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## Article

# A new larval species of *Erythraeus* (*Zaracarus*) (Acari: Erythraeidae) from southeastern Iran

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**Abstract**

The mite species *Erythraeus* (*Zaracarus*) *coleopterus* **sp. nov.** (Acari: Parasitengona: Erythraeidae) associated with a scarabaeid beetle is described from Iran. This is the first record of association between mites of the genus *Erythraeus* and beetles.

**Key word:** mite, beetle, *Erythraeus* (*Zaracarus*) *coleopterus* **sp. nov.,** Scarabaeidae, Parasitengona

## Introduction

The genus *Erythraeus* includes two subgenera among which members of the subgenus *Erythraeus* (*Zaracarus*) Southcott, 1995 are only known from the larval stage. These are ectoparasites, most often on Heteroptera, however some species occur on Neuroptera and Diptera. This subgenus is also collected from plants and soil, where larvae probably wander in search of host insects (Khanjani *et al*. 2010).

Currently, twenty one species of the subgenus *Erythraeus* (*Zaracarus*) have been recorded from Africa (Canary Islands, Ethiopia), Asia (Indonesia, Iran, Pakistan, Turkey) and Europe (Croatia, Greece, Hungary, Montenegro, Poland, Spain) (Kamran *et al*. 2009, Khanjani *et al*. 2010, Haitlinger 2011). From Australia, this subgenus is unknown. Nine species of *Erythraeus* (*Zaracarus*) were described from Iran: *E.* (*Z.*) *tehranicus* Haitlinger and Saboori, 1996; *E.* (*Z.*) *kharrazii* Saboori, 2000; *E.* (*Z.*) *rajabii* Saboori, 2000; *E.* (*Z.*) *iranicus* Saboori and Akrami, 2001; *E.* (*Z.*) *longipedus* Saboori and Nowzari, 2001; *E.* (*Z.*) *ueckermanni* Saboori *et al.*, 2004; *E.* (*Z.*) *kurdistanensis* Khanjani and Ueckermann, 2005; *E.* (*Z.*) *soleimanii* Khanjani and Mirmoayedi, 2010 and *E.* (*Z.*) *hamedanicus* Khanjani and Mirmoayedi, 2010 (Haitlinger and Saboori 1996; Saboori 2000; Saboori and Akrami 2001; Saboori and Nowzari 2001; Saboori *et al*. 2004; Khanjani and Ueckermann 2005; Khanjani *et al*. 2010).

In this paper, we describe the twenty second representative of *Erythraeus* (*Zaracarus*) associated with a beetle of the family Scarabaeidae collected in southeastern Iran. This is the first record of association between species of the genus *Erythraeus* and the beetles of the family Scarabaeidae.

## Material and methods

The mite was collected from a vial containing alcohol and one scarabaeid beetle (*Cyphonoxia* sp.). The beetle was collected by attracting to a light trap on 24 May 2010 near Ghanat Chenar village, Sirjan city, Kerman province, southeastern Iran. The mite was removed from its host, cleared in lactophenol and fixed in Hoyer's medium. The morphology of the mite was studied using a light microscope (Olympus BX51) equipped with phase contrast and drawing tube. All measurements in this description are given in micrometers (μm). Morphological nomenclature follows Haitlinger (2003) and Goldarazena & Zhang (1998).

## *Erythraeus* (*Zaracarus*) *coleopterus* sp. nov. (Figs. 1−16)

*Diagnosis*

AL with thin bases, fn BFe 3-3-3, fnTi 14-15-15, fnTa 22-21-24, Ti I 226, Ge I 163, Ti II 205, Ge II 137, TFe 137.

*Description*: For measurements see Table 1.

*Larva*: Idiosoma oval. Length of idiosoma 408, width 303. Idiosoma dorsally with a scutum, two pairs of eyes and 42 blunt and barbed setae (Fig. 1).

