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# First record of larval *Caeculisoma* (Acari: Erythraeidae) from Iran with description of a new species

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## Original research

### ABSTRACT

*Caeculisoma pouyani* Noei & Kohansal **sp. nov.** (Trombidiformes: Erythraeidae) ectoparasitic on *Sphodromerus luteipes* Uvarov (Orthoptera: Acrididae), an unidentified Cicadellidae nymph (Hemiptera: Auchenorrhyncha) and an unidentified species of Miridae (Hemiptera: Heteroptera) in Chahkandan and Zahan villages, Birjand, South Khorasan province, Iran, is described and illustrated. The newly described species is the first representative of the genus *Caeculisoma* Berlese in Iran. A key to the larval species of *Caeculisoma* of the world is updated.

**Keywords** Acrididae; Callidosomatinae; Cicadellidae; Miridae; South Khorasan

**Zoobank** <http://zoobank.org/A900454F-50E3-4C8E-AE71-39B61E4F020D>

## Introduction

The subfamily Callidosomatinae Southcott, 1957 (Trombidiformes: Erythraeidae) comprises 10 genera described based on the larvae (five genera), post-larval forms (two genera) or both (three genera) (Hakimitabar and Saboori 2022; Noei *et al.* 2024). A key to world genera (larva) of Callidosomatinae was presented by Noei *et al.* (2024). The genus *Caeculisoma* Berlese (Erythraeidae: Callidosomatinae) consists of 26 species with 12 based on larvae (L), or post-larval forms and larvae (P, L) (Saboori *et al.* 2023; Noei *et al.* 2024). The members of this genus are known as parasites of Hemiptera, Lepidoptera and Orthoptera: 1. *Caeculisoma carmenae* Haitlinger, 2008 (L) on herbaceous plants, South Africa; 2. *C. cooremani* Southcott, 1972 (L) from *Urniella* sp. (Orthoptera: Acrididae), Australia; 3. *C. darwiniense* Southcott, 1961 (P, L) from *Goniaea* sp. aff. *hyaline*, *Austracris guttulosa* (Walker, 1870), *Austroicetes tricolor* (Sjöstedt, 1920), *Macrazelota cervina* (Walker, 1870), *Peakesia vitripennis* Sjöstedt, 1921 and *Macrotona* sp. (misspelling of the original generic name in Southcott 1972: 28) (Orthoptera: Acrididae), Australia; 4. *C. hunanica* Zheng, 2002 (L) picked from the alcoholic pot of the Malaise trap, China; 5. *C. huxleyi* Southcott, 1972 (L) from *Xanthorhoe* sp. (misspelling of the original generic name in Southcott 1972: 32) (Lepidoptera: Geometridae), New Zealand; 6. *C. mouldsi* Southcott, 1988 (L) from *Chlorocysta suffusa* (Distant, 1907), *Psaltoda fumipennis* Ashton, 1912, *Tamasa doddi* (Goding & Froggatt, 1904) (misspelling of original generic name in Stroiński *et al.* 2013: 197) and *Venustria superba* Goding & Froggatt, 1904 (Hemiptera: Auchenorrhyncha: Cicadidae), Australia; 7. *C. nestori* Haitlinger, 2004 (L) from plants, Brazil; 8. *C. sparnoni* Southcott, 1972 (L) has been collected on shoes of collector when standing on graveled suburban path with light vegetation (*Cynodon* sp.), Australia; 9. *C. penlineatus* Xu & Jin, 2019 (L) from unidentified Issidae (Hemiptera: Auchenorrhyncha), *Mileewa margheritae* Distant, 1908 (Hemiptera: Cicadellidae), unidentified Alebrini (Hemiptera:

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Cicadellidae), unidentified Delphacinae (Hemiptera: Delphacidae), *Neuterthron hamuliferum* Ding, 2006 (Hemiptera: Delphacidae), China; 10. *C. semispinus* Xu & Jin, 2019 (L) from *Shaddai* sp. (Hemiptera: Cicadellidae) and unidentified Zyginellini (Hemiptera: Cicadellidae), China; 11. *C. allopenlineatus* Xu & Jin, 2020 (L) from unidentified Cicadellinae (Hemiptera: Cicadellidae), China; 12. *C. brasiliensis* Noei & Šundić, 2024 (L) has been collected during biological inventory in caves, Brazil (Southcott 1961, 1972, 1988; Zheng 2002; Haitlinger 2004, 2008; Małkol and Wohltmann 2012, 2013; Stroiński *et al.* 2013; Xu *et al.* 2019a, b, 2020; Noei *et al.* 2024). In this paper, the genus *Caeculisoma* is recorded for the first time from Iran ectoparasitic on Hemiptera and Orthoptera, represented by a new species which is here described and illustrated. A key to the world species (larvae) of the genus *Caeculisoma* is also provided.

