

A NEW SPECIES OF THE GENUS *ABALAKEUS*  
(ACARI, ERYTHRAEIDAE) FROM IRAN

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*Abalakeus gonabadensis* sp. n. (Acari: Erythraeidae), a new mite species is described and illustrated on the basis of larval characteristics. Immature mites were found externally attached on the two host species *Aphis craccivora* (Hemiptera: Aphididae) and *Dociostaurus* cf. *tartarus* (Orthoptera: Acrididae). Samples were collected in Gonabad city, Khorasan Razavi province, Northeastern Iran. A key to world larval species of the genus is provided.

Key words: Trombidiformes, Parasitengonina, mite, Aphididae, Acrididae

INTRODUCTION

The superfamily Erythraeoidea (Acari: Trombidiformes: Parasitengonina) includes two families, namely Smarididae VITZTHUM, 1929 and Erythraeidae ROBINEAU-DESVOIDY, 1828. The family Erythraeidae is a relatively more diverse group, which consists of five subfamilies. Among them, Erythraeinae comprises 14 genera including *Abalakeus* (SABOORI *et al.* 2009). To date, four species of this genus have been described: *Abalakeus chekei* SOUTHCOTT, 1994 from Niger; *Abalakeus bambusae* ZHANG, 2000 from China; *Abalakeus lorestanicus* SABOORI *et* LACHINANI, 2003 and *Abalakeus jahromiensis* SEDGHI, SABOORI *et* HAKIMITABAR, 2010 both from Iran (SOUTHCOTT 1994, ZHANG *et al.* 2000, SABOORI & LACHINANI 2003, SEDGHI *et al.* 2010).

During the course of a study on the prostigmatic mites associated with insects across several regions of Iran, we collected and identified a new larval species of the genus *Abalakeus* from a single aphid and also from three grasshoppers in Gonabad city, Khorasan Razavi, Northeastern Iran. The larval characteristics of this new species are described. This is the first record of the genus *Abalakeus* as an ectoparasite on an aphid namely *Aphis craccivora* KOCH, 1854 (Hemiptera: Aphididae).

## MATERIALS AND METHODS

Mites were removed from the hosts *A. craccivora* (Hemiptera: Aphididae) and *Doclostaurus cf. tartarus* (STSHELKANOVITZEV, 1921) (Orthoptera: Acrididae), using a fine paint brush. The insect hosts were captured by sweep net. The collected mites were cleared in lactophenol and mounted on microscopic slides using Hoyer's medium (WALTER & KRANTZ 2009). Samples were characterized morphologically using a light compound microscope (Olympus BX 51) equipped with phase contrast and a drawing tube. Measurements are given in micrometers ( $\mu\text{m}$ ). The terminology and abbreviations are adapted from SABOORI *et al.* (2009) and ROBAUX (1974).

**Abalakeus gonabadensis** sp. n.

(Figs 1–16)

**Diagnosis.** Larva with the following features:  $fD = 50$ ;  $fV = 11$ ;  $fnTi = 14-15-15$ ;  $fnGe = 9-8-8$ ;  $f\zeta = 1-1-1$ ;  $f\varepsilon = 0-0-0$ ;  $fCp = I(1-1)$ , II (0-0), III (0-0); solenidion present on TFe I.

**Description.** Holotype Larva: color red when alive. Idiosoma oval (Fig. 1). Scutum either pentagonal or oval in outline (Figs 1 and 4), slightly wider than long with slightly concave anterior border, straight anterolateral borders and slightly convex posterolateral borders; AL longer than PL, both fully barbed. Anterior pair of sensilla (AM) shorter than posterior one (S), both barbed in distal  $\frac{1}{4}$ . Scutum finely punctate and striated; distance between the SB bases greater than AA; ISD greater than AP (Fig. 4).

A pair of eyes posterolateral to scutum on each side (Fig. 1). Eye plate absent. Anterior eyes 16 in diameter, posterior ones 10 in diameter. Ventral surface of idiosoma bearing 11 barbed setae posterior to coxae III (Fig. 2). All ventral setae barbed. Sternalae with short barbs. Coxae I-III each with one seta; coxalae *1b* longer than other coxalae and with fine barbs (Fig. 2). Coxal fields punctate. Supracoxal seta of leg I (*eI*) small, peg-like and 3 long. Tarsi with median claw-like empodium, falciform anterior claw; posterior claw a spoon-like rod, without hook element but with long, divided onychotrichs.  $NDV = 50 + 11 = 61$ .

