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Article

First record of the family Pomerantziidae (Acari: Trombidiformes) from Middle East, with recording of two species for the first time from Asia

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ABSTRACT
During the study of the mite fauna of wheat fields in Marand region of East Azerbaijan province, Iran, two species of the family Pomerantziidae namely *Apomerantzia kethleyi* (Price, 1975) and *Pomerantzia benhami* Price, 1974 were identified and illustrated. It is the first record of this mite family from Middle East and these two species are recorded for the first time from Asia. In addition, a key to adult females of known genera and species of this family is provided.

KEY WORDS: *Apomerantzia*; fauna; Marand; new report; *Pomerantzia*.

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INTRODUCTION

The family Pomerantziidae (Trombidiformes: Prostigmata) was proposed by Baker (1949) with description of *Pomerantzia charlesi* Baker, 1949, collected from peach orchard soil in the Southern United States. This family comprises of two genera, *Pomerantzia* Baker, 1949 (including four species) and *Apomerantzia* Fan & Chen, 2005 (including two species) (Fan and Chen 2005; Bochkov and Walter 2007). Mites of this family are adapted to the underground soil habitat and mostly found from deeper soil horizons in the United States, China and Philippines (Baker 1949; Price 1974; Price and Benham 1976; Kethley 1989; Fan and Chen 2005; Bochkov and Walter 2007). The stout claws, missing empodia and greatly enlarged legs I are suitable for digging. Their small and elongate cylindrical-shaped body allows easy movement through the soil. The enlarged ventral setae on tibiae and tarsi II–IV provide support points for forward movement. Their euedaphic life style cause secondary loss of prodorsal naso and bothridia and protruding their peritremes (Walter *et al*. 2009). Members of this family have complete ontogenic stages including prelarva, larva, three nymphal stages and adult (Price 1974; Bochkov and Walter 2007).

Until now, no pomerantziid mites were recorded from Middle East. During the current study, two species belonging to two genera of the family Pomerantziidae were identified. Our purpose is to introduce and illustrate Iranian specimens of these two species along with recording new localities for them.

MATERIAL AND METHODS

During the study of mites of family Pomerantziidae in the Marand region of East Azerbaijan province (Iran), samples were taken from wheat fields soils during mid-September of 2014. The collected samples were transferred into the laboratory. Mites were extracted with a Berlese funnel, stored in Oudeman's solution, cleared in Nesbitt's fluid and slide-mounted in Hoyer's medium (Walter and Krantz 2009). They were then examined and identified under a phase-contrast Olympus BX53 microscope. In the descriptions, the gnathosomal chaetotaxy follows Grandjean (1947) and the idiosomal chaetotaxy follows Grandjean (1939) as adapted for Prostigmata by Kethley (1990). All morphological measurements are given in micrometers and the line drawings were handmade through a camera lucida. Specimens are held in the Acarology laboratory, Department of Plant Protection, Faculty of Agriculture, Azarbaijan Shahid Madani University, Tabriz, Iran.

RESULTS

Family Pomerantziidae Baker, 1949

Type genus: *Pomerantzia* Baker, 1949; by original designation.

Key to adult females of known genera and species of the family Pomerantziidae

1. Each peritreme with 6–8 chambers, *c2* anterior to *c1*, ventrolateral shields fused with coxae III, coxa IV with 3 setae, genu I with 10(1) setae, genu IV with 6 setae ..... *Apomerantzia* Fan & Chen, 2005 2
– Each peritreme with 3–5 chambers, *c2* posterior to *c1*, ventrolateral shields separate from coxae III, coxa IV with 4 setae, genu I with 12(1) setae ..... *Pomerantzia* Baker, 1949 3
2. Striae between shields *F* and *H* narrow, tarsus I with 19(8) setae ..... *A. kethleyi* (Price, 1975)
– Striae between shields *F* and *H* broad, tarsus I with 19(6) setae ..... *A. prolata* (Price, 1971)
3. Tarsi II and IV each with 12 setae ..... *P. philippina* Bochkov & Walter, 2007
– Tarsi II and IV each with 11 setae 4
4. Tibia IV with 8(1) setae ..... *P. charlesi* Baker, 1949
– Tibia IV with 9(1) setae 5
5. Tarsus I with 19(8) setae ..... *P. benhami* Price, 1974
– Tarsus I with 18(8) setae ..... *P. subterranea* Fan & Chen, 2005

Pomerantzia benhami Price, 1974

Pomerantzia benhami Price, 1974: 425; Fan and Chen 2005: 8, Table 2; Bochkov and Walter 2007: 159, 169.

