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Article

The second larval species of *Cicaditrombium* (Acari: Trombidiidae) of the world from Iran

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ABSTRACT
Cicaditrombium lorestanensis Noei **sp. nov.** (Acari: Trombidiformes: Trombidiidae) collected from forest soils (off host) in Hotel Kouhestan region, Birjand city, South Khorasan province, and also collected from soil samples (off host) from under an apple tree in the Bayranshahr city, Lorestan province, Iran, is described. This is the second larval species of *Cicaditrombium* which is described in the world.

KEY WORDS: Bayranshahr; Birjand; *incertae sedis*; Prostigmata; Trombidiformes; Trombidioidea.

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INTRODUCTION

The family Trombidiidae Leach comprises four subfamilies including Allothrombiinae Thor, Dolichothrombiinae Robaux, Paratrombiinae Feider and Trombidiinae Leach (Mąkol and Wohltmann 2012, 2013) as well as some genera *incertae sedis*. The *incertae sedis* comprises 12 genera including the monotypic *Cicaditrombium* Saboori & Lazarboni (Saboori and Lazarboni 2008; Mąkol and Wohltmann 2012; Saboori and Hakimitabar 2013). *Cicaditrombium weni* Saboori and Lazarboni, 2008 was described ectoparasitic on *Cicadatra alhageos* (Kolenati) [syn.: *Cicadatra ochreata* Melichar] (Hemiptera: Auchenorrhyncha: Cicadidae) from Iran (Saboori and Lazarboni 2008) as well as was collected as ectoparasite of a moth (Lepidoptera: Noctuidae) from Fars (Jahrom region), Tehran and Yazd provinces, Iran (Sedghi 2009; Hakimitabar 2011; Mohamadi 2013). This species was recorded several times from different regions in Iran (Saboori and Lazarboni 2008; Sedghi 2009; Hakimitabar 2011, Mohamadi 2013; Mohamadi *et al.* 2013; Noei 2013).

In this paper, we described a new species of the genus *Cicaditrombium* (Acari: Trombidiidae) from forest soils (off host).

MATERIAL AND METHODS

Three specimens were extracted from forest soils (off host), near a seasonal river, and also from soil

samples (off host) from under an apple tree, using a Berlese funnel, cleared in Nesbitt's fluid and mounted on glass microscope slides using Hoyer's medium (Walter and Krantz 2009). Figures were drawn and measurements (given in micrometers, µm) were made using a BX51 phase contrast Olympus microscope equipped with a drawing tube. The terminology and abbreviations follow Mąkol (2007) and Saboori *et al.* (2009) except for the following characters: IL — idiosoma length, IW — idiosoma width, W — scutum width and *cs* — adoral seta.

