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A new species of *Charletonia* from Iran

(Acari, Erythraeidae)

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Charletonia baluchestanica Tashakor & Hakimitabar spec. nov. (Acari: Trombidiformes: Erythraeidae) is described and illustrated based on larvae ectoparasitic on *Ochrilidia* sp. (Orthoptera: Acrididae) in Sistan and Baluchestan province, eastern Iran. The mites were attached to basal fore- and hindwings, dorsal surface of the abdomen and also tympanum of the host.

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Introduction

The genus *Charletonia* (Acari: Parasitengona: Erythraeidae) was established by Oudemans, 1910. To date, about 74 species of this genus with more than two setae between coxae II and III have been described. To the present, 13 species of larval *Charletonia* have been reported from Iran as follows: *C. krendowskyi* (Feider 1954); *C. saboorii* Karimi Iravanlou, Kamali & Talebi, 2002; *C. nazaleae* Karimi Iravanlou, Kamali & Talebi, 2002; *C. damavandica* Karimi Iravanlou, Kamali & Talebi, 2002; *C. ahwazensis* Haitlinger & Saboori, 2007; *C. mehranensis* Haitlinger & Saboori, 2007; *C. behbahanensis* Haitlinger & Saboori, 2008; *C. bojnordensis* Haitlinger & Saboori, 2008; *C. talebii* Sedghi, Saboori & Hakimitabar, 2010; *C. stekolnikovi* Hakimitabar & Saboori, 2011; *C. shahriari* Saboori, Azimi & Shirdel, 2012; *C. dalegori* Haitlinger, 2003; *C. terianae* Hakimitabar, Saboori & Seiedy, 2013; *C. behshahriensis* Hakimitabar & Saboori, 2014; *C. farajii* Noei, Saboori & Hajizadeh, 2015 (Karimi Iravanlou et al. 2002, Haitlinger & Saboori 2007, 2008, Sedghi

et al. 2010, Hakimitabar & Saboori 2011, Ahmadi et al. 2012, Saboori et al. 2012, Hakimitabar et al. 2013, Hakimitabar et al. 2014, Noei et al. 2015).

Among them, seven species have four setae between coxae II & III. In this paper, we describe and illustrate the larva of *Charletonia baluchestanica* spec. nov. associated with its locust host, *Ochrilidia* sp. (Orthoptera: Acrididae).

Materials and methods

Mites were collected from one specimen of *Ochrilidia* sp. (Orthoptera: Acrididae) and host captured using an insect net. Mites were detached by an insect pin and preserved in 75 % ethanol. The mites were cleared in lactophenol and mounted in Hoyer's medium.

Morphology of the mites was studied using a phase contrast microscope (Olympus BX51, Tokyo, Japan). All measurements in the description are given in micrometers. Terminology and abbreviations follow those of Saboori et al. (2009) and Wohltmann et al. (2007).

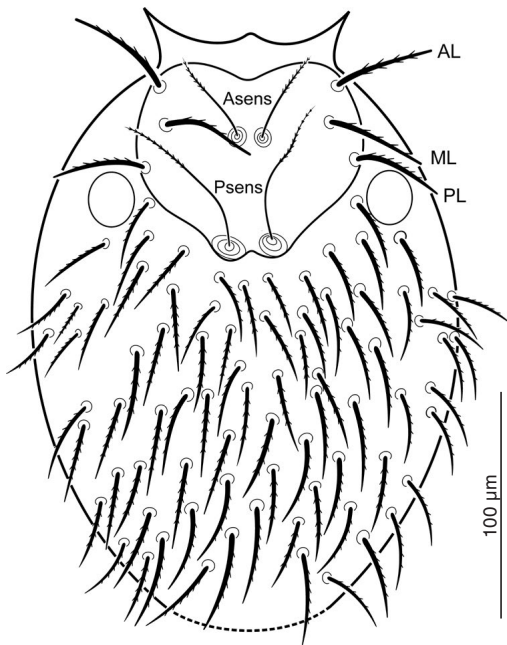


Fig. 1. *Charletonia baluchestanica* Tashakor & Hakimitabar spec. nov. (larva). Dorsal view of idiosoma.