Distribution and habitat – United States (California: from agricultural soil (Price 1974); from agricultural soil at depth of 30.5–121.9 cm in the San Joaquin Valley, 22.9–249.8 cm in western Fresno County (Price and Benham 1976).

Iranian Adult female (Figs. 1–2)

Gnathosoma – 84 long and 60 wide. Peritreme with 4 chambers, situated between cheliceral

bases. Chelicerae 50 long, about 4× length of movable digits (12). Palp 75 long, palpfemur 40 long and 21 wide, longer than length of palptibia plus palptarsus, terminal palptibial claw strong, 12 long, accessory claw conical, 4 long; counts of setae and solenidia from palptrochaner to palptarsus: 0, 1, 1, 2 + 1 terminal claw + 1 accessory claw, 4 + 1ω + 4 eupathidia. Subcapitular setae *m* 15 about as long as width of *m–m* (17), rostrum with 2 pairs of setae, *ro1* 7 and *ro2* 11.

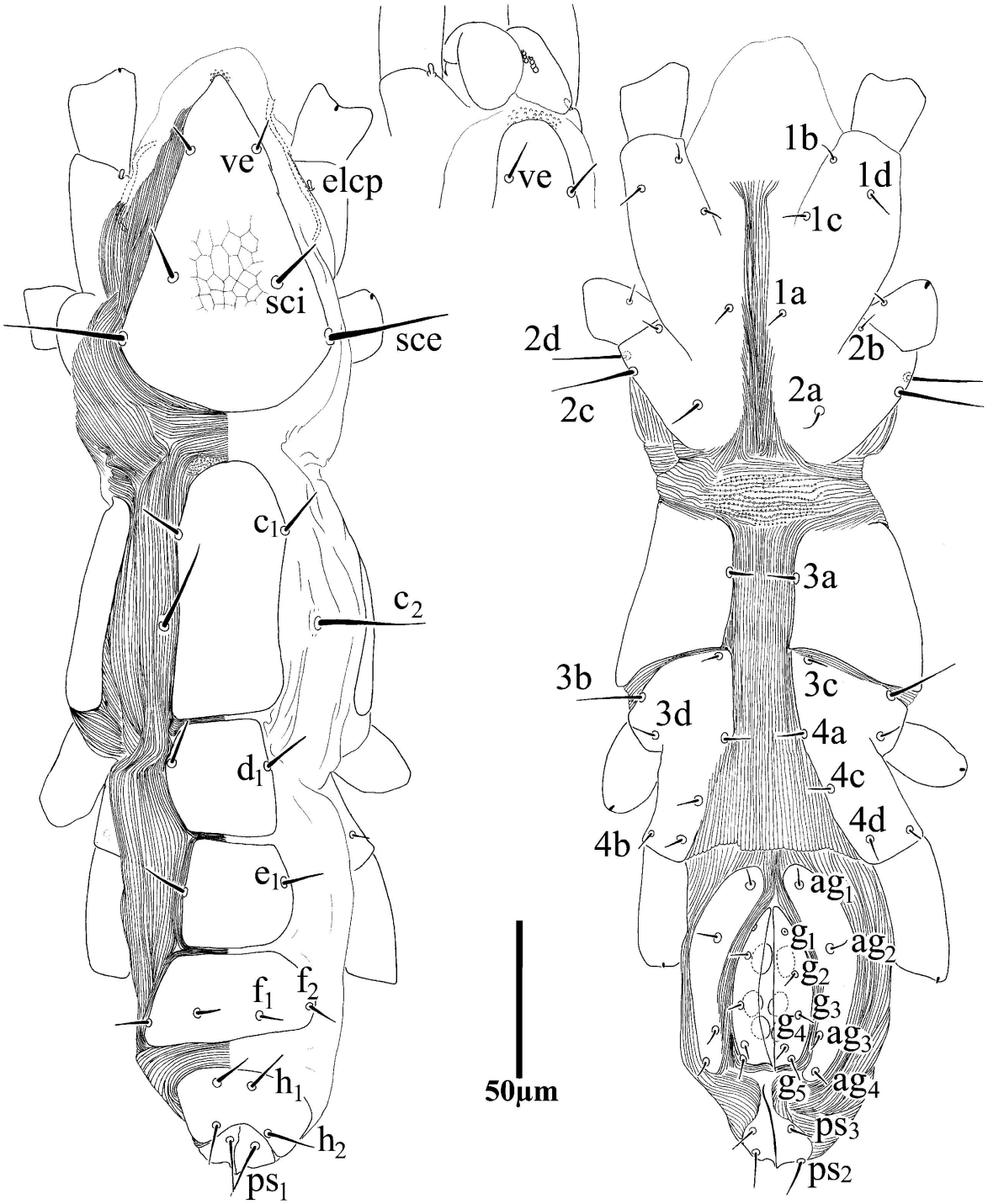

Figure 1. *Pomerantzia benhami* Price, 1974 – Dorsal (left) and ventral (right) view of body and dorsolateral view of the chelicerae (center).

