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Description a new species of *Pteridopus* (Trombidiformes: Chyzeriidae) from southeastern Iran

Malihe Haddadi[1] | Sara Ramroodi[1]* | Javad Noei[2] | Ehsan Rakhshani[1]

1. *Department of Plant Protection, College of Agriculture, University of Zabol, Zabol, Iran; E-mails; malihe.haddadi2211@gmail.com; sara.ramroodi@gmail.com/ sararamroodi@uoz.ac.ir; rakhshani@uoz.ac.ir*
2. *Department of Plant Protection, Faculty of Agriculture, University of Birjand, Birjand, Iran; E-mail: noei.javad@birjand.ac.ir*

**** Correspondence***
sara.ramroodi@gmail.com

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ABSTRACT

A new species of the genus *Pteridopus* Newell & Vercammen-Grandjean, 1964, *P. bonjarensis* Haddadi & Noei **sp. nov.**, from Zabol and Bonjar counties, Sistan and Baluchestan Province, Iran is described and illustrated. It represents the fifth known larval species of this genus worldwide and the third recorded from Iran. An updated key to the world species of the genus is also presented.

KEYWORDS

Acari, larva, Prostigmata, Pteridopinae, Sistan and Baluchestan, trap

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INTRODUCTION

The family Chyzeriidae Womersley, 1954 has three subfamilies: Chyzeriinae Womersley, 1954, Pteridopinae Southcott, 1987 and Ralphaudyninae Southcott, 1987 (Mąkol and Wohltmann 2012; Haddadi *et al.* 2025). The subfamily Pteridopinae comprises seven genera based on larvae [L] or post larval forms [P], including *Parachyzeria* Hirst, 1926 [P], *Parawenhoekia* Paoli, 1937 (syn.: *Napassenia* Haitlinger, 1999) [L], *Pteridopus* Newell & Vercammen-Grandjean, 1964 [L], *Cretessenia* Haitlinger, 1999 [L], *Perumaropta* Haitlinger, 1999 [L], *Iberochyzeria* Mayoral, Welbourn & Barranco, 2018 [L] and *Cretachyzeria* Liu, Fan & Ren, 2025 (the first formally described fossil species) [P] (Mąkol and Wohltmann 2012; Mayoral *et al.* 2018; Liu *et al.* 2025). According to the latest revision of the *Pteridopus* in 2009, the genus contains four species based on larvae [L], including: *P. auditor* Newell & Vercammen-Grandjean, 1964, ectoparasitic on *Gryllus* sp. (Orthoptera: Gryllidae), *P. pseudhannemania* Newell & Vercammen-Grandjean, 1964 collected from forest soil (off host), both from Africa (respectively from Zimbabwe and Angola), *Pteridopus treati* Saboori & Nemati, 2003, from soil (host unknown) and *P. alivaensis* Seiedy, Saboori & Hakimitabar, 2009, ectoparasitic on *Paradrymadusa* sp. (Orthoptera: Tettigoniidae) both from Asia, Iran (Newell and Vercammen-Grandjean 1964; Vercammen-Grandjean 1972; Saboori and Nemati 2003; Seiedy *et al.* 2009).

To date, six species of Chyzeriidae have been described or reported from Iran: *Gryllochyzeria hojjati* Saboori, Zhang & Nemati, 2005 – *Gryllotrombella afshari* Saboori, Nemati & Mossadegh, 2005 from the family Trombellidae mentioned incorrectly in Seiedy *et al.* (2009) – and *Ralphaudyna iranensis* Zhang & Saboori, 1995 (Ralphaudyninae), *Parawenhoekia aginapaica* (Haitlinger 1999), *Pteridopus alivaensis* Seiedy, Saboori & Hakimitabar, 2009, *Pt. treati* Saboori & Nemati, 2003 and *Perumaropta sibsuranensis* Haddadi & Noei, 2025 (Pteridopinae) (Haitlinger 1999; Zhang and Saboori 1995; Saboori and Nemati 2003; Saboori

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et al. 2005, 2008; Seiedy *et al.* 2009; Haddadi *et al.* 2025; Kiany *et al.* 2025; Sedghi *et al.* 2026). In the present study, *P. bonjarensis* Haddadi & Noei **sp. nov**., is described and illustrated from Sistan and Baluchestan Province, Iran.

MATERIAL AND METHODS

The specimens were collected by the ground tubular trap, pitfall trap and ramp trap in Zabol and Bonjar Counties, Sistan and Baluchestan Province, Iran. The traps were placed on the ground in unsprayed grape, apple, and plum orchards, where herbaceous cover was present at the base of the trees. The specimens found in the vials contained many different insects, hence, it was not possible to identify the true host of the larvae. The larval specimens were cleared in lactophenol, and mounted on microscope slides using Hoyer's medium (Walter and Krantz 2009). Illustrations were prepared using a BX51 Olympus microscope equipped with a drawing tube and magnification changer. Measurements (given in micrometers, µm) were taken using a CH30 Olympus microscope. Terminology and abbreviations follow Mąkol (2007), Wohltmann *et al.* (2007).