Charletonia baluchestanica
Tashakor & Hakimitabar spec. nov.
 Figs 1-9

Diagnosis. Larva with the following features: four setae between coxae II and III, Ti III < 150, solenidion on Ge I proximal to most distal normal seta.

Description (n = 7)

Idiosoma 244–580 long, 184–380 wide. Dorsal surface with 79–86 (fD) barbed and blunted setae; one eye on each side of idiosoma, 25 in diameter; scutum punctate and wider than long; anterior margin slightly convex in lateral parts and concave in median part, lateral borders slightly convex; posterior border concave except around Psens bases which is slightly convex; scutum with two pairs of sensilla and three pairs of normal setae (Fig. 1).

AL, ML and PL barbed and blunted and approximately equal in length. Anterior sensilla (Asens) shorter than posterior sensilla (Psens), both barbed in distal half.

Ventral surface of idiosoma with 36–43 (fV) pointed setae with fine barbs. Sternalae 1a (between coxae I), 2a (between coxae II); 3a (between coxae III) barbed and pointed; four setae between coxae II and III, similar to sternalae. NDV = 79 + 43 = 122 holotype, NDV = 119–129 paratypes. Coxa I with one

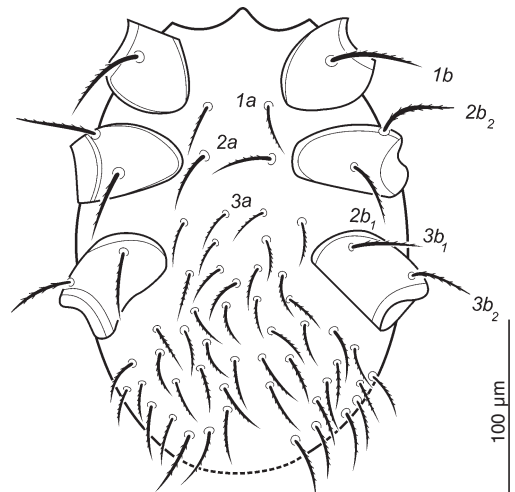


Fig. 2. *Charletonia baluchestanica* Tashakor & Hakimitabar spec. nov. (larva). Ventral view of idiosoma.

barbed and pointed seta (1b); coxae II and III each with two barbed setae which 2b₂, 3b₂ are blunted and 2b₁, 3b₁ are pointed. Supracoxal seta of leg I peg like, 4 long (Fig. 2).

Leg segmentation formula: 7–7–7. Leg setal formula: Leg I: Ta-1ω, 1ε, 2ζ, 1Cp, 29n; Ti-2φ, 1κ, 1Cp, 18n (17 in one paratype); Ge-1σ, 1κ, 12n; TFe-5n, BFe-4n; Tr-1n. Leg II: Ta-1ω, 2ζ, 30n; Ti-2φ, 19n; Ge-1κ, 12n; TFe-5n, BFe-4n; Tr-1n. Leg III: Ta-1ζ, 30n; Ti-1φ, 19n; Ge-12n; TFe-5n, BFe-2n; Tr-1n (Fig. 3–8).

Dorsal surface of legs punctate whereas ventral surface is sparsely punctate.

IP = 527 + 511 + 568 = 1606 holotype, IP = 1536–1602 paratypes.

Subcapitulum with a barbed galeala (Ga), and two hypostomalae, anterior one (aHy) nude and posterior (pHy) one barbed and pointed. Galeala (31) almost with the same length as posterior hypostomalae (33). Palpal femur and genu each with one barbed and pointed seta; palpal tibia with three barbed and pointed setae; palpal tibial claw bifid. Palp tarsus with four barbed and one nude setae, an eupathidium and a solenidion. fPp = 0–B–B–BBB₂–BBBBNωζ. Cheliceral basis and subcapitulum punctate. Cheliceral blade with a subterminal tooth. Supracoxal seta peg-like (eP), 4 long (Fig. 9).

Measurements are given in Table 1.