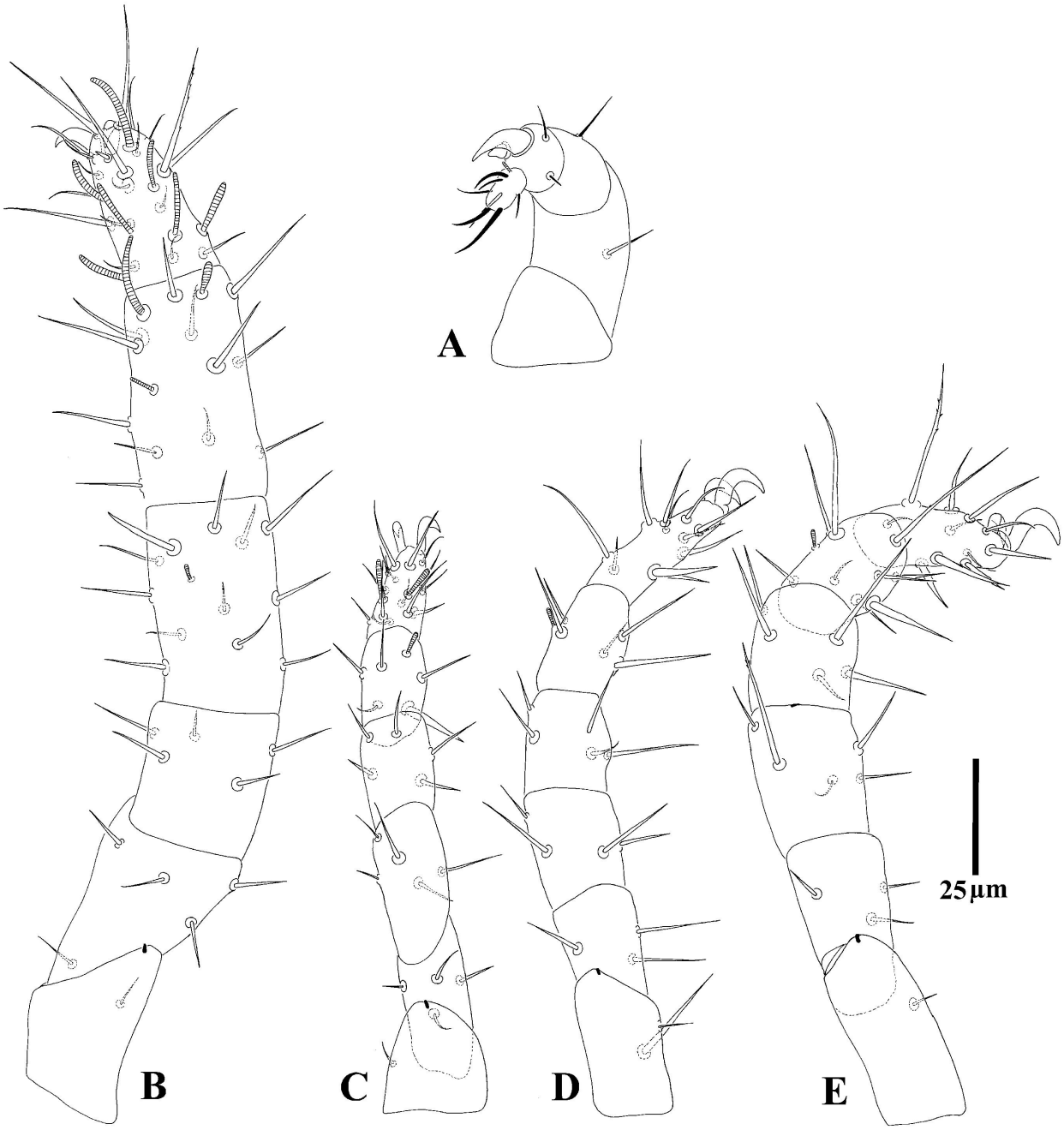

Figure 2. *Pomerantzia benhami* Price, 1974 – A. Palp; B. Leg I; C. Leg II; D. Leg III; E. Leg IV.

Idiosoma – Weakly sclerotized, narrowly oval in shape, 355–370 long and 92–97 wide. Prodorsal shield reticulated at the center, remaining shields without ornamentation, striae between shields *F* and *H* narrow. All dorsal setae smooth. Prodorsal shield bearing 3 pairs of setae, *ve* 9– 12, *sci* 17–21 and *sce* 33–39; distances: *ve–ve* 15–18, *ve–sci* 39– 47, *sci–sci* 24–29, *sci–sce* 19 and *sce –sce* 54–62. Hysterosomal shield *C* longitudinally rectangular, with 1 pair of setae, *c1* 10–11, on its anterior half part; setae *c2* 20–34 obviously longer than other hysterosomal setae, situating on platelets posterior to *c1*; shields *D* and *E*, nearly square, each bearing 1 pair of setae, *d1* 10–16 and *e1* 10–15; shield *F* nearly trapezoid, bearing 2 pairs of setae, *f1* 10–15 and *f2* 10–13, *f2* widely spaced and on the same row of *f1*; shield *H* trapeziform, bearing 2 pairs of setae, *h1* 17–19 and *h2* 16–17, *h2* obviously posterior to *h1*; distances *c1–c1* 30–32, *c1–c2* 27, *d1–d1* 27–29, *e1–e1* 28–29, *f1–f1* 17–19, *f1–f2* 14, *h1–h1* 8–13, *h1–h2* 13–16, *h2–h2* 13–14. Sejugal grove present. shields bearing setae *3a* separated