RESULTS

Systematics

Superfamily Trombidioidea

Epifamily Trombelloidae Thor, 1935

Family Chyzeriidae Womersley, 1954

Subfamily Pteridopinae* Southcott, 1987

Genus *Pteridopus* Newell & Vercammen-Grandjean, 1964

* Based on Mąkol and Wohltmann (2012). It is mentioned as Pteridopodinae in Southcott (1987) and Mayoral *et al.* (2018).

Type species: *Pteridopus auditor* Newell & Vercammen-Grandjean, 1964

Pteridopus bonjarensis Haddadi & Noei sp. nov. (Figs 1–16)

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Diagnosis

Scutum hexagonal, dorsal opisthosomal setal rows C and D each with three pairs of setae, seven normal setae on Ti III, Ti I 112–125, Ti III 122–132, Ge III 112–127, AL > PL, AP 67–80, AM 67–76, fD 28–32, fV 38–40.

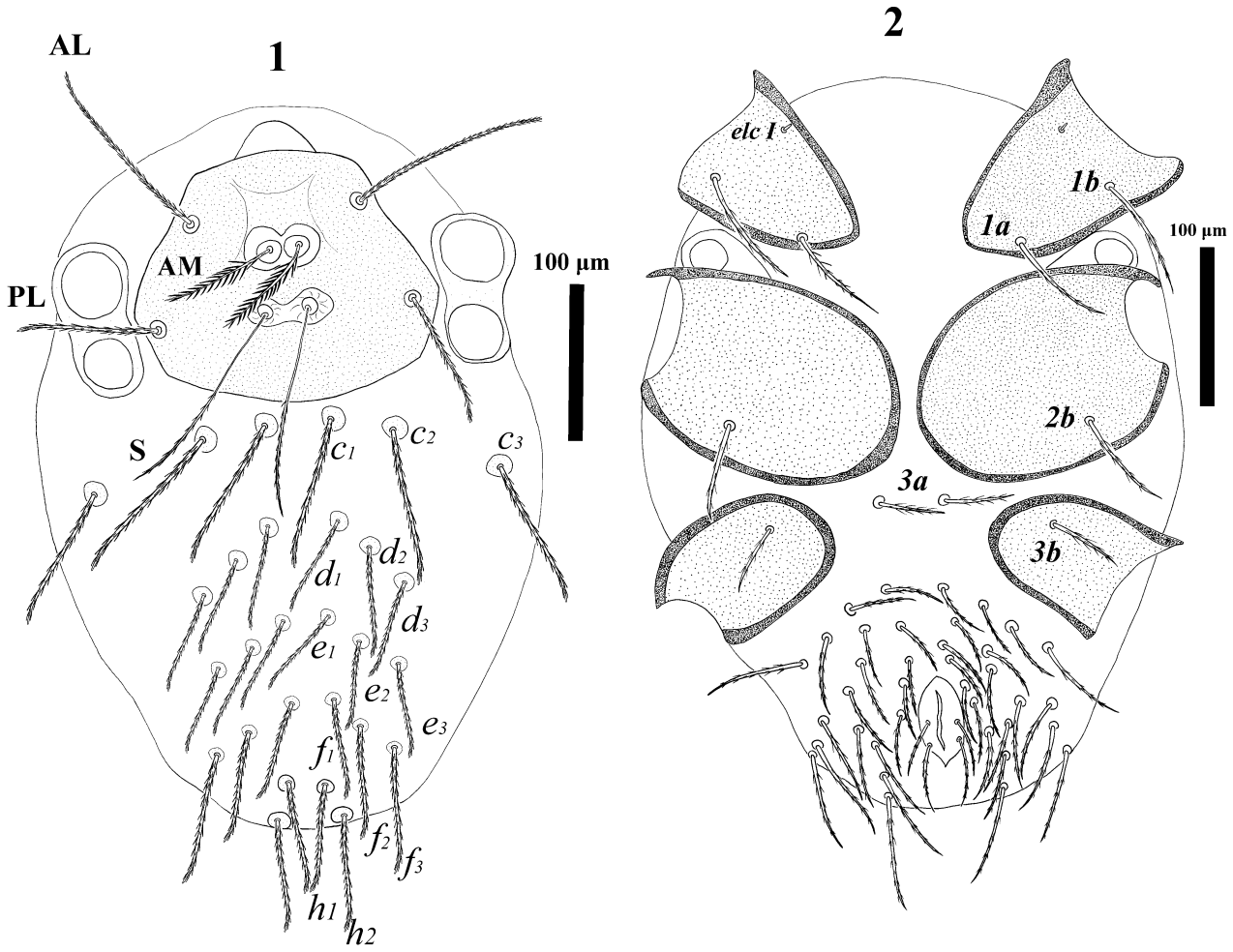
Description (n = 7)

