Description of a new vagrant Aceria species (Acari: Eriophyidae) on Artemisia scoparia Waldst. & Kit (Asteraceae) in northwest Iran and a key to the world species associated with Artemisia spp.

Arash Honarmand
Azarbaijan Shahid Madani University
Parisa Lotfollahi (prslotfollahy@yahoo.com)
Azarbaijan Shahid Madani University https://orcid.org/0000-0003-3139-8149
Zahra Hashemi–Khabir
Agriculture and natural resources research and education center
Syamak Hanifeh
agriculture and natural resources research and education center
Xiao–Feng Xue
Nanjing Agricultural University

Research Article

Keywords: habitus, host plant, polyvinyl alcohol, survey, West Azerbaijan

Posted Date: February 12th, 2024

DOI: https://doi.org/10.21203/rs.3.rs-3902976/v1

Abstract

To fill the gap of eriophyoid mites in Iran, a field survey was carried out in northwest Iran (Aras dam lake, West Azerbaijan Province), on summer 2022. As a result of which one new vagrant *Aceria* species (Acari: Eriophyoidea: Eriophyidae) associated with *Artemisia scoparia* Waldst. & Kit. (Asteraceae) was discovered. The new species is illustrated and described herein as *Aceria artemiparia* **sp. nov.**. The specific epithet *artemiparia*, is a combination of first six letters of the genus name and five last letters of species name of the host plant. No apparent symptom was observed on the host. This is the second report of an eriophyid mite species associated to *Artemisia scoparia* host plant. *Aceria artemiparia* **sp. nov.** is unique among 23 *Aceria* spp. associated with *Artemisia* species plants by having a smooth prodorsal shield and 8–rayed empodium. Furthermore, we provided a checklist and morphological keys of eriophyoid mites associated with *Artemisia* spp. of the world.

Introduction

The genus *Artemisia* L., commonly known as wormwood, comprises 478 valid species belonging to the Asteraceae (Compositae) family (POWO (2024)). *Artemisia* species are mainly hairy shrubs distributed mostly in the Northern Hemisphere, with some species also found in the Southern Hemisphere. The origin of Northern Hemisphere species can be tracked back to Western and Central Asia, and they have been introduced to South America and Australia. Many *Artemisia* species possess diverse and extensive medicinal properties and are used in both folk remedies and the pharmaceutical industry (Iram et al. 2019). In Iran, thirty-four valid species of this genus are found; their distribution patterns are influenced by various factors such as climatic conditions and altitude (Shahrivari et al. 2022). *Artemisia scoparia* Waldst. & Kit. is a perennial and aromatic medicinal plant that grows in various regions of Asia and Central Europe, including China, India, Iran, Japan, Korea, Pakistan, and Saudi Arabia (Ding et al. 2021).

Up to now, 32 eriophyoid mite species (Acari: Eriophyoidea) have been reported infesting *Artemisia* spp. around the world (Amrine and de Lillo unpublished databases). We provide their type host plant species and relationship to hosts in Table 1. Among these species, only six were reported in Iran: *Paraphytoptus paradoxus* Nalepa, 1896, *Aceria artemisiae* (Canestrini, 1891), *Aceria gallartae* Honarmand, Sadeghi–Namaghi and de Lillo, 2020, *Aceria alghoorii* Honarmand, Sadeghi–Namaghi and de Lillo, 2020, and *Aceria khaniensis* Honarmand, Sadeghi–Namaghi and de Lillo, 2020, *Aceria jolfae* Lotfollahi, 2024 (Kamali 2011; Gol et al. 2019; Honarmand et al. 2020; Lotfollahi and Masoudi-Rad, 2024).

To fill the gap of eriophyoid mites in Iran, a survey was carried out in West Azerbaijan Province on summer 2022 as a result of which a new species was discovered and described.

Table 1
List of eriophyoid mites associated with *Artemisia* spp. around the world.