from coxae III. Aggenital valves bearing 4 pairs of setae, *ag1* 5– 6, *ag2* 6–7, *ag3* 5–6 and *ag4* 5–7. Genital valves bearing 5 pairs of setae, *g1* 5, *g2* 5, *g3* 5 and *g4* 5, *g6* 7–8. Pseudanal valves bearing 3 pairs of setae, *ps3* 9–10, *ps2* 10–11 and *ps1* 15–18. **Legs** I, II, III, IV about 203–230, 110–123, 110–143, and 160–180, respectively. Counts of setae and solenidia on legs I–IV: coxae (including *1a*, 2*a*, *3a* and *4a*) 4+ 1*elcp*, 4, 4, 4; trochanters 1, 1, 2, 1; basifemora 5, 4, 3, 3; telofemora 5, 5, 4, 5; genua 12 + 1κ, 5, 5, 5; tibiae 12 + 3φ, 5 + 1φ, 5 + 1φ, 9 + 1φ; tarsi 19 + 7ω + 1ε, 14 + 2ω, 11, 11.

Material examined – One female from soil horizon II (18-41 cm depth) and one female, one deutonymph and one tritonymph from soil horizon III (41-90 cm depth) of wheat field, 38°26‘37.45"N, 45°53'55.39"E, 1399 m above sea level.

Comment – It is the first record of this species from Asia.

Remarks

The Iranian female specimens of *P. benhami* are quite similar to the original description and drawings made by Price (1974). The author was not able to directly compare Iranian specimen with the type series.

Apomerantzia cf. *kethleyi* (Price, 1975)

Pomerantzia kethleyi Price, 1975: 487; Fan and Chen 2005: 1, 5, 7, Table 2; Bochkov and Walter 2007: 159, 169.

Distribution and habitat – United States (Indiana: from prairie grassland soil at depth of 35–65 cm (Price 1975). Illinois: from clay soil at depth of 40–60 cm (Kethley 1989). Minnesota: from coarse sand and gravel at a depth of 0–10 cm (Kethley 1989).