Genus *Cicaditrombium* Saboori and Lazarboni, 2008

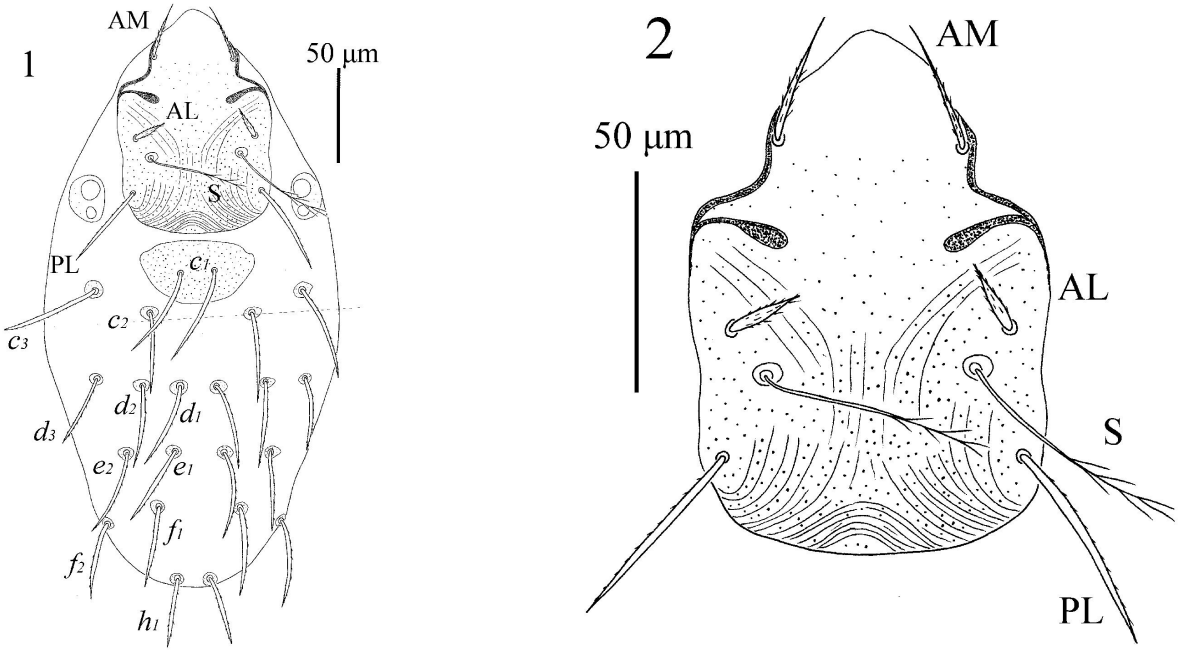
Type species: *Cicaditrombium weni* Saboori and Lazarboni, 2008

Cicaditrombium lorestanensis Noei sp. nov. (Figs. 1–11)

Diagnosis of larva – AL scutalae and pedocoxalae *2a*, *2b* and *3b* thick, spear-like, tapering and pointed.

Description of larva (n = 3)

Dorsum (Figs. 1, 2) – Idiosoma 267–305 long and 135–157 wide. Dorsum of idiosoma with 26 dorsal barbed setae, each arise from a punctate raised sclerite, arranged in 5 rows, fD = 4 (+2)-6-4-6-4 = 24 (+2): c_{1-3}, d_{1-3}, e_{1-2}, f_{1-3} and h_{1-2} (Figs. 1, 3). Scutum semipentagonal, bearing 3 pairs of normal setae (AM, AL and PL) and one pair of sensilla (S). Setae AL thick, spear-like, tapering, pointed and shorter than AM and PL, all scutalae barbed. Sensilla relatively long and barbed in distal half. Scutum rounded anteriorly, posterior border slightly convex, punctate from posterior border to level of AM bases and with striations from posterior border extended between PL and S to just anterior to AL and behind tear-like ornamentation in lateral side (Figs. 1, 2), tear-like ornamentation between AM and AL setae on each side, anterior borders of scutum (between tear-like ornamentation and AM seta on each side) concave, lateral borders approximately parallel; posterolaterally on each side of scutum 2 eyes situated on common ocular plate (25–27 long, 18–21 wide), anterior lens (diameter 11) slightly larger than posterior one (diameter 7–8).



Figures 1–2. *Cicaditrombium lorestanensis* Noei **sp. nov.** (larva) – 1. Dorsal view of idiosoma; 2. Dorsal scutum.

Venter (Fig. 3) – Idiosoma ventrally with one pair of barbed sternal setae (*3a*) and 2 pairs of ventral setae (fV) behind coxa III, and a uropore. Coxa I with proximal seta *1a* and distal antero-lateral seta *1b*; coxa II with approximately medially seta *2a* and distal medially seta *2b*; coxa III with seta *3b* approximately medially; *2a*, *2b* and *3b* setae, all thick, spear-like, tapering and pointed; all coxalae barbed; coxae I–III each punctate. Claparède's organs between coxae I and II, oval. NDV = 24 (+2) + 4 = 28 (+2).