Dorsum (Fig. 1) – Idiosoma 400–480 long and 310–350 wide; dorsal surface with 28–32 barbed setae arise from punctate circle plates, arranged in five rows ($c_{1\text{-}3}$-$d_{1\text{-}3}$-$e_{1\text{-}3}$-$f_{1\text{-}3}$-$h_{1\text{-}2}$), fD = 6-6-6-6-4= 28 in holotype (ARS-20260222-1a) and four paratypes (ARS-20260222-1b-1b, 1e, 1f, 1h), and 30 and 32 in two paratypes (ARS-20260222-1c, 1d, respectively; see Table 1). Scutum hexagonal and punctate, with a smooth naso and two pairs of normal setae (AL, PL); AL longer than PL, both barbed, and two pairs of sensilla (AM and S); AM shorter than S and with long setules; S with short barbs in the distal half. On each side of scutum two eye lenses situated posterolaterally on a common ocular plate, sparsely punctate (95–102 × 50–62), the anterior lens (45–52 diameter) larger than the posterior one (37–52 diameter).

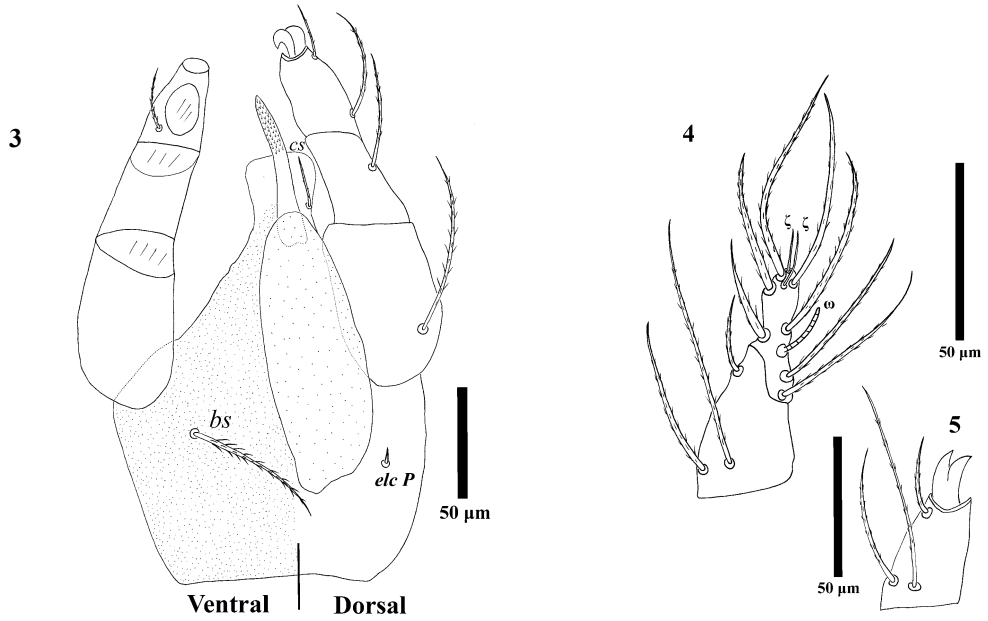
Venter (Fig. 2) – Idiosoma ventrally with 38 barbed setae behind coxae III in holotype and 32–39 in paratypes (fV = 32–39; see Table 1); one pair of barbed intercoxal setae (*3a*); coxa I with two barbed setae (*1a* and *1b*); coxa II and III each with one barbed seta (*2b* and *3b* respectively), (fn Cx 2-1-1); coxae I–III each punctate and all coxalae barbed. NDV = 28 + 38 = 66 in holotype and 62–67 in paratypes,. Supracoxal seta (*elc I*) peg-like, present (5–8 long). Claparède's organs between coxae I and II, circular. Anal plate 50–52 long, with two pairs of barbed setae on each side.

Gnathosoma (Figs 3–5) – Cheliceral bases sparsely punctate on the dorsal surface, 125–137 long; cheliceral blade straight, 62–72 long, with numerous small teeth. Subcapitulum with barbed galeala (*cs*)

(with minute barbs) and hypostomala (*bs*); palpfemur 75–90 and palpgenu 40–50 long, each with one barbed dorsal seta. Palptibia 37–45 with three barbed setae; palpal tibial claw bifurcate, 17–30 long; palptarsus 15–20 with seven barbed setae, two eupathidia and one solenidion; fPp = 0-B-B-BBB$_2$-7Bωζζ. Palp supracoxal setae (*elc P*) peg-like (5–8 long).