Iranian Adult female (Figs. 3, 4)

Gnathosoma – 90 long and 72 wide. Peritreme with 7 chambers, situated between cheliceral bases. Chelicerae 80 long, about 4× length of movable digits (20). Palp 95 long, palpfemur 55 long and 22 wide, longer than length of palptibia plus palptarsus, terminal palptibial claw strong, 10 long, accessory claw conical, 4 long; counts of setae and solenidia from palptrochaner to palptarsus: 0, 1, 1, 2 + 1 terminal claw + 1 accessory claw, 4 + 1ω + 4 eupathidia. Subcapitular setae *m* 21 about as long as width of *m–m* (22), rostrum with 2 pairs of setae, *ro1* 8 and *ro2* 10. **Idiosoma** weakly sclerotized, narrowly oval in shape, 440 long and 115 wide. Shields without ornamentation, striae between shields *F* and *H* narrow. All dorsal setae smooth. Prodorsal shield bearing 3 pairs of setae, *ve* 11, *sci* 17 and *sce* 30; distances: *ve–ve* 23, *ve–sci* 47, *sci–sci* 45, *sci–sce* 30 and *sce –sce* 55. Hysterosomal shield *C* longitudinally rectangular, with 1 pair of setae, c_1 15, on its middle part; setae *c2* 32 obviously longer than other hysterosomal setae, situating anterior to *c1*; shields *D* and *E*, nearly square, each bearing 1 pair of setae, *d1* 16 and *e1* 10; shield *F* nearly trapezoid, bearing 2 pairs of setae, *f1* 10 and *f2* 9, *f2* widely spaced and on the same row of *f1*; shield *H* trapeziform, bearing 2 pairs of setae, *h1* 19 and *h2* 11, *h2* widely spaced and obviously posterior to *h1*; distances *c1–c1* 33, *c1–c2* 40, *d1–d1* 38, *e1–e1* 34, *f1–f1* 24, *f1–f2* 11, *h1–h1* 8, *h1–h2* 10, *h2–h2* 30. Sejugal grove present. Shields bearing setae *3a* connected to coxae III. Aggenital valves bearing 4 pairs of setae, *ag1* 6, *ag2* 8, *ag3* 9 and *ag4* 7. Genital valves bearing 4 pairs of setae, *g1* 5, *g2* 6, *g3* 5 and *g4* 5. Pseudanal valves bearing 3 pairs of setae, *ps3* 9, *ps2* 10 and *ps1* 13. **Legs** I, II, III, IV about 280, 170, 200, and 270, respectively. Counts of setae and solenidia on legs I–IV: coxae (including *1a*, 2*a*, *3a* and *4a*) 4+1 peg + 1*elcp*, 4, 4, 3; trochanters 1, 1, 2, 1; basifemora 5, 4, 3, 3; telofemora 5, 5, 4, 5; genua 10 + 1κ, 5, 5, 6; tibiae 12 + 3φ, 5 + 1φ, 5 + 1φ, 9 + 1φ; tarsi 19 + 7ω + 1ε, 14 + 5ω, 11, 12.

Material examined – One female of from soil horizon III (58-115 cm depth) of wheat field, 38°25‘29.19"N, 45°52'59.22"E, 1376 m above sea level.