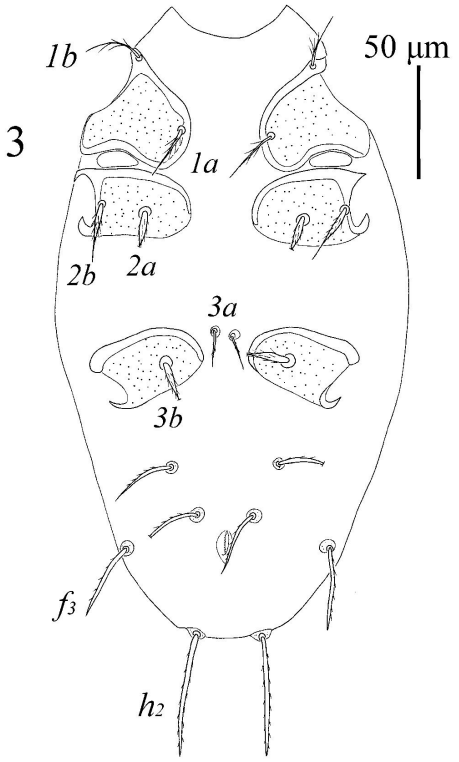


Figure 3. *Cicaditrombium lorestanensis* Noei **sp. nov.** (larva). 3. Ventral view of idiosoma.

Gnathosoma (Figs. 4, 5) – Cheliceral bases punctate on dorsal surface, cheliceral base 55–60 long; cheliceral blade slightly curved, 15–17 long, with a subterminal tooth. Adoral seta *cs* 3 long, arising from a pair of cuticular structures; one pair of barbed and thick subcapitular setae (*bs*), 9–11 long; palpfemur 25–28 and palpgenu 15–17 long, each without seta. Palptibia 12–14 long, with three nude seta; palpal tibial claw 9–11 and bifurcate; palptarsus 6–7 with 4 nude setae, one barbed seta and an eupathidium; fPp = 0-0-0-NNN$_2$-BNNNNζ. Palpal supracoxal setae (*elcp*) peg-like, 4–6 long.

Legs (Figs. 6–11) – Leg segmentation formula 6-6-6. Leg setal formula: Leg I: Ta – 1ω, 2ζ, 17n; Ti – 2φ, 1κ, 5n; Ge – 2σ, 1κ, 4n; Fe – 5n; Tr – 1n (Figs. 6–7). Leg II: Ta – 1ω, 1ε, 14n; Ti – 2φ, 5n; Ge – 1σ, 1κ, 3n; Fe – 4n; Tr – 1n (Figs. 8–9). Leg III: Ta – 13n; Ti – 5n; Ge – 1σ, 3n; Fe – 4n; Tr – 1n (Figs. 10–11).

IP = 813–891. Metric data are given in Table 1.

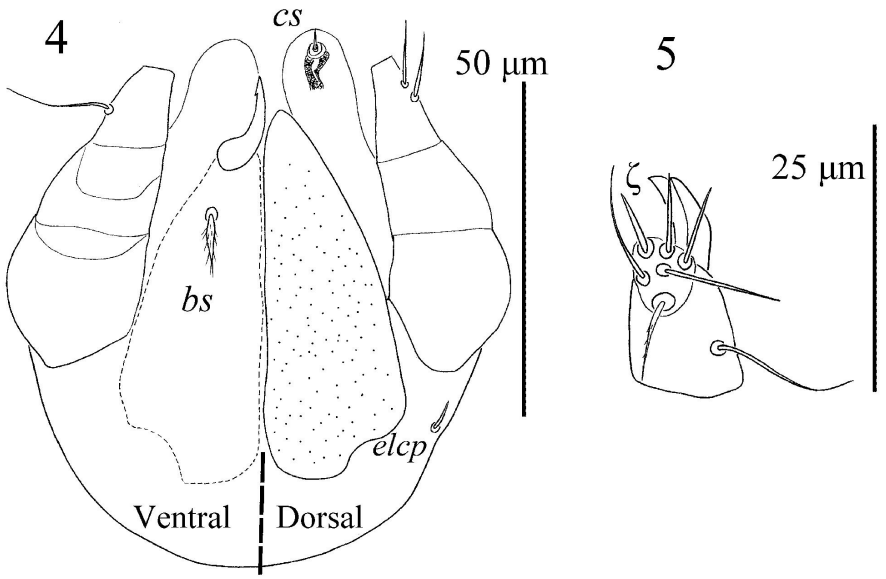
Etymology

The specific epithet is derived from the type locality, Lorestan Province, Iran.