## Material and methods

Three specimens of *Caeculisoma* were detached from their hosts, *Sphodromerus luteipes* Uvarov, 1933 (Orthoptera: Acrididae) (attached to a cross-vein of the hind wing), an unidentified Cicadellidae nymph (attached to the head) and Miridae (attached to the distal membranous area of forewing) with an insect pin under a stereomicroscope. Three other specimens were found in the vials, containing many different insects collected by a sweep net, hence it is not possible to identify the true host of the larvae. The host insects were collected by a light trap (*S. luteipes*) or sweep net (Cicadellidae and Miridae). Mites were cleared in lactophenol fluid and mounted on glass microscope slides using Hoyer's medium (Walter and Krantz 2009). Measurements (given in micrometers,  $\mu\text{m}$ ) were calculated using a CH30 Olympus microscope and illustrations were drawn by a BX51 Olympus microscope equipped with a drawing tube. Lengths of leg tarsi were measured without the pretarsus. The terminology and abbreviations are adapted from Wohltmann *et al.* (2006) and Wohltmann and Małkol (2012).

## Results

### Erythraeidae Robineau-Desvoidy, 1828

### Callidosomatinae Southcott, 1957

### Genus *Caeculisoma* Berlese, 1888

### *Caeculisoma pouyani* Noei & Kohansal sp. nov. (Figs 1A-D, 2A-L)

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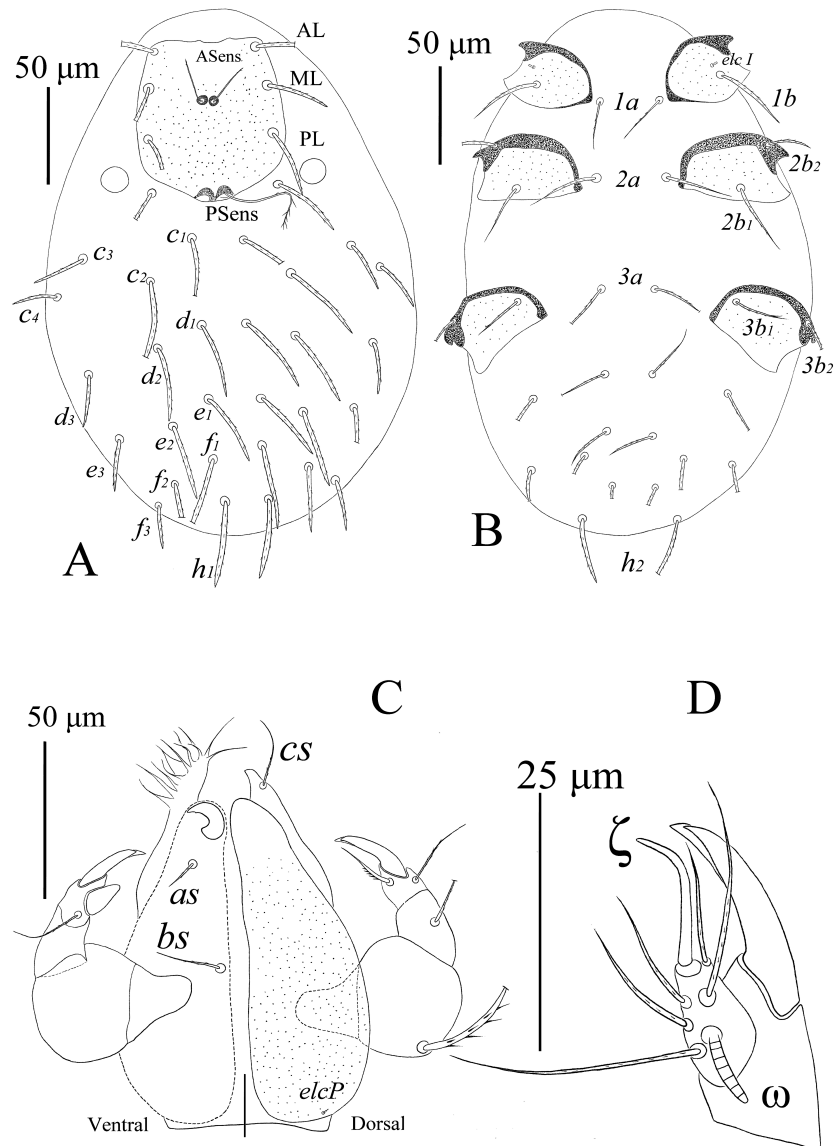
### Diagnosis

ASens posterior to the level of ML (closer to ML than PL); scutum longer than wide (SD/W 1.09–1.16), SD 82–96, ISD 50–57, PW 62–70, Ti III 115–130.