Remarks. This species belongs to the species group of *Charletonia* with four setae between coxae II–III, solenidion placed in distal half of Ge I and proximal to the most distal normal seta. This group includes two species: *C. ghanensis* Haitlinger, 2007 from Ghana and *C. zorani* Haitlinger, 2004 from Croatia. It differs



Figs 3–8. *Charletonia baluchestanica* Tashakor & Hakimitabar spec. nov. (larva). 3. Leg I, Tr-Ge; 4. Leg I, Ti-Ta; 5. Leg II, Tr-Ge; 6. Leg II, Ti-Ta; 7. Leg III, Tr-Ge; 8. Leg III, Ti-Ta.

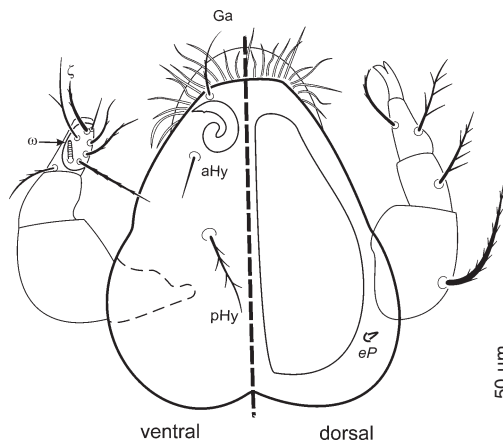


Fig. 9. *Charletonia baluchestanica* Tashakor & Hakimitabar spec. nov. (larva). Ventral view (left) and dorsal view (right) of gnathosoma.

Table 1. Measurements of the larvae of *Charletonia baluchestanica* Tashakor & Hakimitabar spec. nov. (P, paratype).

Character	Holotype	P1	P2	P3	P4	P5	P6	Range
SD	88	85	90	85	86	84	82	82-90
W	104	104	101	103	105	101	100	100-105
AW	82	77	78	82	77	75	76	75-82
MW	75	76	78	77	75	74	72	72-78
PW	98	98	99	102	99	96	95	95-102
AA	10	11	10	11	12	11	10	10-12
SB	21	19	18	19	17	18	21	17-21
ISD	49	47	50	45	49	47	47	45-50
AP	36	35	40	34	35	37	31	31-40
AL	46	40	50	48	49	45	50	40-50
ML	47	45	45	46	45	43	46	43-47
PL	44	35	44	42	40	37	43	35-44
AAS	43	42	42	42	40	40	38	40-43
Asens	47	40	45	42	45	42	47	40-47
Psens	83	67	72	70	77	69	71	67-83
DS	33-47	28-42	34-43	30-45	26-40	29-46	34-43	26-47
PDS	40	42	40	42	40	37	37	37-42
1a	36	38	32	36	39	-	35	32-39
1b	58	64	49	63	57	56	58	49-64
2a	46	45	43	43	43	-	42	42-46
2b ₁	45	45	45	42	38	44	47	38-47
2b ₂	45	49	46	48	47	43	47	43-49
3b ₁	44	38	42	38	37	37	37	37-44
3b ₂	36	37	37	46	38	33	37	33-46
GL	118	116	124	112	126	122	112	112-126
Ga	31	27	36	-	34	32	34	27-36
aHy	16	13	16	-	16	-	16	12-16
pHy	33	-	32	-	-	-	27	27-33
PaScFed	51	51	54	46	54	51	55	46-55
PaScGed	33	30	34	33	31	37	31	30-37
Ta I (L)	120	121	120	126	122	125	126	120-126
Ta I (H)	24	20	20	20	21	21	20	20-24
Ti I	99	96	102	100	103	108	99	96-108
Ge I	91	87	91	91	92	95	86	86-95
TFe I	56	54	55	52	55	59	51	51-56
BFe I	62	60	58	62	55	63	63	55-63
Tr I	41	41	40	41	40	41	43	40-43
Cx I	58	41	52	45	41	50	59	41-59
Leg I	527	500	518	517	508	541	527	500-541
Ta II (L)	122	116	113	116	112	108	116	108-122
Ta II (H)	25	22	20	21	21	21	21	20-25
Ti II	99	83	87	88	88	93	89	83-99
Ge II	89	78	77	78	83	85	79	77-89
TFe II	56	50	50	46	49	51	45	45-56
BFe II	42	54	54	54	50	52	54	42-54
Tr II	38	38	41	40	44	41	45	38-45
Cx II	65	58	60	54	51	58	59	51-65
Leg II	511	477	482	476	477	488	487	476-511
Ta III (L)	118	120	122	127	122	125	128	118-128
Ta III (H)	22	18	18	18	17	17	18	17-22
Ti III	128	130	128	130	133	138	132	128-138
Ge III	89	88	90	93	91	95	88	88-95
TFe III	60	58	59	56	60	50	59	50-60
BFe III	62	58	55	54	54	60	55	54-62
Tr III	46	41	47	50	46	46	46	41-50
Cx III	65	64	65	65	64	64	62	62-65
Leg III	568	559	566	575	570	573	570	559-575
IP	1606	1536	1566	1568	1555	1602	1584	1536-1606