Scutum wider than long, anterior and posterior margins convex in lateral parts and concave in median part; Scutum ornamented with fairly deep dimples. Anterior border concave, anterolateral borders straight and posterolateral borders slightly convex, border near S bases deeply concave. Scutum with two pairs of scutalae; anterolateral setae (AL) with thin bases and longer than PL; both fully barbed. Anterior pair of sensillae (ASens) very short, with fine setules; posterior pair of sensillae (PSens) with fine setules in distal half and more than three times longer than ASens (Fig. 1). Each side of scutum with one pair of eyes, circular, not on platelets; anterior eye 18, posterior one 16 across.

Ventral surface of idiosoma (Fig. 2) bearing four sternal setae between coxae I (*1a*) and III (*3a*), Sternala *1a* longer than sternala *3a*. Coxae I-III each with one seta; coxala *1b* more than twice as long as coxalae *2b*; coxala *3b* longer than coxala *2b*; all coxalae barbed. Opisthogaster with 15 barbed setae.

Gnathosoma (Fig. 3). Subcapitulum with smooth hypostomal setae (*bs*) and galeal setae (*as*). Palps five-segmented (Fig. 4), femur and genu each with one barbed seta, tibia with three barbed setae and a bifurcate claw, tarsus with seven setae including eupathidium and solenidion; eupathidium with a long branch at the base. fPp= 0-B-B-$BBB_2$-BBBBNωζ.