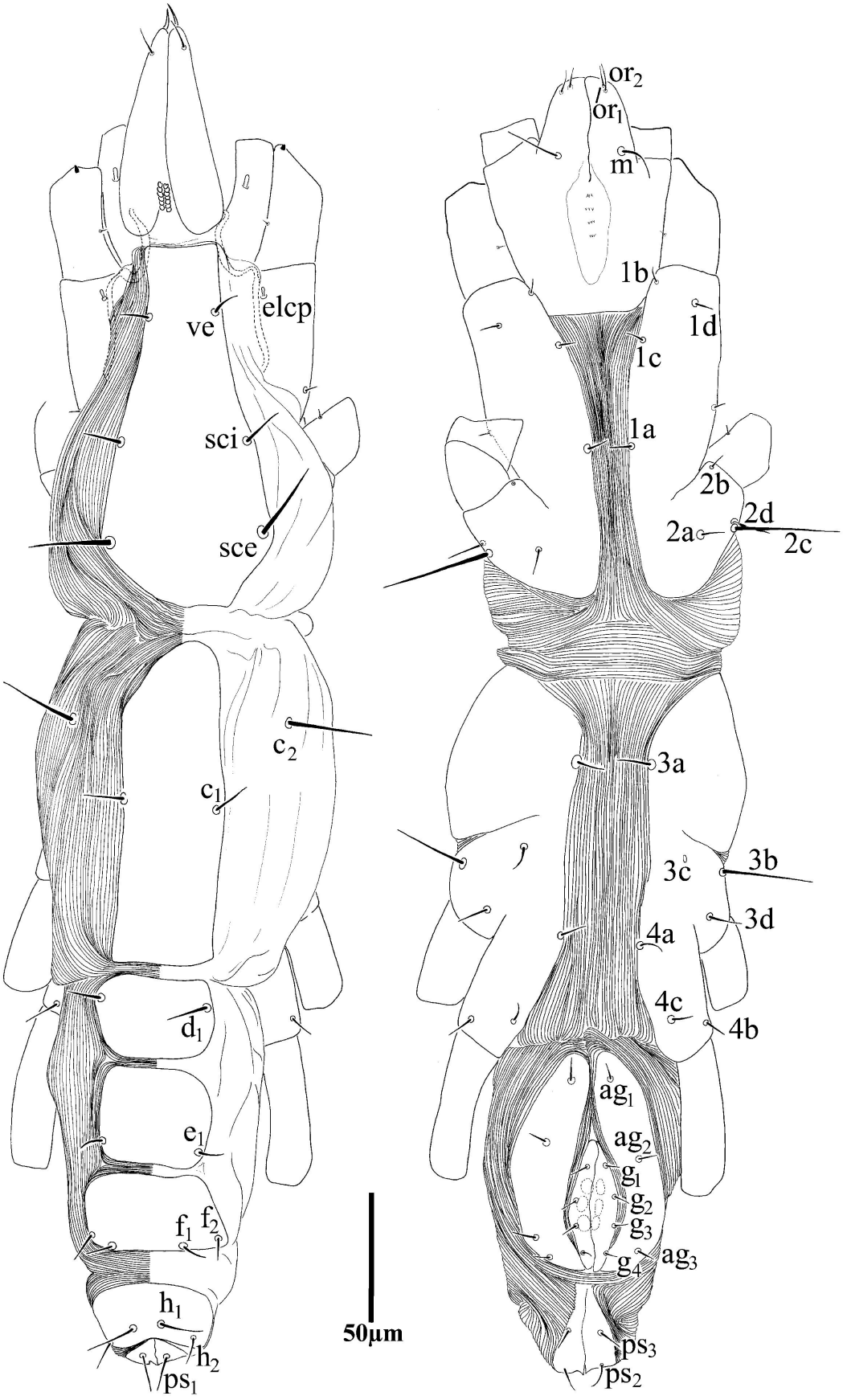

Figure 3. *Apomerantzia kethleyi* (Price, 1975) – Dorsal (left) and ventral (right) view of body.