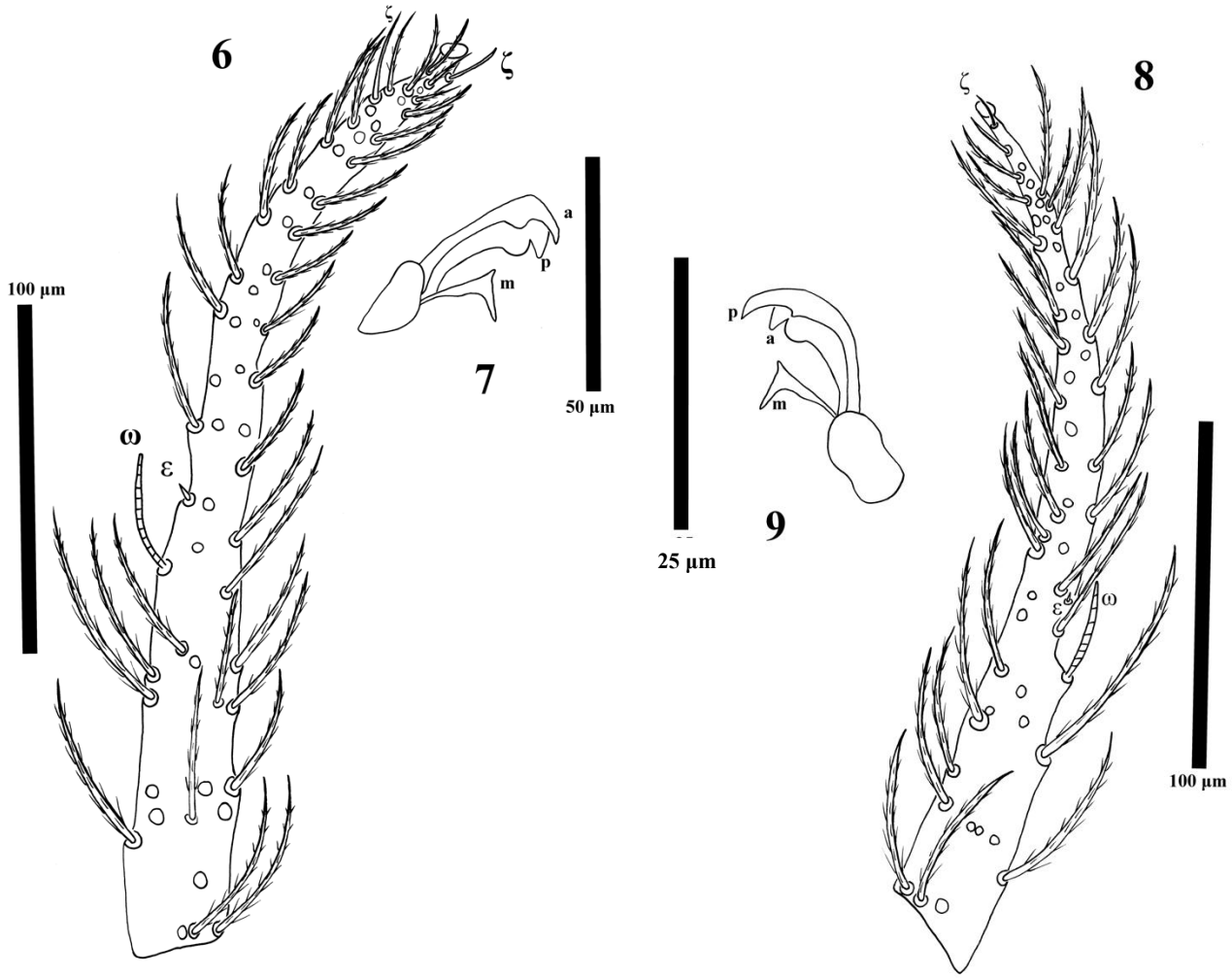


Figures 1–2. *Pteridopus bonjarensis* Haddadi & Noei **sp. nov.** (larva) – **1.** Dorsal view of idiosoma; **2.** Ventral view of idiosoma.



Figures 3–5. *Pteridopus bonjarensis* Haddadi & Noei **sp. nov.** (larva) – **3.** Gnathosoma, ventral (left) and dorsal (right) view; **4.** Details of palp tibia and palp tarsus; **5.** Palp tibia and palp tibial claw.

Legs (Figs 6–16) – Leg segmentation formula: 7-7-7; Leg setal formula: **Leg I**: Ta-1ω,1ε, 2ζ, 58/59n (54/-n in ARS-20260222-1c; 56/-n in ARS-20260222-1d; 57/-n in ARS-20260222-1b; 57/58n in ARS-20260222-1g; 58/-n in ARS-20260222-1e; 59/60n in ARS-20260222-1f); Ti- 2φ, 1κ, 8n; Ge- 1σ, 1κ, 4n; TFe- 5n; BFe- 1n; Tr-1n; Cx- 2n (Figs 2, 6–7, 11–12). **Leg II**: Ta- 1ω, 1ε, 1ζ, 51/53n (50/-n in ARS-20260222-1d and 1g; 50/49n in ARS-20260222-1f; 52/52n in ARS-20260222-1c; 52/-n in ARS-20260222-1b; 56/-n in ARS-20260222-1e); Ti- 2φ, 8n; Ge- 1σ, 1κ, 4n; TFe- 4n; BFe- 2n; Tr- 1n; Cx- 1n (Figs 2, 8–9, 13–14). **Leg III**: Ta- 58/59n (59/-n in ARS-20260222-1b; 59/59n in ARS-20260222-1c; 57/60n in ARS-20260222-1d; -/57n in ARS-20260222-1e; 61/58n in ARS-20260222-1f; -/57n in ARS-20260222-1g); Ti- 1φ,7n; Ge- 1σ, 4n; TFe- 4n; BFe- 2n; Tr- 1n; Cx- 1n (Figs 2, 10, 15–16). There are two and 14 (in holotype and paratypes) bipectinate setae on the Ti and Ta III, respectively. All leg tarsi terminated with two claws and a r-shaped empodium. Anterior and posterior claws with a single ventral protrusion. Measurements are given in Table 1.