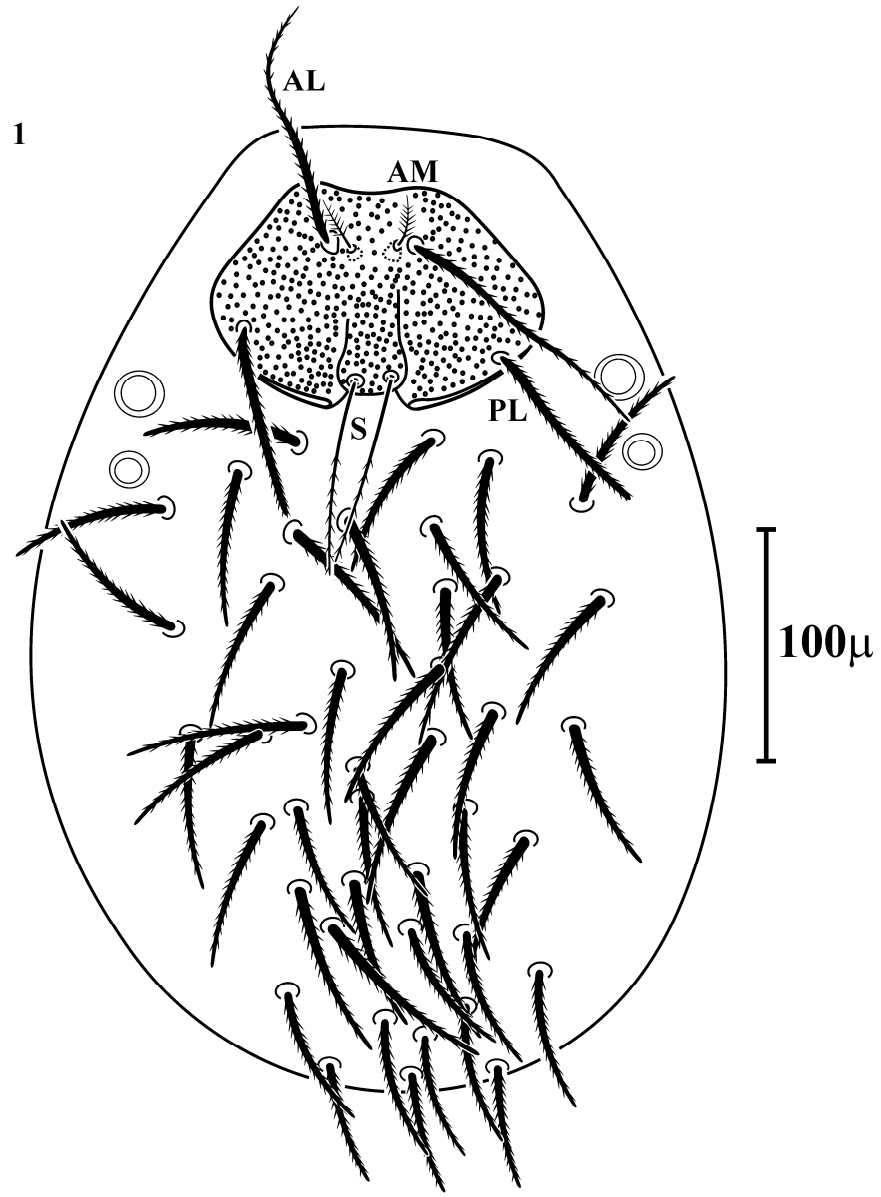



**Figure 1.** *Erythraeus* (*Zaracarus*) *coleopterus* **sp. nov.** (larva). Dorsum of idiosoma.

Legs (Figs. 5–16). Leg segmental formula: 7-7-7. Tarsi terminate into two lateral claws and a claw-like empodium. Legs setal formula: Leg I: Ta- 1ω, 1ε, 2ζ, 22n, Ti- 2φ, 1Cp, 1κ, 14n, Ge- 1σ, 1κ, 8n, TFe- 5n, BFe- 3n, Tr- 1n, Cx- 1n (Figs. 5–8). Leg II: Ta- 1ω, 2ζ, 21n, Ti- 2φ, 15n, Ge- 1κ, 8n, TFe- 5n, BFe- 3n, Tr- 1n, Cx- 1n (Figs. 9–12). Leg III: Ta- 1ζ, 24n, Ti- 1φ, 15n, Ge- 8n, TFe- 5n, BFe- 3n, Tr- 1n, Cx- 1n (Figs. 13–16).