Type host plant	Species	Relationship to hosts (Amrine and de Lillo unpublished database)
A. absinthium L.	*Aceria absinthii* (Liro, 1943)	Vagrant
	Phyllocoptes tenuirostris (Nalepa, 1896)	Leaf deformation, rust
	Paraphytoptus paradoxus Nalepa, 1896	Vagrant
A. arborescens (Vaill.) L.	*Aceria affinis* (Nalepa, 1900)	Leaf blisters
	Paraphytoptus septemscutatus Nalepa, 1900	Galls
A. argyi H.Lév. & Vaniot	*Aceria kunminensis* Kuang and Hong, 1991	Galls on leaves
	Epitrimerus argyris Xue, Song and Hong, 2007	Vagrant
A. californica Less.	*Aceria paracalifornicus* (Keifer, 1939)	Leaf erineum
	Aceria trifila Keifer, 1965	Inhabiting the growing tips
	Paraphytoptus californicus (Hall, 1910)	Vagrant
A. campestris L.	*Aceria artemisiaecampestris* Liro, 1943	Leaf rolling
	Aceria subtilis (Nalepa, 1892)	Thickened flower heads, shoot apex deformation
A. alba Turra.	*Aceria tingens* (Nalepa, 1917)	Flower deformation, red–violet coloration of blooms
A. douglasiana Besser ex Besser	*Aceria abalis* (Keifer, 1940)	Hairy pockets on the lower leaf surface, deform terminal leaves in heavy infestations
	Aceria douglasiana Wilson and Oldfield, 1966	Vagrant
	Aceria neoartemisiae (Keifer, 1938)	Erineum pockets on lower leaf surfaces (growth distortion and clustering of flowers and buds on *A. frigida* Willd.)
	Calepitrimerus cariniferus Keifer, 1938	Vagrant
A. dracunculus L.	*Aceria dracunculi* (Keifer, 1939)	Severely stunted and thickened shoots, resulting in a ball–like structure of aborted leaves and flowers

Type host plant	Species	Relationship to hosts (Amrine and de Lillo unpublished database)
A. feddei H.Lév. & Vaniot	*Heterotergum artemisiae* Hong and Kuang, 1989	Vagrant
A. furcate M. Bieb.	*Paraphytoptus inaequalis* Keifer, 1938	Vagrant
A. pontica L.	*Aceria pontica* (Nalepa, 1917)	White felt hairiness, knot–like leaf galls
A. pycnocephala (Less.) DC.	*Aceria pycnocephalae* Keifer, 1955	Vagrant
A. sieberi Besser	*Aceria gallartae* Honarmand, Sadeghi–Namaghi and de Lillo 2020	Witches' broom composed of the slender leaves with hypertrichosis and quite shortened internode
A. tridentata Nutt.	*Aceria oreadis* Keifer, 1966	Inhabiting buds and leaf bases.
	Aceria portalis Keifer, 1965	Inhabiting leaf and bud hairs.
	Paraphytoptus artemisiae Wilson, 1959	Vagrant
A. vulgaris L.	*Aceria artemisiae* (Canestrini, 1891)	Galls
	Aceria horrida (Nalepa, 1917)	Galls, flower head swollen, staying complete, the flower spoiled
	Aceria marginemvolvens (Corti, 1910)	Leaf rolling
A. tournefortiana Rchb.	*Aceria khaniensis* Honarmand, Sadeghi–Namaghi and de Lillo 2020	Vagrant
A. scoparia Waldst. & Kitam.	*Aceria alghoorii* Honarmand, Sadeghi–Namaghi and de Lillo 2020	Vagrant
	Aceria artemiparia **sp. nov.**	Vagrant
A. fragrans Willd.	*Aceria jolfae* Lotfollahi, 2024	Vagrant

Material and methods

The host plant samples were collected from northwest Iran (West Azerbaijan) from 2021 to 2022 in early summer by fourth author. The leaves were transferred to bottle (60cc) with Ethanol alcohol (70%). Specimens were extract from the sediments obtained under a dissecting stereomicroscope directly.