Figures 6–9. *Pteridopus bonjarensis* Haddadi & Noei **sp. nov.** (larva) – **6.** Ta I; **7.** Pretarsus I; **8.** Ta II; **9.** Pretarsus II.

Material examined

The holotype (ARS-20260222-1a) was collected by M. Haddadi, on 4 May 2023, IRAN: Sistan and Baluchestan Province (Southeast Iran), Zabol County, 31°02'12"N, 61°32'14"E, 480 m a.s.l.; six paratype larvae (ARS-20260222-1b, 1c, 1d, 1e, 1f, 1g), same data except 8 and 11 May 2025, Bonjar County, 31°03' 24.5"N, 61°34'43.0"E, 480 m a.s.l. coll. Masoumeh Enayatnia.

Type deposition

The holotype (ARS-20260222-1a) and four paratype larvae (ARS-20260222-1b, 1c, 1d, 1e) are

deposited in the Acarological Collection, Zoological Museum, Faculty of Agriculture, University of Tehran, Karaj, Iran, and two paratypes (ARS-20260222-1f, 1g) are deposited in the collection of the Department of Plant Protection, Faculty of Agriculture, University of Zabol, Zabol, Iran (DPPZ).

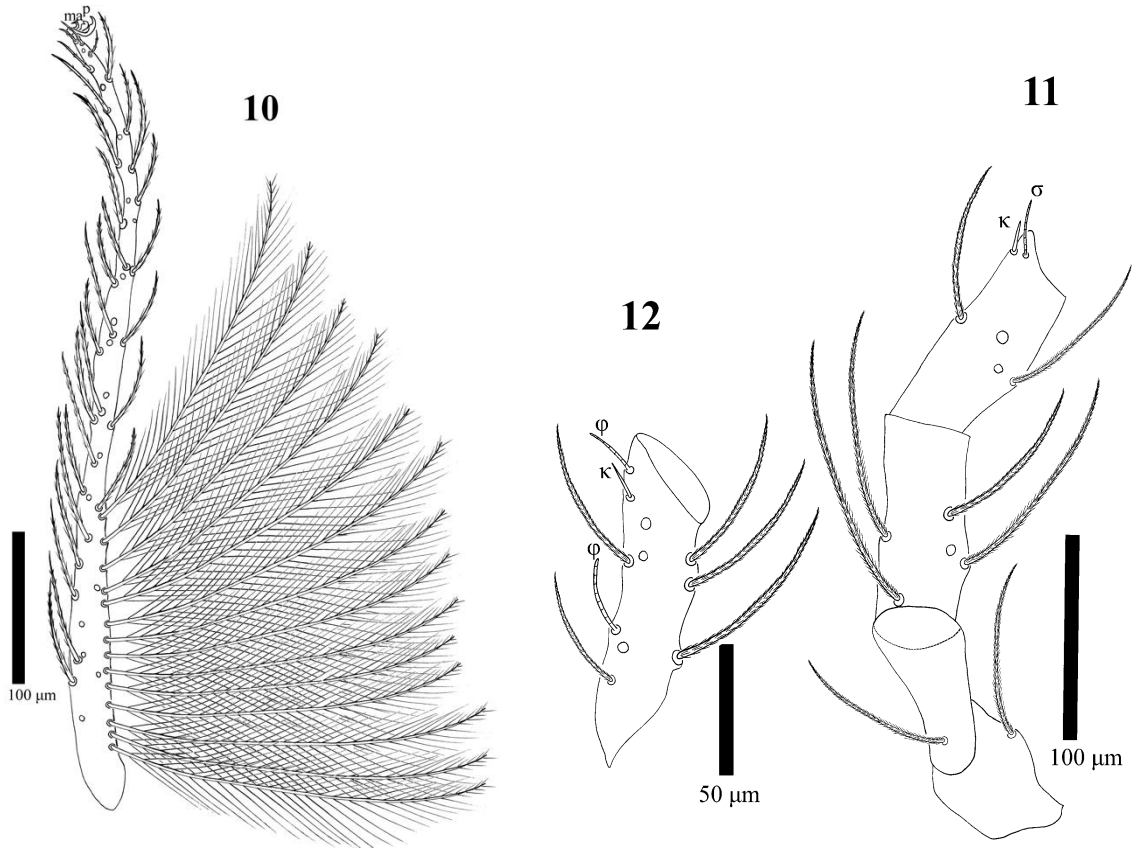
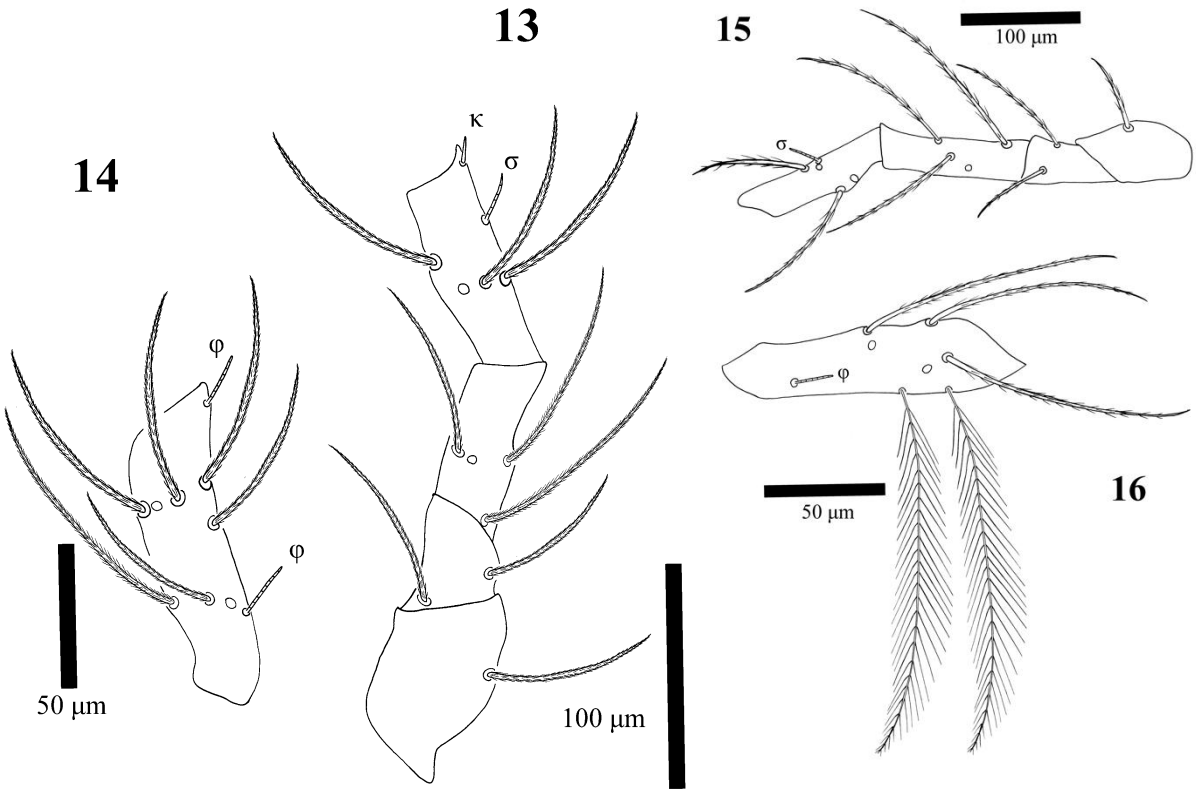