Leg setal formula: Leg I (Figs 5–8): Ta-1 $\omega$ , 2 $\zeta$ , 1Cp, 24n; Ti-2 $\phi$ , 1Cp, 1 $\kappa$ , 14n; Ge-1 $\sigma$ , 1 $\kappa$ , 9n; TFe-1 $\rho$ , 5n; BFe-2n; Tr-1n. Leg II (Figs 9–12): Ta-1 $\omega$ , 1 $\zeta$ , 25n; Ti-2 $\phi$ , 15n; Ge-1 $\sigma$ , 1 $\kappa$ , 8n; TFe-5n; BFe-2n; Tr-1n. Leg III (Figs 13–16): Ta-1 $\zeta$ , 24n; Ti-1 $\phi$ , 15n; Ge-1 $\sigma$ , 8n; TFe-5n; BFe-1n; Tr-1n. Leg segments punctate, all leg setae with small barbs usually hardly visible.

Gnathosoma with smooth galealae (Ga) and hypostomalae (Hy), 26 and 39 long respectively (Fig. 3). Palp trochanter without seta, palpal femur and genu each with one barbed seta, tibia with two barbed setae and one nude seta; palpal tibial claw bifid. Tarsus with six setae including solenidion and eupathidium (Fig. 3).  $fPp = 0-B-B-BBN_2-4N\omega\zeta$ . Cheliceral base punctate. Supracoxal seta of palp (*eP*), minute, peg-like.

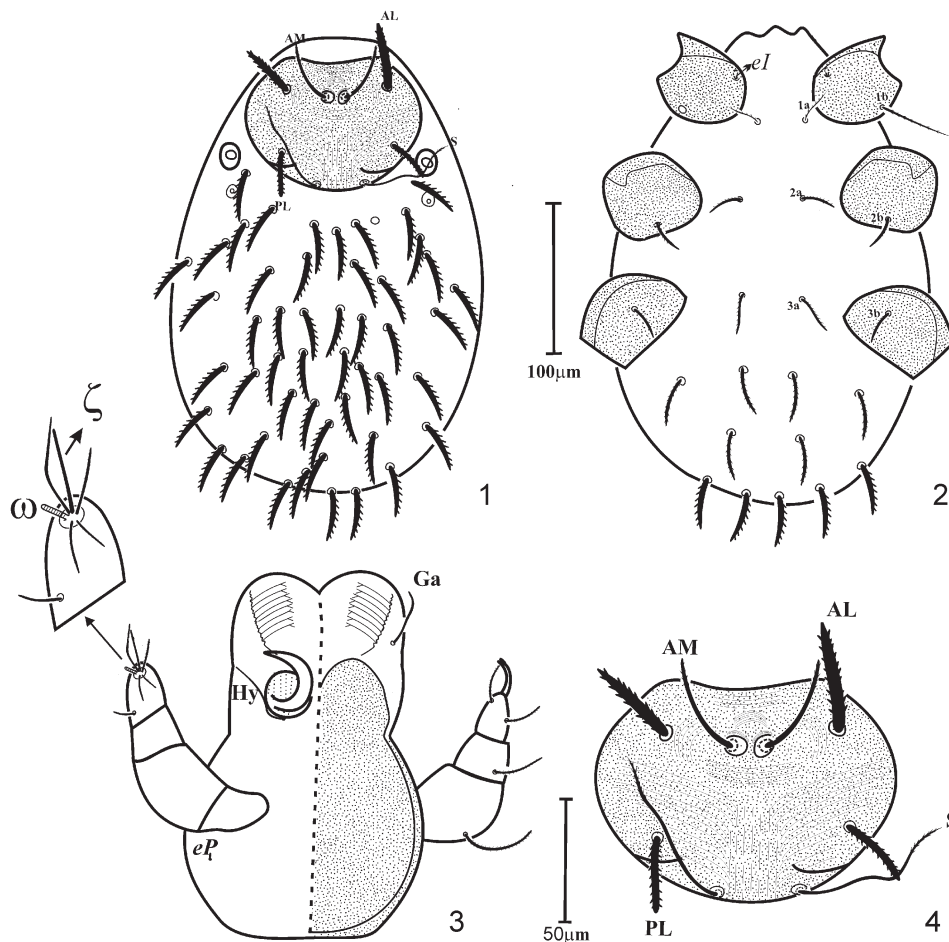
Measurements are given in Table 1.