### Description (n=6)

**Dorsum** — (Figures 1A, 1B). Dorsum of idiosoma with 30 (in all specimens) barbed setae. All dorsal setae with fine barbs. Scutum rectangular in shape, punctate, with two pairs of sensilla (ASens and PSens) and three pairs of normal setae (AL, ML and PL). Anterior border of scutum straight or very slightly wavy, lateral borders slightly convex and posterior border convex with two close bases of posterior sensillary setae. ASens posterior to the level of ML. PSens longer (1.92–2.2x) than ASens, barbed at distal half and ASens with few barbs at distal part. Setae AL, ML and PL barbed. One eye (diameter 12–17) and one seta posterolaterally, on each side of the scutum.

**Venter** — (Figure 1B). Idiosoma ventrally with three pairs of sternal setae (1a, 2a, 3a); 12 barbed setae (11 in one paratype, ARS-20240410-2c) behind coxae III, all ventral setae with

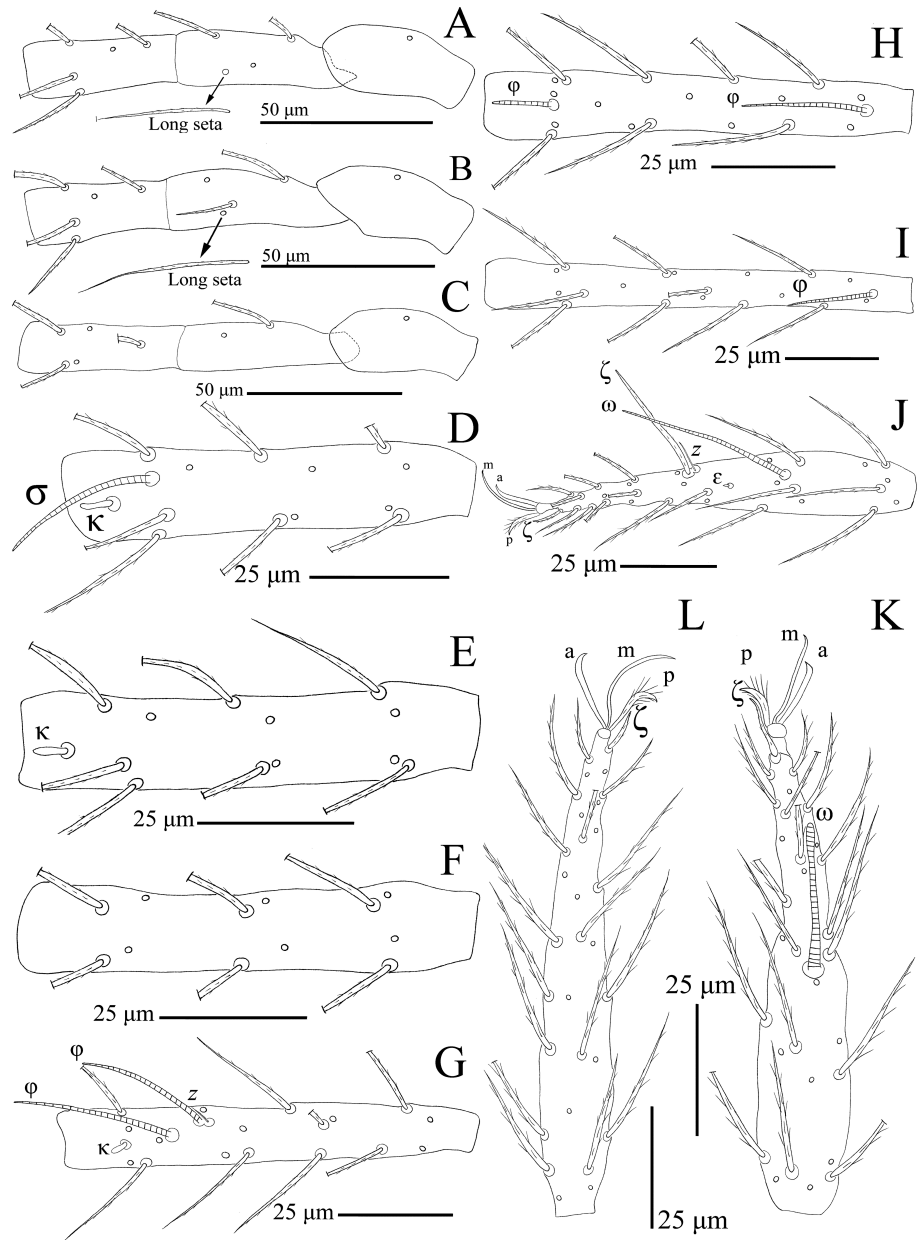


**Figure 1** *Caeculisoma pouyani* Noei and Kohansal **sp. nov.** (larva); A – Dorsal view of idiosoma; B – Ventral view of idiosoma; C – Dorsal view (right) and ventral view of gnathosoma (left) (excluding setae on palptarsus); D – Ventral view of palpal tarsus.