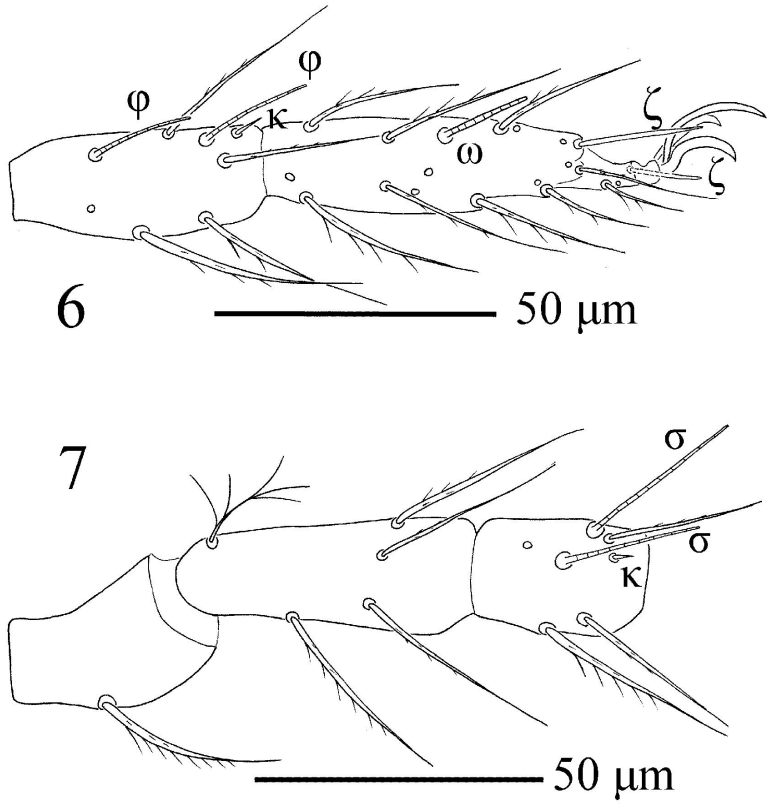
Type material

The Holotype (ARS-20170305-2a) was collected from forest soils (off host), near a seasonal river, IRAN: South Khorasan province (Eastern Iran), Birjand city, Hotel Kouhestan region, 32°

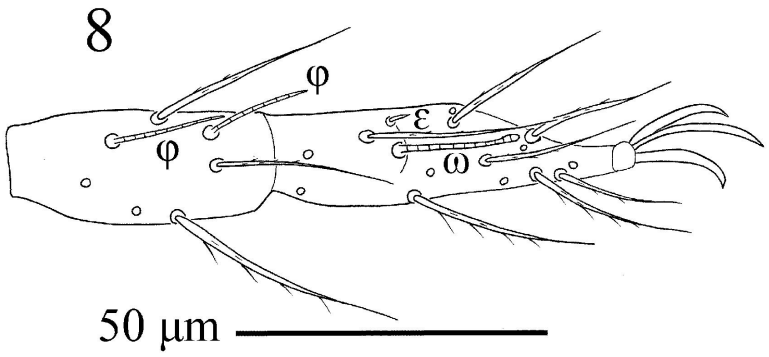
49.40' N, 59° 10.48' E, 79 m a.s.l., 10 July 2016, coll. J. Noei; one paratype larva (ARS-20170305-2b), same data as holotype except 18 June 2016; One paratype larva (ARS-20170305-2c) was collected from soil samples (off host) under an apple tree, IRAN: Lorestan province (Western Iran), Bayranshahr city, 48° 35.08' N, 33° 38.44' E, 1672 m a.s.l., 28 July 2013, coll. I. Hasanvand.