IP= 949 + 873 + 1181= 3003

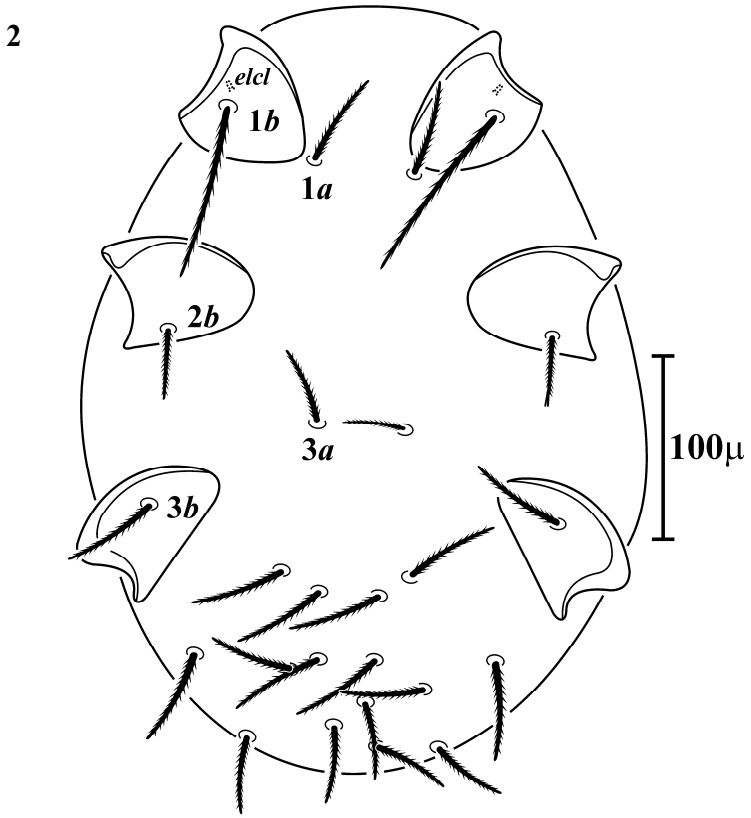


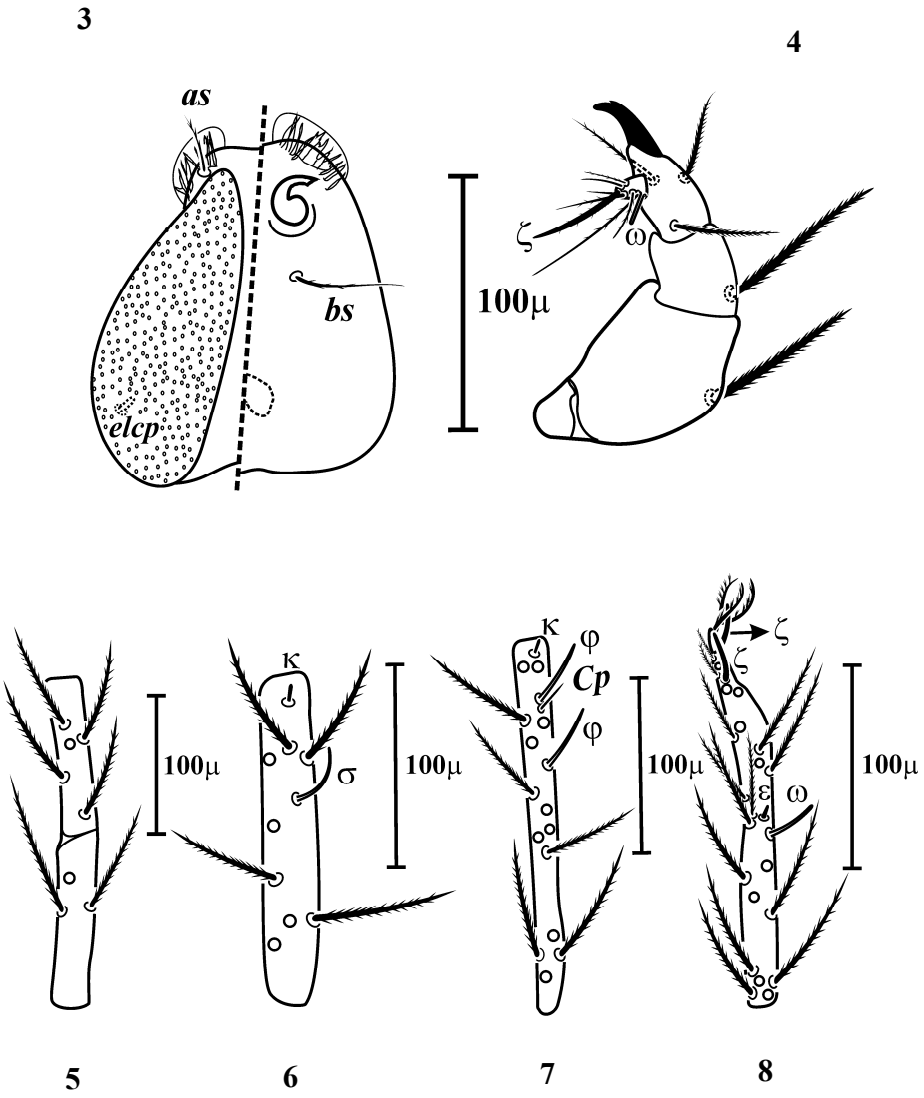

**Figure 2.** *Erythraeus* (*Zaracarus*) *coleopterus* **sp. nov.** (larva). Venter of idiosoma.

## Remarks

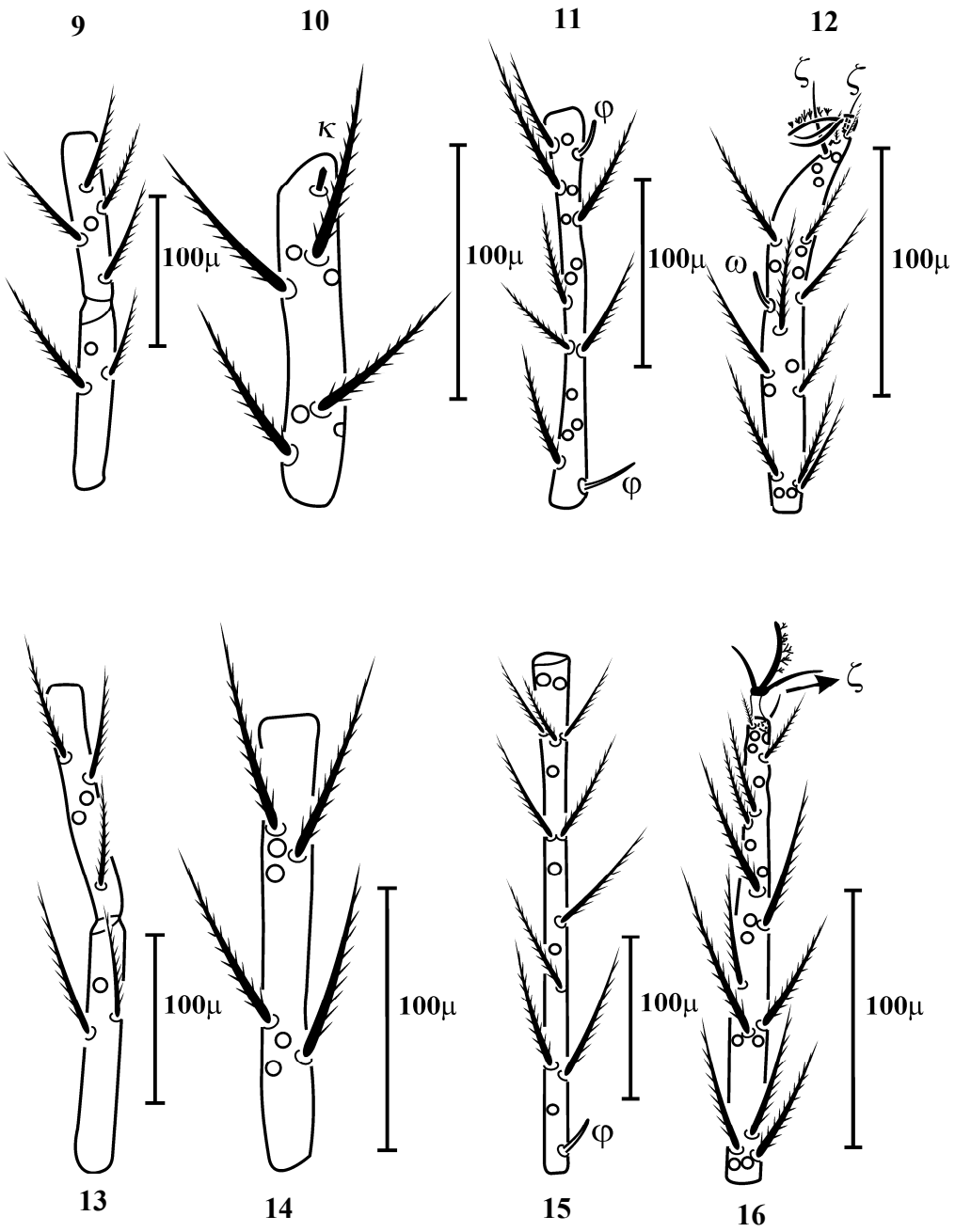
The new species belongs to the species group of the subgenus *Zaracarus* with basifemoral setal formula 3-3-3 and AL with thin bases. This group includes the following species: *E.* (*Z.*) *soleimanii*, *E.* (*Z.*) *kastaniensis* Haitlinger, 2006, *E.* (*Z.*) *passidonicus* Haitlinger, 2006 and *E.* (*Z.*) *bibadakiensis* Haitlinger, 2011.