fine barbs. Coxa I with one barbed seta (*1b*), coxa II (*2b<sub>1</sub>*, *2b<sub>2</sub>*) and III (*3b<sub>1</sub>*, *3b<sub>2</sub>*) each with two barbed setae. A peg-like supracoxal seta (*elc 1*) present on coxa I, 5 long. NDV= 30 + 12= 42 (41 in paratype, ARS-20240410-2c).

**Gnathosoma** — (Figures 1C and 1D). Cheliceral bases punctate dorsally (except anterior part), cheliceral base 95–102 long; cheliceral blade curved, 13–17 long, with a subterminal tooth. Subcapitulum with barbed galealae (*cs*) and two barbed hypostomalae, posterior hypostomalae (*bs*) longer than anterior (*as*); palptrochanter 21–25 long, palpfemur 30–37 long, with one barbed dorsal seta, palpgenu 22–25 long, with one barbed dorsal seta. Palptibia 17–22 long, with three barbed setae (one of the dorsal seta with coarse barbs); odontus bifurcate, 22–25; palptarsus 10–11 with five finely barbed setae, one solenidion and one eupathidium; fPp= 0-B-B-BBB<sub>2</sub>-5Bωζ. Palpal supracoxal seta (*elcP*) peg-like, 6 long.

**Legs** — (Figures 2A–2L). Leg segmentation formula 7-7-7. Leg setal formula is given in Table 1. Each leg tarsus with lateral falciform claws and claw-like empodium. Posterior tarsal



**Figure 2** *Caeculisoma pouyani* Noei and Kohansal **sp. nov.** (larva), Leg I–III: A – Tr–TF I; B – Tr–TF II; C – Tr–TF III; D – Ge I; E – Ge II; F – Ge III; G – Ti I; H – Ti II; I – Ti III; J – Ta I – K – Ta II; L – Ta III.

claws pulvilliform with ventrally directed hook. Basifemur I and II each with one finely barbed, thin seta that is much longer than other normal setae, (40–45 and 40–47 respectively).

Metric data are given in Table 2.

### Etymology

The species is named in honor of Mr. Mohsen Pouyan (Head of Medicinal Plants Research Complex, Academic Center for Education, Culture and Research, South Khorasan Province, Birjand, Iran) in appreciation of his valuable efforts on the Medicinal Plants.

**Type material**

**Holotype larva** (ARS-20240410-2a) — The holotype larva was collected ectoparasitic on *Sphodromerus luteipes* (Orthoptera: Acrididae), IRAN: South Khorasan province, Birjand county, Chahkandan village, 32°15'27.29" N, 59°43'50.03" E, 1928 m a.s.l., 31 May 2021 coll. Mahnaz Kohansal; two paratype larvae (ARS-20240410-2b, 2d) same data as holotype, ectoparasitic on an unidentified Cicadellidae nymph and an unidentified Miridae respectively; two paratype larvae (ARS-20240410-2e, 2f), same data as holotype, were removed from a vial containing insects and one paratype larva (ARS-20240410-2c), same data as holotype, was removed from a vial containing insects collected by sweep net, Zirkouh county, Zahan village, 32°15'27.29" N, 59°43'50.03" E, 1928 m a.s.l.

**Type deposition** — The holotype (ARS-20240410-2a) and paratype larvae (ARS-20240410-2b, 2c, 2d, 2e, 2f) are deposited in the Acarological Collection, Jalal Afshar Zoological Museum, Department of Plant Protection, Faculty of Agriculture, University of Tehran, Karaj, Iran.