**Material studied:** holotype, larva, Gonabad, Khorasan Razavi province, Northeastern Iran, 34° 11' N, 58° 32' E, 1622 m a.s.l. 29-IV-2010. H. HAJIQANBAR leg., ectoparasitic on *Aphis craccivora* KOCH. (Hemiptera: Aphididae) (HH-20111121-1a); Paratypes, 3 larvae, Sysab, Khorasan Razavi province, Northeastern Iran. 25-VI-2010. H. HAJIQANBAR leg., ectoparasitic on *Doclostaurus cf.*

*tartarus* (STSHELKANOVITZEV) (Orthoptera: Acrididae) (HH-20111121-1b-1c-1d). The holotype, one paratype and host insects are deposited in the Acarological Collection, College of Agriculture, Tarbiat Modares University, Tehran, Iran. One paratype is deposited in each of the followings: Zoological Institute, University of Hamburg, Hamburg, Germany; Acarological Collection, Zoological Museum, College of Agriculture, University of Tehran, Karaj, Iran.

Etymology: The specific epithet refers to the type locality Gonabad.

Remarks. *Abalakeus gonabadensis* sp. n. differs from *A. bambusae* by shape of scutum (oval vs pentagonal) and claws (anterior claw falciform and posterior one spoonlike vs feather like), number of solenidia on TFe I (1 vs 0), f $\zeta$  (2–1–1 vs



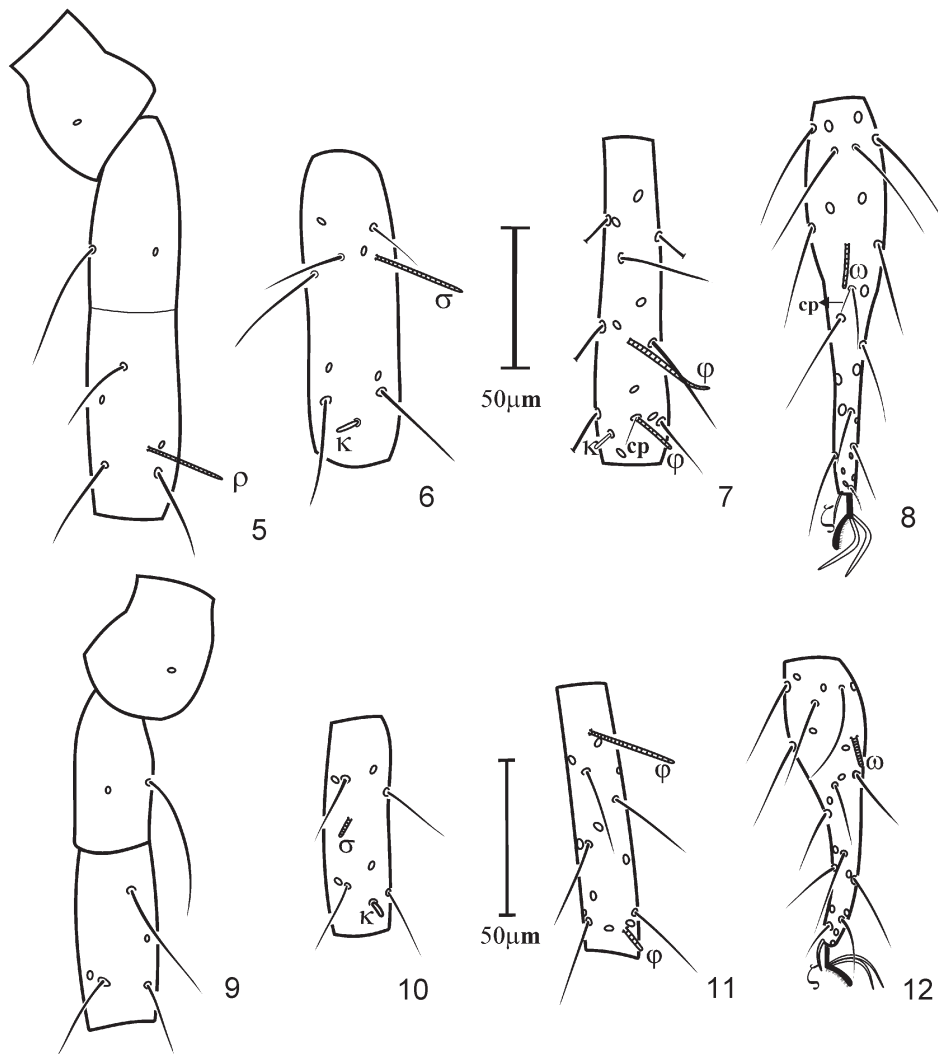
**Figs 1–4.** *Abalakeus gonabadensis* sp. n. (larva) – 1 = dorsal view of idiosoma; 2 = ventral view of idiosoma; 3 = dorsal view (right) and ventral view (left) of gnathosoma; 4 = scutum