Figure 10–12. *Pteridopus bonjarensis* Haddadi & Noei **sp. nov.** (larva) – **10.** Ta III; **11.** Tr–Ge I; **12.** Ti I.



Figures 13–16. *Pteridopus bonjarensis* Haddadi & Noei **sp. nov.** (larva) – **13.** Tr–Ge II; **14.** Ti II; **15.** Tr–Ge III; **16.** Ti III.

Figures 17. Photograph of dorsal scutum (holotype) of *Pteridopus alivaensis* Seiedy*et al.*, 2009.

Table 1. Metric and some meristic data of *Pteridopus bonjarensis* Haddadi & Noei **sp. nov.** (larva). 1a, holotype; 1b–1g, paratypes.

Characters	1a	1b	1c	1d	1e	1f	1g	Range
IL	450	480	450	410	440	400	430	400–480
IW	340	350	340	310	340	320	320	310–350
AL	129	132	127	127	130	125	125	125–132
PL	92	92	100	92	100	87	95	87–100
ISD	40	42	42	40	40	37	42	37–42
MA	50	50	50	45	50	47	47	45–50
AW	110	112	112	100	100	105	110	100–112
PW	162	167	175	175	167	165	170	162–175
ASBa	80	77	75	72	75	77	77	72–80
ASBp	117	120	120	112	115	117	125	112–125
PSBa	92	95	105	100	100	95	102	92–105
PSBp	55	50	60	57	57	70	60	50–70
SD (including naso)	172	172	177	175	175	175	180	172–180
Naso	17	17	15	17	17	17	22	15–22
W	197	212	200	187	187	200	187	187–212
AP	72	75	80	75	75	75	75	72–80
AM	76	69	70	75	75	67	67	67–76
S	139	138	137	137	135	138	138	135–139
AA	17	22	20	20	17	20	17	17–22
SB	30	22	30	20	25	22	30	20–30

Table 1. Continued.