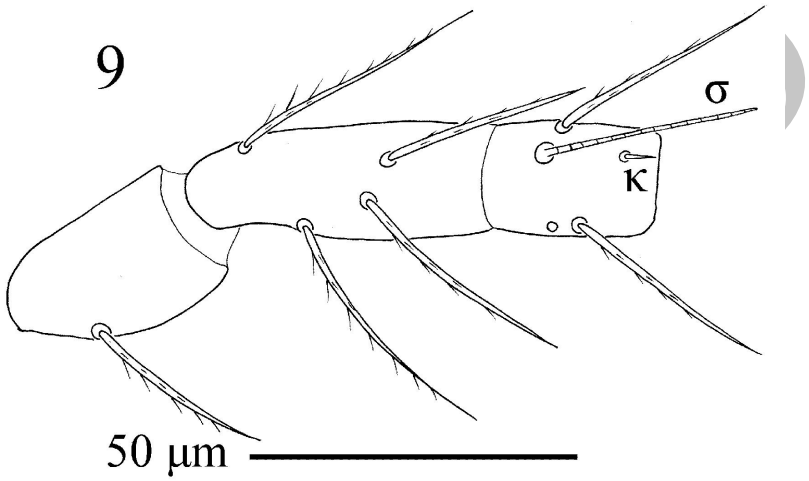


Figures 4–5. *Cicaditrombium lorestanensis* Noei **sp. nov.** (larva) – 4. Dorsal (right) and ventral (left) view of gnathosoma; 5. Ventral view of palpal tarsus.

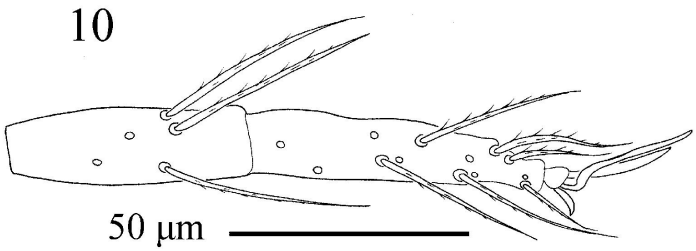


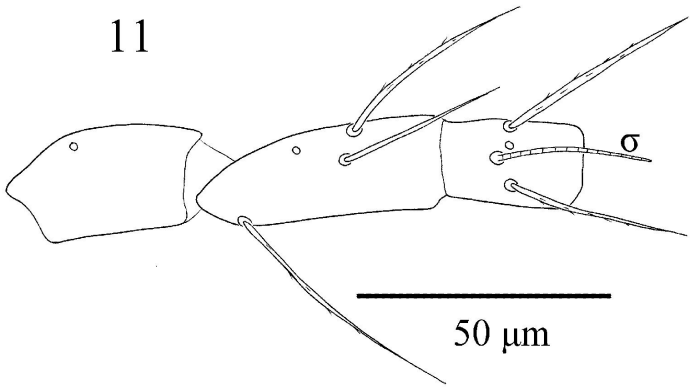
Figures 6–7. *Cicaditrombium lorestanensis* Noei **sp. nov.** (larva) – Leg I: 6. Tibia-tarsus; 7. Trochanter-genu.





Figures 8–9. *Cicaditrombium lorestanensis* Noei **sp. nov.** (larva) – Leg II: 8. Tibia-tarsus; 9. Trochanter-genu.





Figures 10–11. *Cicaditrombium lorestanensis* Noei **sp. nov.** (larva) – Leg III: 10. Tibia-tarsus; 11. Trochanter-genu.

Table 1. Measurements of *Cicaditrombium lorestanensis* Noei **sp. nov.** larvae (2a, holotype; 2b and 2c, paratypes).