from *C. ghanensis* by the shorter ISD (45–50 vs. 64), ML (43–47 vs. 60), PL (35–44 vs. 62), longer AAS (40–43 vs. 26), AW (75–82 vs. 58), Ta I (120–126 vs. 80), Ti I (96–108 vs. 78), Ge I (86–95 vs. 74), TFe I (51–56 vs. 38), Ta II (108–122 vs. 76), Ti II (83–99 vs. 66), Ge II (77–89 vs. 64), TFe I (45–56 vs. 34), Ta III (118–128 vs. 74), Ti III (128–138 vs. 86), Ge III (88–95 vs. 72), TFe II (50–60 vs. 42), the number of fD (79 vs. 146), fv (68 vs. 51), fn ζ (2–2–1 vs. 1–0–0), solenidion on Ti I (2 vs. 6), barbed Asens and Psens (vs. nude), palptibialae (BBB vs. BNN), presence of famulus and Cp on Ta I (vs. absent in *C. ghanensis*), presence Cp on Ti I (vs. absent in *C. ghanensis*), number of normal setae on Ta I (29 vs. 18), Ti I (17–18 vs. 11), Ge I (12 vs. 11), Ta II (29 vs. 17), Ti II (19 vs. 11), Ge II (12 vs. 11), TFe I (5 vs. 4), Ta III (30 vs. 17), Ti III (19 vs. 11), Ge III (12 vs. 11), palptarsus (5 vs. 6) and from *C. zorani* by the longer PW (98–102 vs. 72), SD (82–90 vs. 76–78), 2a (42–46 vs. 26–30), Ta I (120–126 vs. 106–108), Ti I (96–108 vs. 82–92), Ta II (108–122 vs. 94–100), Ta III (118–128 vs. 102–104), Ti III (128–138 vs. 106–122), fD (79 vs. 61), fv (68 vs. 25), fn ζ (2–2–1 vs. 0–0–0), presence famulus and Cp on Ta I & Ti I (vs. absent in *C. zorani*), microseta on Ge II and eupathidium on palptarsus (vs. absent in *C. zorani*), number of normal setae on Ta I (29 vs. 23), Ti I (17–18 vs. 12), Ta II (29 vs. 18), Ti II (19 vs. 14), Ta III (30 vs. 17), Ti III (19 vs. 14), Ge III (12 vs. 10), palptarsus (5 vs. 6), palptibialae (BBB vs. BNN).

Types. The holotype (HH 2012-21) and 6 paratypes (HH 2012-21 P1–P6) were collected from *Ochrilidia* sp. (Orthoptera: Acrididae), 10 February 2011, by H. Hajiqaanbar in Bampoor region, Iranshahr city, Sistan and Baluchestan province. The parasitic larvae were attached to basal fore- and hindwings, dorsal surface of the abdomen and also in tympanum of the host. The holotype, 3 paratypes and host insect are deposited in the Acarological Collection, College of Agriculture, Tarbiat Modares University, Tehran, Iran, two paratypes in the Acarological Collection, Zoological Museum, College of Agriculture, University of Tehran, Karaj, Iran, and one paratype in the Acarological Collection, Acarological Society of Iran, Department of Plant Protection, Faculty of Agriculture, University of Tehran, Karaj, Iran.

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