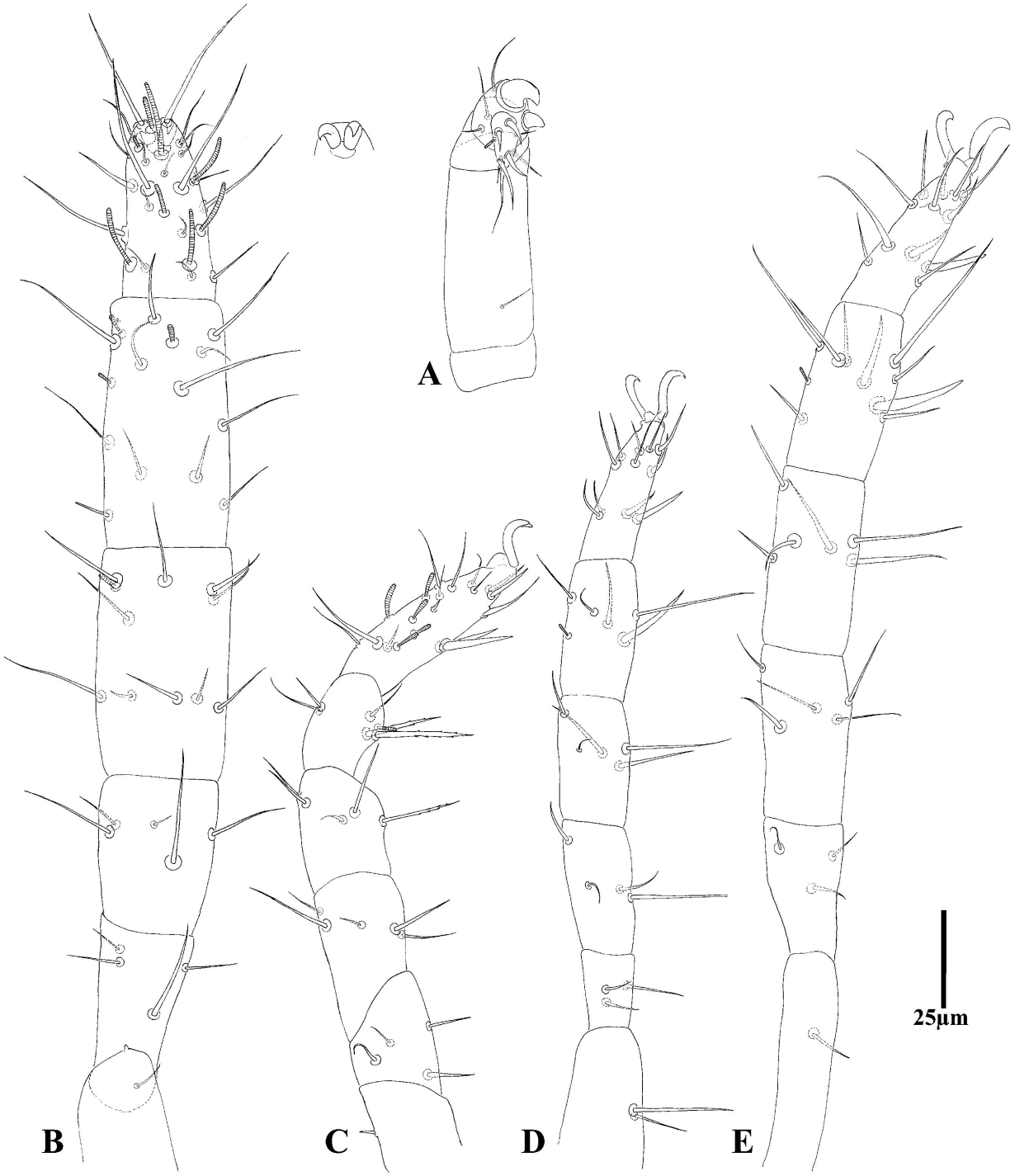

Figure 4. *Apomerantzia kethleyi* (Price, 1975) – A. Palp; B. Leg I (including ventral aspect of tarsal terminus in right); C. Leg II; D. Leg III; E. Leg IV.

Comment – It is the first record of this species from Asia.

Remarks

In *P. kethleyi* seta *pl″* of tarsus II is short and tooth-like. Therefore, this seta was misinterpreted by Price (1974, 1975) and the actual formula of tarsus II is 14 + 5ω as indicated in Bochkov and

Walter (2007). The Iranian single female specimen had strong similarities with United States specimens but the author was not able to directly compare Iranian specimen with the type series.

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نخستین گزارش خانوادهٔ Pomerantziidae (Acari: Trombidiformes) از خاورمیانه همراه با گزارش دو گونه برای نخستین بار از آسیا

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چکیده

طی مطالعه‌ای روی فون کنه‌های خاک کشتزارهای گندم دشت مرند استان آذربایجان غربی در ایران، دو گونه متعلق به دو جنس از خانوادهٔ Pomerantziidae به نام‌های *Apomerantzia kethleyi* (Price, 1975) و *Pomerantzia benhami* Price, 1974 شناسایی و ترسیم شد. این نخستین گزارش این خانواده از خاورمیانه و نخستین گزارش این دو گونه از آسیا است. افزون بر آن کلیدی برای شناسایی جنس‌ها و گونه‌های خانوادهٔ Pomerantziidae ارایه می‌شود.

واژگان کلیدی: *Apomerantzia*؛ فون؛ مرند؛ گزارش نو؛ *Pomerantzia*.

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