Ethanol alcohol (70%) was used as the preservative medium (Krantz and Walter 2009). The obtained specimens were cleared in lactic acid for 5 to 10 minutes (modified method) in an oven at 70°C, then were mounted with Heinze PVA (polyvinyl alcohol) medium (Evans 1992). Setal notation and terminology were followed Lindquist (1996). Olympus BX53 Phase Contrast microscope was used for morphological measurements based Amrine and Manson (1996) as modified by de Lillo et al. (2010). In the female description, the holotype measurements are followed by range values of the studied population (i.e. holotype and paratypes) set between parentheses; only the range values are given for males. The mean values of the paratypes are reported in a few cases when measurements of the holotype could not be taken, due to the slide mounting position of the specimens; these are marked by an asterisk (*). Line drawings were drawn using a camera lucida based on de Lillo et al. (2010) and abbreviations follow Amrine et al. (2003). Drawings were edited with Adobe Photoshop® CC 2017 software. Host plant names and their synonymies are in accordance with "*The World Flora Online*" (2024). All paratypes and holotype of new species are deposited at the Acarology Laboratory, Department of Plant Protection, Faculty of Agriculture, Azarbaijan Shahid Madani University, Iran. All paratypes and holotypes of the new species are deposited at the Acarology Laboratory, Department of Plant Protection, Faculty of Agriculture, Azarbaijan Shahid Madani University (Iran) except one paratype of each species which are deposited in the Acarological Collection, Jalal Afshar Zoological Museum (JAZM), Faculty of Agriculture, University of Tehran, Karaj, Iran.

Results

Family Eriophyidae Nalepa

Subfamily Eriophyinae Nalepa

Tribe Aceriini Amrine *et* Stasny

Genus *Aceria* Keifer

*Aceria artemiparia*sp. nov. Fig. 1

Description

FEMALE: (measured specimens n = 10) Body vermiform, 160 (150–180, including gnathosoma), 35* (35–45) wide, 41 (40–42) thick. **Gnathosoma** 17(17–20) projecting obliquely downwards, pedipalp coxal setae *ep* not detectable, dorsal pedipalp genual setae *d* 8 (7–9), unbranched, subapical pedipalp tarsal setae *v* 1 (no range), cheliceral stylets 14 (13–17). **Prodorsal shield** subtriangular21 (21–24), including frontal lobe, 32 (30–32) wide; with acuminated frontal lobe 2 (2–3) over gnathosomal base. Prodorsal shield smooth without any line, one pit located between scapular tubercles on the first dorsal semiannuli. Lateral side of prodorsal shield without ornamentations. Tubercles of scapular setae *sc* on rear shield margin, 19 (19–21) apart, scapular setae *sc* 31 (31–33), directed backward. **Leg I** 21 (21–23), femur 8 (7–9), genu 4 (3–5), tibia 4 (4–5), tarsus 6 (6–8), tarsal solenidion ω 7 (6–7), curved down, distally