Characters	1a	1b	1c	1d	1e	1f	1g	Range
DS min.	62	62	62	70	65	62	65	62–70
DS max.	100	102	117	120	100	100	100	100–120
PDS	73	77	87	87	77	75	77	73–87
***cs* (*or*)**	45	45	45	42	45	42	42	42–45
bs	69	70	70	65	65	62	70	62–70
1a	50	65	62	65	62	62	57	50–65
1b	75	77	75	75	70	77	75	70–77
2b	62	57	62	62	62	57	57	57–62
3a	47	50	50	40	40	-	42	40–50
3b	47	40	50	50	45	40	42	40–50
GL	210	200	212	212	212	200	212	200–212
PaScFed	85	90	90	82	90	80	80	80–90
PaScGed	63	63	65	62	62	62	60	60–65
elc I	5	5	5	5	5	5	5	5
elc P	5	8	5	8	5	8	5	5–8
Ta I (L)	287	290	287	287	287	270	275	270–290
Ta I (H)	27	25	25	25	30	30	30	25–30
Ti I	125	125	125	125	120	120	125	120–125
Ge I	110	117	112	112	117	112	112	110–117
TFe I	107	112	107	112	115	112	105	105–115
BFe I	75	72	82	87	77	75	87	72–87
Tr I	62	67	75	62	62	75	75	62–75
Cx I	120	125	125	125	125	125	125	120–125
Leg I	886	908	913	910	903	889	904	886–913
Ta II (L)	260	260	260	272	262	250	250	250–272
Ta II (H)	25	25	25	25	27	27	25	25–27
Ti II	112	112	105	102	115	107	112	102–115
Ge II	100	100	90	100	107	100	102	90–107
TFe II	85	82	75	75	87	95	90	75–95
Bfe II	52	55	72	52	62	62	75	52–75
Tr II	70	75	87	87	80	82	85	70–87
Cx II	155	185	175	185	175	162	175	155–185
Leg II	834	869	864	873	888	858	889	834–889
Ta III (L)	500	517	515	500	507	512	512	500–517
Ta III (H)	22	20	25	25	27	25	25	20–27
Ti III	122	130	125	132	125	125	125	122–132
Ge III	112	125	127	127	125	127	125	112–127
TFe III	122	132	135	127	137	125	135	122–137
BFe III	75	87	90	100	87	92	92	75–100
Tr III	80	75	97	90	82	90	87	75–97
Cx III	102	110	125	112	100	117	127	100–127
Leg III	1113	1176	1214	1188	1163	1188	1203	1113–1214
IP	2838	2953	2991	2966	2954	2935	2996	2838–2996
Ocular plate	100	95	102	100	100	97	100	95–102
Anterior lens	52	47	45	47	52	47	50	45–52
Posterior lens	42	42	37	42	40	40	40	37–42
Palpfemur	75	82	90	87	87	90	90	75–90
Palpgenu	40	40	42	42	50	50	47	40–50

Table 1. Continued.

Characters	1a	1b	1c	1d	1e	1f	1g	Range
Palptibia	37	40	40	37	40	40	40	37–40
Palptarsus	17	15	15	15	15	20	17	15–20
Palp tibial claw	17	30	22	22	22	25	25	17–30
Cheliceral blade	62	70	67	67	72	67	62	62–72
Cheliceral base	137	125	125	137	125	125	125	125–137
Anal plate	50	50	50	50	52	50	50	50–52
fD	28	28	32	30	28	28	28	28–32
fV	38	39	32	32	34	36	~36	32–39
NDV	66	67	64	62	62	64	~64	62–67

Etymology

The specific epithet is derived from the type locality, Bonjar, Sistan and Baluchestan Province, Iran.

DISCUSSION

Based on the diagnostic characters provided by Mayoral *et al.* (2018), the new species is assigned to the genus *Pteridopus*: setae on the coxal fields of legs I–III setaform; Ta III with 11–16 (14 setae in our specimens) long pectinate setae; Ti III with two long pectinate setae; prodorsal AL *(ve)* setae much longer than distance between the bases of the AL and PL (*sce)* setae.