**Differential diagnosis**

The new species belongs to the species group of *Caeculisoma* with ASens bases set posterior to ML bases. *Caeculisoma pouyani* **sp. nov.** is close to *C. darwiniense* Southcott, 1961, *C. sparsoni* Southcott, 1972 and *C. mouldsi* Southcott, 1988 in SD < 100, ISD < 66, PW < 80, AL < 56, ML < 64 based on the present identification key. The new species differs from *C. darwiniense* in scutum longer than wide (vs. wider than long in *C. darwiniense*), shape of scutum (rectangular vs. triangular), the shorter AW (52–61 vs. 83–85), MW (60–70 vs. 87–90), PW (62–70 vs. 77–78) and fV (12 vs. 17); from *C. sparsoni* in scutum longer than wide (vs. subequal in length and width in *C. sparsoni*), shape of scutum (rectangular vs. square), shorter AP (40–45 vs. 56), longer PSens (50–55 vs. 42), *1b* (40–46 vs. 28), *2a* (32–35 vs. 16), Ta I (97–107 vs. 77), Ta III (95–110 vs. 79), Ti III (115–130 vs. 100); from *C. mouldsi* in scutum longer than wide (vs. subequal in length and width in *C. mouldsi*), the shorter DS Min (25–27 vs. 47), DS Max (40–42 vs. 64), Ta I (97–107 vs. 129–155), Ti I (85–95 vs. 175–206), Ge I (70–77 vs. 131–153), Ta III (95–110 vs. 137–164), Ti III (115–130 vs. 240–279). Comparison of larval measurements in species of *Caeculisoma* is given in Table 3.

**Table 1** Leg chaetotaxy of *Caeculisoma pouyani* Noei and Kohansal **sp. nov.** (larva). 2a, holotype; and 2b–2f paratypes.

Character	2a	2b	2c	2d	2e	2f
Ta I	1ω, 1ε, 2ζ, 1z, 28n	1ω, 1ε, 2ζ, 1z, 28/29n	1ω, 1ε, 2ζ, 1z, 28/29n	1ω, 1ε, 2ζ, 1z, 29n	1ω, 1ε, 2ζ, 1z, 29n	1ω, 1ε, 2ζ, 1z, 29n
Ti I	2φ, 1z, 1κ, 17n	2φ, 1z, 1κ, 17n	2φ, 1z, 1κ, 17n	2φ, 1z, 1κ, 17n	2φ, 1z, 1κ, 17n	2φ, 1z, 1κ, 17n
Ge I	1σ, 1κ, 12n	1σ, 1κ, 12n	1σ, 1κ, 12n	1σ, 1κ, 12n	1σ, 1κ, 11/12n	1σ, 1κ, 12n
TFe I	5n	5n	5n	5n	5n	5n
BFe I	4n	4n	4n	4n	4n	4n
Tr I	1n	1n	1n	1n	1n	1n
Cx I	1n	1n	1n	1n	1n	1n
Ta II	1ω, 1ζ, 29/30n	1ω, 1ζ, 29n	1ω, 1ζ, 29/30n	1ω, 1ζ, 30/31n	1ω, 1ζ, 30n	1ω, 1ζ, 30n
Ti II	2φ, 17n	2φ, 18n	2φ, 17/18n	2φ, 18n	2φ, 17/18n	2φ, 17/18n
Ge II	1κ, 12n	1κ, 12n	1κ, 12n	1κ, 12n	1κ, 12n	1κ, 12n
TFe II	5n	5n	5n	5n	5n	5n
BFe II	4n	4n	4n	5/4n	4n	4n
Tr II	1n	1n	1n	1n	1n	1n
Cx II	2n	2n	2n	2n	2n	2n
Ta III	1ζ, 30/29n	1ζ, 30/29n	1ζ, 30/29n	1ζ, 30n	1ζ, 30n	1ζ, 29n
Ti III	1φ, 17/18n	1φ, 18n	1φ, 18/17n	1φ, 18n	1φ, 18n	1φ, 17/18n
Ge III	12n	12n	12n	12n	12n	12n
TFe III	5n	5n	5n	5n	5n	5n
BFe III	2n	2n	2n	2n	2n	2n
Tr III	1n	1n	1n	1n	1n	1n
Cx III	2n	2n	2n	2n	2n	2n

**Table 2** Metric and some meristic data for *Caeculisoma pouyani* Noei & Kohansal **sp. nov.** (larva). 2a, holotype; 2b–2f, paratypes.

