.032	0.002
	SIPH	0.16	0.156–0.163	0.004
	BW SIPH	0.07	0.056–0.075	0.007
	MW SIPH	0.06	0.056–0.071	0.005
	DW SIPH	0.04	0.035–0.038	0.001
	Cauda	0.1	0.081–0.107	0.011
	BW cauda	0.1	0.081–0.113	0.014
	Length of cephalic setae	0.06	0.05–0.063	0.005
	Length of marginal setae on tergum I	0.06	0.05–0.066	0.006
	Dorsal setae on tergum VIII	0.07	0.07–0.077	0.003
Ratios	Antenna/Body	0.46	0.42–0.5	0.035
	Hind femur/Ant.III	1.93	1.75–2.02	0.108
	Hind tibia/Body	0.45	0.38–0.48	0.042
	PT/Ant.VIb	1.49	1.24–1.59	0.147
	URS/BW URS	3.86	3.71–4.0	0.105
	URS/2HT	1.65	1.48–1.8	0.148
	SIPH/Body	0.13	0.12–0.14	0.008
	SIPH/Cauda	1.67	1.46–1.93	0.208
	SIPH/BW SIPH	2.37	2.17–2.79	0.243
	SIPH/MW SIPH	2.53	2.29–2.77	0.184
	SIPH/DW SIPH	4.31	4.16–4.46	0.125
	Cauda/BW Cauda	1.0	0.78–1.2	0.156
	Length of setae on Ant. III/Ant.IIIBD	1.18	1.05–1.32	0.124
	Cephalic setae/Ant.IIIBD	2.96	2.63–3.31	0.275
	Marginal setae on Tergum I/Ant.IIIBD	3.11	2.78–3.31	0.239
	Dorsal setae on Tergum VIII/Ant.IIIBD	3.84	3.57–4.17	0.231
	Setae on hind tibia/MW hind tibia	1.1	1.06–1.15	0.029

Abdomen: Abdominal tergites sclerotised completely. Dorsal setae on abdominal tergites long, thick and stiff, capitate at apices, on developed setal tubercle. Ventral setae very sparse, fine and pointed, distinctly shorter than dorsal setae. Abdominal tergites VIII with five pairs of capitate setae. Length of marginal setae on abdominal tergite I and spinal setae on tergite VIII: 2.8–3.3 times and 3.6–4.2 times as long as basal width of antennal segment III, respectively. Spiracles round or oval, opened; spiracular plates oval. Siphunculi short, cylindrical (Figure 4 and 19), basal half part concave gradually, with slightly wrinkle; median part distinctly

Table 2. Biometric data (mean, range and standard division) of the alate viviparous female of *Eichinaphis pamirica* Narzikulov (in mm).

Part (for abbreviations see Materials and Methods)		Alate viviparous females, *n* = 2		
		Mean	Range	SD
Length (mm)	Body length	1.28	1.18–1.38	0.145
	Body width	0.61	0.55–0.67	0.088
	Antenna	0.79	0.69–0.89	0.144
	Ant.I	0.05	0.049–0.056	0.005
	Ant.II	0.05	0.052–0.055	0.002
	Ant.III	0.25	0.22–0.28	0.04
	Ant.IV	0.12	0.1–0.15	0.039
	Ant.V	0.11	0.1–0.11	0.01
	Ant.VIb	0.07	0.07–0.08	0.012
	PT	0.14	0.11–0.17	0.036
	Length of setae on Ant. III	0.02	0.02–0.025	0.002
	Ant.IIIBD	0.02	0.019–0.021	0.001
	URS	0.15	0.14–0.15	0.004
	BW URS	0.04	0.031–0.038	0.005
	Hind femur	0.35	0.32–0.38	0.04
	Hind tibia	0.68	0.65–0.7	0.035
	MW hind tibia	0.02	0.023–0.026	0.003
	2HT	0.09	0.093–0.094	0.001
	Length of setae on hind tibia	0.04	0.033–0.038	0.004
	SIPH	0.16	0.14–0.18	0.026
	BW SIPH	0.07	0.056–0.083	0.019
	MW SIPH	0.06	0.055–0.065	0.007
	DW SIPH	0.04	0.035–0.037	0.001
	Cauda	0.1	0.094–0.106	0.008
	BW cauda	0.11	0.091–0.119	0.02
	Length of cephalic setae	0.07	0.069–0.075	0.004
	Length of marginal setae on tergum I	0.05	0.039–0.056	0.012
	Dorsal setae on tergum VIII	0.07	0.07–0.071	0.001
Ratios	Antenna/Body	0.62	0.59–0.65	0.043
	Hind femur/Ant.III	1.41	1.36–1.46	0.067
	Hind tibia/Body	0.53	0.51–0.55	0.032
	PT/Ant.VIb	1.86	1.73–1.99	0.184
	URS/BW URS	4.29	3.95–4.65	0.493
	URS/2HT	1.57	1.53–1.6	0.055
	SIPH/Body	0.12	0.12–0.13	0.007
	SIPH/Cauda	1.56	1.47–1.65	0.129
	SIPH/BW SIPH	2.29	2.11–2.46	0.251
	SIPH/MW SIPH	2.6	2.51–2.69	0.129
	SIPH/DW SIPH	4.34	3.94–4.73	0.556
	Cauda/BW Cauda	0.96	0.89–1.03	0.101
	Length of setae on Ant. III/Ant.IIIBD	1.06	0.05–0.07	0.013
	Cephalic setae/Ant.IIIBD	3.6	3.57–3.63	0.043
	Marginal setae on Tergum I/Ant.IIIBD	2.36	2.04–2.68	0.45
	Dorsal setae on Tergum VIII/Ant.IIIBD	3.56	3.37–3.75	0.269
	Setae on hind tibia/MW hind tibia	1.44	1.43–1.44	0.013

swollen, smooth; flanges developed, siphuncular aperture very large; 2.2–2.8 times as long as its basal width, 2.3–2.8 times as long as its middle width, 2.2–2.5 times as long as its distal width, 1.5–1.9 times as long as cauda, 0.12–0.14 times as long as body. Cauda –tongue-shaped, stout at apex, with spinulose short stripes (Figure 6, 21); 0.8–1.2 times as long as its basal width, with seven long curved setae. Anal plate semi-circular, with 9–11 setae and pointed at apices. Genital plate (Figure 10, 22) broadly circular, with spinulose transverse stripes; with 2 anterior setae and 12 posterior setae.