Character	2a	2b	2c	Range	Character	2a	2b	2c	Range
IL	305	280	267	267–305	*3b**	> 20	> 16	> 16	> 16–> 20
IW	157	142	135	135–157	*cs*	3	3	3	3
SD	119	119	119	119	*bs*	10	11	9	9–11
W	90	83	90	83–90	Cx I	55	61	52	52–61
AW	65	63	60	60–65	Tr I	37	40	35	35–40
PW	70	73	74	70–74	Fe I	53	56	52	52–56
AA	42	42	44	42–44	Ge I	30	32	27	27–32
SB	49	47	52	47–52	Ti I	45	49	42	42–49
ASB	76	78	77	76–78	Ta I (L)	74	76	70	70–76
PSB	43	41	43	41–43	Ta I (H)	18	17	17	17–18
MA	45	42	40	40–45	Leg I	294	314	278	278–314
AP	29	30	33	29–33	Cx II	56	58	50	55–58
AL	19	19	18	18–19	Tr II	35	36	35	35–36
PL	50	49	49	49–50	Fe II	50	50	50	50
AM	33	33	25	25–33	Ge II	26	28	26	26–28
S	60	58	55	55–60	Ti II	42	43	41	41–43
LSS	62	62	62	62	Ta II (L)	61	65	62	61–65
HS	35	36	34	34–36	Ta II (H)	17	17	16	16–17
SL	55	56	46	46–56	Leg II	270	280	264	264–280
SS	18	20	19	18–20	Cx III	51	54	47	47–54
DS Min.	38	37	30	30–38	Tr III	40	41	37	37–41
DS Max.	53	49	42	42–53	Fe III	52	51	50	50–52
PDS Min.	38	43	30	30–43	Ge III	28	30	27	27–30
PDS Max.	55	65	49	49–65	Ti III	51	52	50	50–52
1a	27	26	>15	>15–27	Ta III (L)	65	69	60	60–69
1b	26	30	20	20–30	Ta III (H)	14	14	15	14–15
*2a**	> 15	> 16	> 16	> 15–> 16	Leg III	287	297	271	271–297
2b	21	>17	19	>17–21	IP	851	891	813	813–891
3a	17	15	12	12–17					

* The terminals of *2a* and *3b* setae were broken, their lengths may be about 21 and 25, respectively

Type deposition

The holotype and one paratype larvae (ARS-20170305-2a and 2b) are deposited in the Acarological Collection, Jalal Afshar Zoological Museum (JAZM), Department of Plant Protection, Faculty of Agriculture, University of Tehran, Karaj, Iran, and one paratype larva (ARS-20170305-2c) is deposited in the Acarological Collection, Acarological Society of Iran, Department of Plant Protection, Faculty of Agriculture, University of Tehran, Karaj, Iran.

Remarks

The new species belongs to the genus *Cicaditrombium* because has two median dorsal scuta; Ge II and III each with one solenidion; Ge I and Fe II with four normal setae; Ta III with short and thick inner claw; famulus absent on Ta I, present on Ta II; palpal supracoxal setae present. *Cicaditrombium lorestanensis* Noei **sp. nov.** is similar to *Cicaditrombium weni* Saboori and Lazarboni, 2008. It differs from *C. weni* in the shape of AL scutalae and pedocoxalae *2a*, *2b*, *3b* and *bs* (all thick, spear-like, tapering and pointed vs. normal in *C. weni*), in shorter AL (18–19 vs. 20–25), *2a* (about 21 vs. 25–59), *2b* (> 17–21 vs. 22–57), *3b* (about 25 vs. 27–40), AW (60–65 vs. 71–77), PW (70–74 vs. 77–82), SS (18–20 vs. 25–32), PDS Min. (30–43 vs. 42–50), PDS Max. (49–65 vs. 62–99) (Tables 1, 2), subterminal sword-like and cone-like setae on Ta III (absent vs. present).

The two known species of *Cicaditrombium* larvae may be separated as follows:

1. AL scutalae and pedocoxalae *2a*, *2b* and *3b* thick, spear-like, tapering and pointed ……..……. ……..……... *C. lorestanensis* Noei **sp. nov.**
– AL scutalae and pedocoxalae *2a*, *2b* and *3b* normal …….... *C. weni* Saboori and Lazarboni, 2008

Table 2. Measurements of *Cicaditrombium weni* Saboori and Lazarboni, 2008 (Saboori and Lazarboni (2008)) and new data collected by Sedghi (2009), Mohamadi (2013) and Noei (2013) in Iran.