Character	2a	2b	2c	2d	2e	2f	Range
IL	265	260	310	360	460	950	260–950
IW	185	195	220	252	380	1000	185–1000
SD	85	87	87	87	95	96	82–96
W	75	80	80	77	82	87	75–87
AW	52	57	55	57	56	61	52–61
MW	60	62	62	62	66	70	60–70
PW	62	62	65	62	67	70	62–70
AA	6	6	6	6	6	8	6–8
SB	10	10	10	10	12	12	10–12
ISD	50	50	50	52	57	56	50–57
AP	45	42	45	41	40	43	40–45
AL	broken	broken	32	36	30	broken	30–36
ML	31	30	35	37	32	37	30–37
PL	35	36	35	37	37	broken	35–37
ASens	25	25	25	27	25	25	25–27
PSens	54	52	50	52	55	52	50–55
DS Min	27	25	27	25	25	27	25–27
DS Max	42	42	40	42	42	>15	40–42
<i>la</i>	25	22	27	29	24	24	22–29
<i>lb</i>	40	40	46	42/45	42	42	40–46
<i>2a</i>	35	32	32	34	33	33	32–35
<i>2b<sub>1</sub></i>	32	33	30	30/34	30	broken	30–34
<i>2b<sub>2</sub></i>	20	broken	27	27	32	broken	20–32
<i>3a</i>	25	27	27	25	25	25	25–27
<i>3b<sub>1</sub></i>	27	32	32	30	32	35	27–35
<i>3b<sub>2</sub></i>	broken	broken	23	25	22	29	22–29
GL	117	112	115	112	117	122	112–122
<i>cs</i>	20	20	20	21	20	20	20–21
<i>as</i>	12	13	12	13	13	14	12–14
<i>bs</i>	25	25	20	24	20	23	20–25
PaScFed	37	37	38	42	37	37	37–42
PaScGed	17	17	20	20	17	25	17–25
Ta I	97	100	102	100	100	107	97–107
Ti I	90	90	90	85	90	95	85–95
Ge I	70	70	70	74	72	77	70–77
TFe I	40	40	42	42	46	46	40–46
BFe I	54	55	55	53	60	60	53–60
Tr I	42	40	42	45	37	45	37–45
Cx I	42	42	42	40	45	52	40–42
Leg I	435	437	443	439	450	482	435–482
Ta II	87	97	92	90	90	97	87–97
Ti II	86	87	85	85	85	92	85–92
Ge II	73	72	73	73	72	80	72–80
TFe II	40	40	42	42	47	45	40–47
BFe II	50	52	52	52	57	52	50–57
Tr II	42	42	42	42	45	45	42–50
Cx II	55	57	55	57	57	63	55–63
Leg II	433	447	441	441	455	474	433–474
Ta III	97	105	100	100	102	110	95–110
Ti III	115	120	115	115	115	130	115–130
Ge III	77	77	77	78	75	85	75–85
TFe III	51	50	51	52	55	57	50–70
BFe III	57	60	57	57	65	62	57–65
Tr III	45	45	45	45	45	45	45
Cx III	50	50	52	55	55	60	50–60
Leg III	492	507	497	502	512	549	492–549
IP	1360	1391	1381	1382	1417	1505	1360–1505
Long seta on BFe I	40	40	42	45	45	42	40–45
Long seta on BFe II	40	40	45	47	42	47	40–47

**Key to the larval species of *Caeculisoma* of the world [updated after Noei et al. (2024)]**

- 1. ASens bases between levels of ML and PL scutalae . . . . . *C. semispinus* Xu & Jin, 2019
- ASens bases closer to the level of PL scutalae or ML scutalae . . . . . 2

**Table 3** Comparison of measurements in species of *Caeculisoma* known as larvae: *C. allopenlineatus* Xu & Jin, 2020, *C. brazilensis* Noei & Šundić, 2024, *C. carmenae* Haitlinger, 2008, *C. cooremani* Southcott, 1972, *C. darwiniense* Southcott, 1961, *C. hunanica* Zheng, 2002, *C. huxleyi* Southcott, 1972, *C. mouldsi* Southcott, 1988, *C. nestori* Haitlinger, 2004, *C. penlineatus* Xu & Jin, 2019, *C. semispinus* Xu & Jin, 2019 and *C. sparnoni* Southcott, 1972.