Alate viviparous female. Similar in colouration to apterae.

Mounted specimens: Head dorsum, antennal segments I–II, base of segment III, distal portion of segment V and base of the segment VI brown (Figure 23), others pale. Siphunculi (Figure 23) brown except pale brown median part. Marginal patches and transverse bands of abdominal tergites, legs and genital plates brown. Forewing and hind wing pale, all veins brown. For morphometric data, see Table 2.

Head: Median frontal tubercle higher than antennal tubercles (Figure 23). Dorsum of head sclerotised completely. Frontal setae thick, stiff and pointed at apices, 3.5–3.6 times as long as basal width of antennal segment III. Dorsal setae of head long, acute, capitate at apices. Antennae six-segmented, segments I and II smooth with sparse wrinkles, segments III–VI imbricated (Figure 11–12, 24); 0.6–0.7 times as long as body, length in proportion of segments I–VI: 20–23, 20–24, 100, 44–55, 41–45 and 30–31 + 52–60, respectively. Processus terminalis 1.7–2 times as long as base of the segment. Primary rhinaria ciliated, segments III with 4–6 large round, secondary rhinaria. Antennal setae short and pointed, segments I–VI each with 3–4, 3–4, 3–5, 3, 2 and 2 + 1 setae, respectively, apex of processus terminalis with 3 or 4 short setae; 1–1.1 times as long as basal diameter of the segment. Rostrum reaching hind coxae, ultimate rostral segment thin, wedge-shaped, apex brown, 4–4.7 times as long as its basal width, 1.5–1.6 times as long as hind second tarsal segment, with three pairs of primary setae and two pairs of accessory setae.

Thorax: Dorsum of thorax sclerotised completely. Hind femora 1.4–1.5 times as long as antennal segment III. Hind tibiae 0.5–0.6 times as long as body, setae on hind tibiae 1.4–1.5 times as long as middle diameter of the segment. First tarsal chaetotaxy: 2, 2, 2.

Abdomen: Abdominal tergites smooth. Dorsal setae are the same as apterae. Abdominal tergites each with one pair of marginal patches and one transverse band. Abdominal tergite VIII with nine setae. Marginal setae on tergite I 2–2.7 times as long as basal width of antennal segment III, dorsal setae on tergite VIII 3.4–3.8 times as long as basal diameter of antennal segment III. Siphunculi similar to apterae, 0.12–0.13 times as long as body, 2.1–2.5 times as long as its basal width, 2.5–2.7 times as long as its middle width, 3.9–4.7 times as long as its distal width and 1.5–1.7 times as long as cauda. Cauda (Figure 13, 25) tongue-shaped, constricted at base, with spinulose short stripes; 0.9–1 times as long as its basal width and with seven setae. Anal plate with 10–11 setae. Genital plate (Figure 14, 26) with 11 posterior setae and 2 anterior setae. Forewing median vein with two-forked, hind wing with two oblique veins (Figure 23).

Specimens examined: Mongolia: Umnogovi Province, Bulgan (43.79°N, 102.36°E), altitude 1880 m, two alate viviparous females and five apterous viviparous females, on *Krascheninnikovia* sp., 27. Viii. 2012, coll. B. Zhang.

Biology: The species was collected from the undersides of leaves of *Krascheninnikovia* in a dry or desert environment, not attended by ants (Figure 27–30).

Distribution: This is a typical species in arid and semi-arid regions, it mainly distributed in Central and North-west Asia, including Iran, Kazakhstan, Kyrgyzstan, Mongolia and Tajikistan.

Remark: Specimens from Mongolia are smaller than both the types and Kyrgyzstan specimens in apterae (length of body: Mongolian specimens: 1.18–1.38 mm, type specimens: 1.37–1.57 mm, Kyrgyzstan specimens: 1.72–1.95 mm). Mongolian specimens also have thicker and longer dorsal hairs, more developed setal tubercle and much less secondary rhinaria of antennal segment III in alatae (Mongolian specimens with 4–6 secondary rhinaria, Kyrgyzstan specimens with 6–9 secondary rhinaria). Although dorsal hairs and setal tubercle of type specimens have not been given in the original description, the illustrations of type specimens provided by Narzikulov (1963) clearly show that these characters are poorly developed. Morphometric data are similar to those in the types and Kyrgyzstan specimens, but in apterae the length of antennal segment IV (Mongolian specimens: 0.06–0.1 mm, type specimens: 0.09–0.13 mm, Kyrgyzstan specimens: 0.09–0.13 mm) and the length of cauda are shorter (Mongolian specimens: 0.08–0.11 mm, type specimens: 0.11–0.13 mm, Kyrgyzstan specimens: 0.14–0.16 mm). Compared to the type specimens, PT/Ant.VIb of Mongolian specimens is smaller (Mongolian specimens: 1.2–1.6 times, type specimens: 1.6–1.8 times). These characters are continuous variable and the variations are interpreted as intraspecific variations.

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Disclosure statement

No potential conflict of interest was reported by the authors.

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