Character	Saboori & Lazarboni (2008) (Markazi province) N = 8	Sedghi (2009) (Fars province) N = 4	Mohamadi (2013) (Yazd province) N = 4	Noei (2013) (Guilan province) N = 1
IL	255–507	242–361	297–656	275
IW	149–309	124–188	198–421	158
SD	102–126	105–110	99–111	124
W	84–97	87–99	87–89 (3)	94
AW	71–77	74–78	74–79	77
PW	77–82	78–83	77–79	84
AA	42–45	37–43	40–42 (3)	42
SB	47–52	51–54	50–62	57
ASB	62–82	59–64	62–99	74
PSB	42–47	43–48	17–25	47
MA	42–49	44–48	-	45
AP	27–30	25–28	25–30	32
AL	20–25	23–27 (2)	25–30	25
PL	54–62	49–59	50–62	57
AM	25–30	26–28 (2)	27–30 (3)	25
S	55–69	58–64	54–62	62
LSS	62–77	62–72	62–74	69
HS	28–39	34–38 (3)	30–42	32
SL	54–64	57–64	62–67	71
SS	25–32	22–27	20–30	30
DS Min.	37–45	33–43	37–50	42
DS Max.	44–54	44–54	50–62	59
PDS Min.	42–50	31-47 (3)	50–57	45
PDS Max.	62–99	73-96 (3)	54–87	64
1a	26–30	32–37	22–35	14/11
1b	32–37	25–33 (2)	17–42	30
2a	25–59	41–46	37–42	35
2b	22–57	32–37	27–45	25
3a	23–32	25–35	17–35	27
3b	27–40	33–38	30–40	37
cs	2–3 (*or*)	2 (*or*)	-	3 (*or*)
bs	24–26	22–28	20–35	20
Cx I	50–57	43–51	54–62	52
Tr I	33–37	37–43	37–45	37
Fe I	52–59	49–56	54–62	59
Ge I	30–35	33–37	30–37	32
Ti I	49–54	49–53	42–50	50
Ta I (L)	67–84	68–79	74	82
Ta I (H)	17–19	18–20	17–25	17
Leg I	223–255	290–310	302–330	312
Cx II	50–54	43–49	54–57	54
Tr II	32–37	33–47	37–40	37
Fe II	47–54	47–50	50–52	54
Ge II	27–29	27–31	27–30	27
Ti II	45–54	44–48	42–50	45
Ta II (L)	62–77	64–75	-	74
Ta II (H)	17–20	17–18	17	17

Table 2. Continued.

Character	Saboori & Lazarboni (2008) (Markazi province) N = 8	Sedghi (2009) (Fars province) N = 4	Mohamadi (2013) (Yazd province) N = 4	Noei (2013) (Guilan province) N = 1
Leg II	210–240	261–295	283–305	291
Cx III	52–57	46–57	50–62	57
Tr III	42–47	46–53	42–50	45
Fe III	47–62	43–58	54–62	59
Ge III	25–30	26–30	27–30	27
Ti III	52–57	48–56	52–54	57
Ta III (L)	69–79	53–75	62–74	74
Ta III (H)	15–17	16–17	15–22	17
Leg III	230–254	272–318	292–327	319
IP	675–749	827–923	894–942	922

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دومین گونه لاروی جنس *Cicaditrombium* (Acari: Trombidiidae) در جهان از ایران

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چکیده

گونهٔ جدیدی به نام *Cicaditrombium lorestanensis* Noei **sp. nov.** (Acari: Trombidiformes: Trombidiidae) از خاک‌های جنگلی (بدون میزبان) در استان خراسان جنوبی، شهر بیرجند، منطقه هتل کوهستان و هم‌چنین از نمونه‌های خاک (بدون میزبان) زیر درخت سیب در استان لرستان، شهر بیرانشهر در ایران جمع‌آوری و توصیف می‌شود. این دومین گونه لاروی جنس *Cicaditrombium* است که در دنیا توصیف می‌شود.

واژگان کلیدی: بیرانشهر؛ بیرجند؛ *Cicaditrombium*؛ Prostigmata؛ Trombidiformes؛ Trombidioidea.

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