Characters	<i>C. allopenlineatus</i> N=3	<i>C. brazilensis</i> N=9	<i>C. carmenae</i> N=1	<i>C. cooremani</i> N=9*	<i>C. darwiniense</i> N=2**	<i>C. hunanica</i> N=1	<i>C. huxleyi</i> N=1 ***	<i>C. mouldsi</i> N=51	<i>C. nestori</i> N=1	<i>C. penlineatus</i> N=17* <sup>4</sup>	<i>C. semispinus</i> N=6	<i>C. sparnoni</i> N=1 <sup>5*</sup>
SD	100–107	130–154	82	79–84	87–88	111	159	84–100 (38)	86	94–114	78–84	83
W	88–96	107–118	76	73–86	97–105	107	133	87–101 (44)	92	109–126	71–80	85
AW	55–57	75–82	50	58–69	83–85	62	94	58–75 (43)	74	66–75	40–45	59
MW	58–62	92–105	60	58–73	87–90	76	106	72–82 (43)	80	81–93	55–62	69
PW	70–75	95–110	66	57–67	77–78	79	115	69–80 (45)	72	80–104	57–71	67
AA	11–14	12–17	8	8–10	8–9	11	12	7–11 (46)	10	12–16	7–11	-
SB	14–18	16–20	12	13–15	15	12	20	11–15 (48)	12	14–19	11–16	11
ISD	52–55	100–112	46	34–41	47–48	67	109	48–66 (41)	30	34–47	41–44	48
AP	46–49	55–77	46	32–45	43–44	55	69	37–50 (46)	44	49–59	4–47	56
AL	36–43	75–95	28	24–30	41–43	51	75	35–56 (33)	42	46–61	36–43	27
ML	114–120	72–82	32	25–30 (8)	43–46	67	73	44–64 (41)	42	59–83	43–51	29
PL	51–57	80–90	40	24–30 (7)	33–34	51	81	38–56 (45)	36	42–63	39–46	28
ASens	46–51	60–65	24	26–35	40–41	37	70	35–49 (44)	32 AM	46–57 ASE	24–27	26
PSens	69–73	90–112	38	42–47	68–75	53	-	55–68 (41)	40	61–74 PSE	58–63	42
DS Min	36–44	50–60	42	19	26–31	48	50–82	47 (1)	30	27–33	36–40	24
DS Max	69–76	90–105	52	30	51–55	85	-	64 (1)	54	63–73	54–62	36
<i>Ia</i>	17–20	82–95	20	22	30 (1)	39	64	-	28	21–29	25–29	16
<i>Ib</i>	71–77	92–107	42	38	40 (1)	-	90	-	40	55–68	58–66	28
<i>2a</i>	37–46	85–105	-	36	36 (1)	40	86	40	30–39	41–45	16	
<i>2b<sub>1</sub></i>	47–50	95–106	36	34	32 (1)	-	74	-	26	30–38	45–49	17
<i>2b<sub>2</sub></i>	35–37	43–50	26	22	20 (1)	-	63	-	34	33–39	27–36	22
<i>3a</i>	31–37	80–92	-	24–30 (1)	31 (1)	-	73	36	23–33	31–40	20	
<i>3b<sub>1</sub></i>	52–53	85–105	26	30	28 (1)	-	74	-	36	31–39	40–47	16
<i>3b<sub>2</sub></i>	34–36	45–55	22	18	20 (1)	-	60	-	36	32–39	31–38	16
GL	129–132	175–192	100	-	-	-	-	-	116	127–151	103–114	112
<i>cs</i>	28–33	37–45	-	20	20 (1)	-	c. 25	-	-	24–32	18–22	17
<i>as</i>	10–11	17–25	-	10	17	-	20	-	24 <i>Sc<sub>1</sub></i>	13–21	-	10
<i>bs</i>	23–29	87–92	-	26	46	-	60	-	-	27–34	-	15
PaScFed	65–73	87–113	58	-	-	-	-	-	30	75–92	49–64	-
PaScGed	26–31	35–45	16	-	-	-	-	-	26	22–33	24–27	-
Ta I	140–147	197–217	68	74–88	104	-	132	129–155 (50)	108	137–155	134–141	77
Ti I	164–170	280–310	62	63–83 (8)	102	-	157	175–206 (50)	106	143–167	149–163	83
Ge I	115–119	195–228	46	58–75 (8)	-	-	117	131–153 (51)	96	112–130	118–127	65
TFe I	72–77	90–137	28	-	-	-	-	-	50	68–83	65–76	-
BFe I	70–74	125–146	38	-	-	-	-	-	52	72–89	76–84	-
Tr I	44–52	70–75	34	-	-	-	-	-	32	38–53	40–43	-
Cx I	45–56	80–97	50	-	-	-	-	-	46	38–62	45–58	-
Leg I	666–679	1045–1195	316	360	520	655	725	-	490	627–709	648–676	395
Ta II	129–136	172–187	62	-	-	-	-	-	106	134–152	118–127	-
Ti II	151–161	250–276	52	-	-	-	-	-	102	150–179	142–153	-
Ge II	108–109	150–187	48	-	-	-	-	-	90	113–132	105–116	-
TFe II	57–63	75–112	34	-	-	-	-	-	50	61–77	56–65	-
BFe II	64–71	112–127	42	-	-	-	-	-	54	68–81	71–80	-
Tr II	44–49	69–77	32	-	-	-	-	-	38	43–54	40–47	-
Cx II	57–66	87–100	60	-	-	-	-	-	60	57–78	56–67	-
Leg II	615–644	921–1059	326	345	455	621	690	-	500	645–724	618–634	390
Ta III	137–141	192–212	72	70	104	-	129	137–164	118	131–153	136–140	79
Ti III	227–239	340–377	72	104	143	-	186	240–279	152	213–239	213–227	100
Ge III	111–112	187–220	54	64	-	-	106	-	98	117–140	122–131	65
TFe III	94–109	102–157	36	-	-	-	-	-	62	100–121	81–89	-
BFe III	87–98	137–170	46	-	-	-	-	-	62	93–113	91–100	-
Tr III	47–52	77–87	36	-	-	-	-	-	42	45–56	40–47	-
Cx III	63–68	82–100	60	-	-	-	-	-	62	61–77	56–67	-
Leg III	767–805	1123–1289	376	420	535	728	790	-	596	768–878	758–791	435
IP	2061–2115	3089–3526	1018	1125	1510	2004	2205	-	1586	2060–2298	2041–2100	1220