**Table 1.** Morphometric data of *Abalakeus gonabadensis* sp. n. larvae (a, holotype; b-d, paratypes).

Character	a	b	c	d	Character	a	b	c	d
IL	382	1026	487	1019	Ta I(L)	142	155	155	139
IW	263	599	276	584	Ta I(H)	22	22	18	23
SD	103	105	103	89	Ti I	125	121	154	121
W	154	145	138	132	Ge I	114	110	129	116
AW	82	89	93	92	TFe I	86	81	87	87
PW	84	84	86	81	BFe I	84	76	81	81
MA	29	34	40	42	Tr I	60	53	53	50
AA	18	20	19	16	Cx I	71	84	76	76
SB	44	35	42	37	Leg I	682	680	735	670
ISD	79	89	72	75	Ta II(L)	125	134	126	121
AP	52	50	59	47	Ta II(H)	21	22	18	21
AL	50	52	59	58	Ti II	109	102	118	105
PL	39	32	43	42	Ge II	102	89	110	81
AM	50	42	-	50	TFe II	76	76	79	68
S	82	79	80	79	BFe II	71	63	63	76
DS	32–39	33–41	33–42	31–42	Tr II	57	58	50	50
PDS	37–42	36–40	38–43	38–42	Cx II	76	80	84	76
<i>1a</i>	34	28	38	31	Leg II	616	602	630	577
<i>1b</i>	60	53	58	56	Ta III(L)	136	134	128	116
<i>2a</i>	37	30	34	38	Ta III(H)	19	22	18	16
<i>2b</i>	34	26	37	27	Ti III	179	176	118	166
<i>3a</i>	23	29	22	25	Ge III	105	95	108	97
<i>3b</i>	31	25	37	37	TFe III	79	84	79	89
GL	145	154	190	171	BFe III	76	71	68	60
PaScFed	37	31	31	34	Tr III	63	60	50	52
PaScGed	29	26	22	24	Cx III	79	81	76	66
Hy	39	28	23	32	Leg III	717	701	627	646
Ga	26	25	21	26	IP	2015	1983	1992	1893

2–2–0), fe (0–0–0 vs 1–1–0), number of setae on Ti III (15 vs 14), Ta I (24 vs 27), Ta II (25 vs 23), Ta III (24 vs 25), presence of Cp on Ti I (vs absent), absence of Cp on Ta II (vs present); from *A. chekei* in the number of solenidia on Ta I (1 vs 2), Ge III (1 vs 0), presence of Cp on Ti I (vs. absent), absence of Cp on Ta II (vs present), number of setae on Ti I (14 vs 10), Ge II (8 vs 6), Ti II (15 vs 13), Ta II (25 vs. 17), Ti III (15 vs 14); from *A. jahromiensis* in the number of solenidia on TFe I (1 vs 0),