The genus *Pteridopus* is currently restricted to four larval species distributed in two biogeographic regions: *Pt. auditor* and *Pt. pseudhannemania* from the Afrotropical region (Africa: Zimbabwe and Angola, respectively) and *Pt. treati* and *Pt. alivaensis* from the Palearctic region (Asia: Iran). The known host range of *Pteridopus* species is limited to Orthoptera (Gryllidae and Tettigoniidae) (Newell and Vercammen-Grandjean 1964; Saboori and Nemati 2003; Seiedy *et al.* 2009). *Pteridopus bonjarensis* Haddadi & Noei **sp. nov.** is most similar to *Pt. pseudhannemania* based on the shared key characters, anterolateral (*ve*: AL) setae being longer than posterolateral (*sce*: PL) setae. However, it differs from *Pt. pseudhannemania* in the following characters: shape of the scutum (hexagonal vs. trapezoidal in *Pt. pseudhannemania*), shorter AL (125–132 vs. 176); longer PL (87–100 vs. 68), AM (67–76 vs. 51), ASBp (112–125 vs. 96), Ta III (500–517 vs. 463), IP (2838–2993 vs. 2456), and in the number of normal setae on Ti III (7n vs. 8n). The new species also differs from *Pt. treati* in nasus (present vs. absent); fD (28–32 vs. 48), in the number of setae in dorsal opisthosomal rows C and D (each with three pairs of setae vs. with six and five pairs of setae, respectively), in the longer Ti I (112–125 vs. 97), in the number of normal setae on Ti III (7n vs. 6n); in the number of bipectinate setae in Ta III (14 vs. 16), IP (2838–2996 vs. 2556). It differs from *Pt. alivaensis* in the shape of scutum (hexagonal vs. trapezoidal), the number of anal plate setae (2 pairs vs. 3 pairs), in the relative length of AL and PL setae (AL > PL vs. AL < PL), fD (28–32 vs. 37), fV (32–39 vs. 67), NDV (62–67 vs. 104), shorter Ti III (122–132 vs. 149), and Ge III (112–127 vs. 141), and in IP (2838–2993 vs. 3282–3344). Finally, the new species differs from *Pt. auditor* by the absence of the Lassenia-organ (absent vs. present), shape of nasus (small and rounded vs. prominent), shape of scutum (hexagonal vs. nearly rectangular), relative lengths of AL and PL setae (AL > PL vs. AL ≈ PL), longer AM (67–76 vs. 43–48), AL (125–132 vs. 35–38), PL (87–100 vs. 79–83), and S (135–139 vs. 63–68); shorter naso (15–22 vs. 24–32), diameter of the opisthosomal c_3 sclerite (subequal to other sclerites vs. larger than other sclerites), fD (28–32 vs. 37–38), fV (32–39 vs. 59–62) and NDV (62–67 vs. 96–98).

Key to world species of larval *Pteridopus* [adapted from Mayoral *et al.* 2018]

1. Naso present; dorsal opisthosomal setal rows C and D each with three pairs of setae; dorsal opisthosoma with less than 40 setae 2
– Naso absent; dorsal opisthosomal setal rows C and D with six and five pairs of setae, respectively; opisthosoma with more than 45 setae ..... *P. treati* Saboori & Nemati, 2003 [Iran]
2. Naso small and rounded; the diameter of opisthosomal c_3 sclerite subequal to that of other sclerites 3

– Naso prominent; the diameter of opisthosomal c_3 sclerite larger than that of the other sclerites .... *P. auditor* Newell & Vercammen-Grandjean, 1964 [Zimbabwe]

3. Prodorsal sclerite with anterolateral (*ve*: AL) setae longer than posterolateral (*sce*: PL); prodorsal sclerite and coxal fields punctate 4

– Anterolateral (*ve*) and posterolateral (*sce*) prodorsal setae subequal (Fig. 17); prodorsal sclerite punctate and reticulate; coxal fields punctate and partially reticulate .... *P. alivaensis* Seiedy, Saboori & Hakimitabar, 2009 [Iran]

4. Scutum trapezoidal, eight normal setae on Ti III, AL 176, PL 68, AM 51, IP 2456 .... *P. pseudhannemania* Newell & Vercammen-Grandjean, 1964 [Angola]

– Scutum hexagonal, seven normal setae on Ti III, AL 125–132, PL 87–100, AM 67–76, IP 2838–2996 ..... *P. bonjarensis* Haddadi & Noei **sp. nov.** [Iran]

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توصیف گونهٔ جدیدی از جنس *Pteridopus* (Trombidiformes: Chyzeriidae) از جنوب شرق ایران

ملیحه حدادی[۱] | سارا رامرودی*[۱] | جواد نوعی[۲] | احسان رخشانی[۱]

۱. گروه گیاهپزشکی، دانشکدهٔ کشاورزی، دانشگاه زابل، زابل، ایران؛ رایانامه‌ها: *malihe.haddadi2211@gmail.com*، *sara.ramroodi@gmail.com/ sararamroodi@uoz.ac.ir*، *rakhshani@uoz.ac.ir*

۲. گروه گیاهپزشکی، دانشکدهٔ کشاورزی، دانشگاه بیرجند، بیرجند، ایران؛ رایانامه: *noei.javad@birjand.ac.ir*

***نویسندهٔ مسئول**

✉ *sara.ramroodi@gmail.com*

دریافت
۳۰ اردیبهشت ۱۴۰۵
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دبیر تخصصی
ع. صبوری

چکیده

گونه جدیدی از جنس *Pteridopus* Newell & Vercammen-Grandjean, 1964 با نام علمی *P. bonjarensis* Haddadi & Noei **sp. nov.** از شهرستان‌های زابل و بنجار، استان سیستان و بلوچستان، ایران توصیف و ترسیم شده است. این گونه، پنجمین گونهٔ ار مرحله لارو شناخته شده از جنس مذکور در جهان و سومین گونهٔ ثبت شده از ایران است. کلید به روز شده کل گونه های این جنس نیز ارایه شده است.

واژگان کلیدی: کنه‌ها، لارو، پیش‌سُفتیان، Pteridopinae، سیستان و بلوچستان، تله

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