1\*, 2\*, 3\* & 5\* Legs I–III and IP measured with claws. 4\* Based on Xu & Jin (2019: 512; 2020: 295).

2. ASens bases closer to the level of PL scutalae than ML ..... 3  
 — ASens bases closer to the level of ML scutalae than PL ..... 5

3. Four sternal setae III between levels of coxae II and III ..... *C. cooremani* Southcott, 1972  
 — Two sternal setae III between levels of coxae II and III ..... 4



4. AW 66–75\*, W 109–126, BFe I and II with one nude seta longer than the other normal leg setae ..... *C. penlineatus* Xu & Jin, 2019  
 — AW 55–57, W 88–96; without a nude long seta on BFe I and II .....  
 ..... *C. allopenlineatus* Xu & Jin, 2020
5. fn BFe 5-5-2 ..... 6  
 — fn BFe otherwise (4-4-2 or 4-3-2) ..... 7
6. fn Ge 8-8-8, fn Ti 10-10-10 ..... *C. carmenae* Haitlinger, 2008  
 — fn Ge 12-12-12, fn Ti 18-18-18 ..... *C. nestori* Haitlinger, 2004
7. fn TFe 5-5-4 ..... *C. hunanica* Zheng, 2002  
 — fn TFe 5-5-5 ..... 8
8. SD > 130, ISD > 100, PW > 95, AL > 75, ML > 73 ..... 9  
 — SD < 100, ISD < 66, PW < 80, AL < 56, ML < 64 ..... 10
9. W 107–118, Ti I 280–310, Ge I 195–228, Ti III 340–377, odontus with two subterminal teeth ..... *C. brazilensis* Noei & Šundić, 2024  
 — W 133, Ti I 157, Ge I 117, Ti III 186, odontus without subterminal tooth .....  
 ..... *C. huxleyi* Southcott, 1972
10. Scutum wider than long (W 97–105, SD 87–88), fV 17 .....  
 ..... *C. darwiniense* Southcott, 1961b  
 — Scutum subequal in length and width or longer than wide, fV 12 ..... 11
11. Scutum longer than wide (SD 82–96, W 75–87) ..... *C. pouyani* **sp. nov.**  
 — Scutum subequal in length and width ..... 12
12. Ti I 175–206, Ti III 240–279, ML 44–64 ..... *C. mouldsi* Southcott, 1988  
 — Ti I 83, Ti III 100, ML 29 ..... *C. sparnoni* Southcott, 1972

\* Based on Xu *et al.* (2020).

## Discussion

All known species of *Caeculisoma* are confined to the southern hemisphere except *C. pouyani* **sp. nov.** and some species from Nigeria and China (Mağol and Wohltmann 2012, 2013; Xu *et al.* 2019a, b, 2020; Saboori *et al.* 2023). Considering the known host association of the newly described species, host spectrum of the *Caeculisoma* species is still limited to Hemiptera, Lepidoptera and Orthoptera.

Iran mostly lies in the Palearctic zoogeographical realm bordering the Oriental and African ones. Description of *C. haussa* by Beron (2000) from Nigeria (based on post-larval stage) and some species by Zheng (2002) and Xu *et al.* (2019a, b, 2020) from China (*C. hunanica* Zheng, 2002, *C. penlineatus* Xu & Jin, 2019, *C. semispinus* Xu & Jin, 2019, *C. allopenlineatus* Xu & Jin, 2020) and discovery of the new species, *C. pouyani* **sp. nov.** from Iran, extends the distribution of the genus *Caeculisoma* into the northern hemisphere and Palearctic region.

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