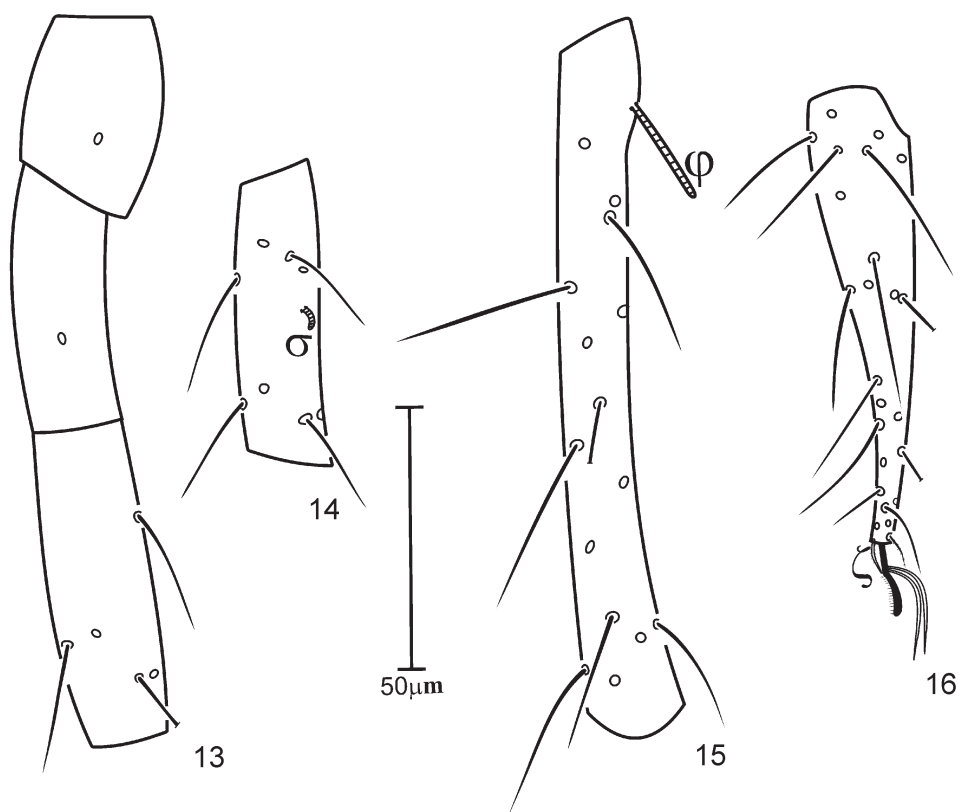
Ge II (1 vs 0), Ge III (1 vs 0), number of setae on Ta II (25 vs 20), Ta III (24 vs 20), and from *A. lorestanicus* in the number of setae on Ti II (15 vs 14), Ge I (9 vs 8), presence of Cp on Ta I (vs absent), absence of famulus on Ta I (vs present). Some larval morphometric data of *Abalakeus gonabadensis* sp. n. and other species of the genus *Abalakeus* are compared in Table 2.



**Figs 5–12.** *Abalakeus gonabadensis* sp. n. (larva) – 5 = leg I, trochanter-telofemur; 6 = Ge I; 7 = Ti I, 8 = Ta I; 9 = Leg II, trochanter-telofemur; 10 = Ge II; 11 = Ti II; 12 = Ta II

KEY TO SPECIES OF THE *ABALAKEUS* OF THE WORLD  
(LARVA)

- |   |                              |   |
|---|------------------------------|---|
| 1 | One solenidion on TFe I      | 2   |
| – | Without solenidion on TFe I. | 4   |
| 2 | One solenidion on Ge III     | 3   |
| – | Without solenidion on Ge III | <i>A. checkei</i> SOUTHCOTT, 1994                 |
| 3 | Ti III 262–301, Ti I 192–213 | <i>A. lorestanicus</i> SABOORI et LACHINANI, 2003 |
| – | Ti III 118–179, Ti I 121–154 | <b><i>A. gonabadensis</i> sp. n.</b>              |



**Figs 13–16.** *Abalakeus gonabadensis* sp. n. (larva) – 13 = leg III, trochanter-telofemur; 14 = Ge III; 15 = Ti III; 16 = Ta III

4	Ti III 425–550, AL 130–140	<i>A. bambusae</i> ZHANG, 2000
–	Ti III 220–302, AL 61–70	<i>A. jahromiensis</i> SEDGHI, SABOORI et HAKIMITABAR, 2010

**Table 2.** Comparison of some larval morphometric data between *Abalakeus gonabadensis* sp. n. and other species of the genus *Abalakeus*.

Character	<i>A. gonabadensis</i>	<i>A. bambusae</i>	<i>A. chekei</i>	<i>A. jahromiensis</i>	<i>A. lorestanicus</i>
AL	50–59	130–140	58–75	61–70	51–65
PL	32–43	106–120	30–45	37–48	36–44
DS	31–42	100–140	46–60	31–48	34–53
GL	145–190	114–116	205	119–146	170–206
SB	35–44	20–24	14–18	14–17	32–39
<i>1a</i>	25–28	62–80	31–42	45–56	37–48
<i>1b</i>	53–60	128–144	57–88	76–87	41–51
<i>3b</i>	25–37	60–68	22–31	32–46	36–47
Ta I	139–155	205–230	164–210	119–146	182–194
Ti I	121–154	325–413	151–183	169–235	192–213
Ge I	110–129	218–270	142–173	146–166	177–199
Ta II	121–134	175–225	146–183	105–129	150–165
Ti II	102–118	310–390	135–164	158–203	172–187
Ge II	81–110	183–230	113–143	101–129	138–155
Ta III	116–136	195–235	160–190	122–143	160–170
Ti III	118–179	425–550	235–278	220–302	262–301
Ge III	95–108	225–285	116–145	117–153	133–145

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