*Erythraeus* (*Z.*) *coleopterus* **sp. nov.** differs from *E.* (*Z.*) *soleimanii* in the shorter W (147 vs. 170–203), Ti I (226 vs. 313–363), Ge I (163 vs. 225–250), Ti II (205 vs. 300–350), Ge II (137 vs. 183–205), TFe (137 vs. 180–215), BFe (142 vs. 178–215), number of setae on Ta I (22 vs. 25) and number of setae on Ti III (15 vs. 14); from *E.* (*Z.*) *kastaniensis* in the shorter W (147 vs. 172–186), number of setae on Ta I (22 vs. 19), Ta II (21 vs. 17) and on Ta III (24 vs. 18); from *E.* (*Z.*) *passidonicus* in the shorter Ti II (205 vs. 242–254), longer leg III (1181 vs. 1094), number of setae on Ta I (22 vs. 16), on Ta II (21 vs. 18), Ta III (24 vs. 16), Ti II (15 vs. 14) and on Ti III (15 vs. 14) and from *E.* (*Z.*) *bibadakiensis* in the shorter GL (138 vs. 160–164), longer Ta I (184 vs.

154–160), number of setae on Ta I (22 vs. 19), Ta II (14 vs. 18), Ta III (21 vs. 16), Ti II (15 vs. 14) and on Ti III (15 vs. 14).




**Figures 3–8.** *Erythraeus* (*Zaracarus*) *coleopterus* **sp. nov.** (larva). 3. Gnathosoma, dorsal view (left) and ventral view (right); 4. Palp; 5. Basi- and telofemur I; 6. Genu I; 7. Tibia I; 8. Tarsus I.




**Figures 9−16.** *Erythraeus* (*Zaracarus*) *coleopterus* **sp. nov.** (larva). 9. Basi- and telofemur II; 10. Genu II; 11. Tibia II; 12. Tarsus II; 13. Basi- and telofemur III; 14. Genu III; 15. Tibia III; 16. Tarsus III.

**Table 1.** Measurements of *Erythraeus* (*Zaracarus*) *coleopterus* **sp. nov.** (larva)

| Character | Holotype | Character | Holotype |
|---|---|---|---|
| GL | 138 | Ta I (H) | 19 |
| IL | 408 | Ti I | 226 |
| IW | 303 | Ge I | 163 |
| SD | 93 | Tfe I | 121 |
| W | 147 | Bfe I | 111 |
| AW | 40 | Tr I | 68 |
| PW | 119 | Cx I | 76 |
| AA | 20 | Leg I | 949 |
| SB | 16 | Ta II (L) | 163 |
| ISD | 60 | Ta II (H) | 14 |
| AL | 119 | Ti II | 205 |
| PL | 79 | Ge II | 137 |
| ASens | 25 | Tfe II | 105 |
| AP | 53 | Bfe II | 116 |
| MA | 8 | Tr II | 63 |
| Psens | 79 | Cx II | 84 |
| *bs* | 46 | Leg II | 873 |
| *as* | 37 | Ta III (L) | 200 |
| DS | 60-71 | Ta III (H) | 15 |
| PDS | 50-62 | Ti III | 358 |
| *1a* | 50 | Ge III | 189 |
| *1b* | 108 | Tfe III | 137 |
| *2b* | 39 | Bfe III | 142 |
| *3a* | 42 | Tr III | 63 |
| *3b* | 61 | Cx III | 92 |
| PaScFed* | 64 | Leg III | 1181 |
| PaScGed** | 67 | IP | 3003 |
| Ta I (L) | 184 | | |

* Dorsal seta of palpal femur
** Dorsal seta of palpal genu

*Type material*

Holotype larva (AM-1) found in Ghanat Chenar village, Sirjan city, Kerman province, southeastern Iran (29° 52' 33" N, 55° 43' 56" E, 2253m a.s.l.) on 24 May 2010, attached to a scarabaeid beetle, collected by Abdolazim Mortazavi. The holotype is deposited in the Acarological Collection, Department of Entomology, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran.

*Etymology*

The species name is derived from the order of the host (Coleoptera). This mite is the first record of a beetle as a host for the genus *Erythraeus*.

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**چکیده**

گونه جدید *Erythraeus* (*Zaracarus*) *coleopterus* (Acari: Parasitengona: Erythraeidae) مرتبط با سخت بالپوشان خانواده Scarabaeidae از ایران توصیف می‌شود. این نخستین گزارش از ارتباط بین کنه‌های جنس *Erythraeus* و سخت بالپوشان است.