rounded, empodium 8 (no range), simple, 8–rayed; basiventral femoral setae *bv* 11 (10–13), antaxial genual setae *l″* 28 (24–29), paraxial tibial setae *l′* 8 (7–9), paraxial fastigial tarsal setae *ft′* 16 (15–17), antaxial fastigial tarsal setae *ft″* 20 (20–25), paraxial unguinal tarsal setae *u′* 3 (3–4). **Leg II** 22 (22–23), femur 8 (7–9), genu 3 (3–4), tibia 3 (3–4), tarsus 6 (6–7), solenidion *ω* 8 (7–9), curved down, distally rounded, empodium 8 (7–8), simple, 8–rayed; femoral setae *bv* 12 (12–14), genual setae *l″* 11 (11–12), tarsal setae *ft′* 9 (7–9), setae *ft″* 23 (21–25), setae *u′* 3 (3–5). **Coxae** smooth; Anterolateral setae on coxisternum I(*1b*)7* (6–7), tubercles *1b* 5* (5–7) apart, proximal setae on coxisternum I (*1a*) 31 (27–31), tubercles *1a* 3* (3–4) apart, proximal setae on coxisternum II (*2a*) 44 (40–48), tubercles *2a* 17* (17–19) apart, prosternal apodeme 4* (4–6). **Opisthosoma** dorsally arched with 45 (44–49) dorsal semiannuli, with elliptical microtubercles close to the rear margin, and 42 (39–44) ventral semiannuli, with small elliptical microtubercles; 3 (3–5) semiannuli with fine microtubercles between coxae and genital coverflap; last 5 (5–6) ventral semiannuli of the opisthosoma with elongated microtubercles on the ventral side. Setae *c2* 25 (22–25), on ventral semiannulus 8 (6–8); setae *d* 76 (68–75), on ventral semiannulus 14 (13–18); setae *e* 39 (35–45), on ventral semiannulus 24 (23–26); setae *f* 43 (43–51), on ventral semiannulus 38 (38–43), 6 (6–7) annuli after setae *f*. Setae *h2* 99 (91–110), setae *h1* 3 (3–5). **External genitalia** 8 (8–10), 16 (15–17) wide, coverflap smooth and without striae, proximal setae on coxisternum III (*3a*) 65* (50–70), 9* (9–10) apart. **Internal genitalia**: Spermathecae ovoid, oriented posterolaterad; spermathecal tubes relatively short as long as 1/5 of spermathecae length; transverse genital apodeme subtrapezoidal, distally folded.

MALE (measured specimen n = 1). Body vermiform, 150 (including gnathosoma), 40 wide, 40 thick. **Gnathosoma** 10 projecting obliquely downwards, chelicerae 9, palp coxal setae *ep* absent, palp genual setae *d* 7, unbranched, palp tarsus setae *v* not detectable. **Prodorsal shield** 20, including frontal lobe, 30 wide, frontal lobe 1. Shield pattern similar to that of female, smooth. Tubercles of scapular setae *sc* on rear shield margin, 19 apart, setae *sc* 24. **Leg I** 21, femur 7, genu 3, tibia 3, tarsus 5, solenidion *ω* 5, curved down, distally rounded, empodium 5, simple, 8–rayed; femoral setae *bv* 9, genual setae *l″* 19, tibial setae *l′* 6, tarsal setae *ft′* 15, setae *ft″* 20. **Leg II** 18, femur 7, genu 4, tibia 2, tarsus 4, solenidion *ω* 5, curved down, distally rounded, empodium 5, simple, 8–rayed; femoral setae *bv* broken, genual setae *l″* 9, tarsal setae *ft′* 7, setae *ft″* 15. **Coxae** similar to those of female, smooth; setae *1b* 6, tubercles *1b* 7 apart, setae *1a* 22, tubercles *1a* 3 apart, setae *2a* 31, tubercles *2a* 17 apart. Prosternal apodeme 5. **Opisthosoma** dorsally arched with 42 dorsal semiannuli; 39 ventral semiannuli; 3 semiannuli between coxae and genital region. Setae *c2* 16 on ventral semiannulus 5, setae *d* 45 on ventral semiannulus 11; setae *e* 23 on ventral semiannulus 21; setae *f* 32 on ventral semiannulus 33, 5 annuli after setae *f*. Setae *h2* 37; setae *h1* 4; setae *3a* 40, 11 apart.

Type host plant

Artemisia scoparia Waldst. & Kit. (Asteraceae).

Relation to the host plant

No apparent symptom was observed.

Type locality

Aras dam lake, West Azerbaijan Province, Iran (39°03' 16 N 45°27' 07 E), 753 m above sea level,coll. S. Hanife, 10 July 2021.

Type material

Holotype: single female on a microscope slide (slide code: AH01–1); paratypes: 9 females (slide codes: AH01–1–2 to AH01–1–10) and one male (slide code: AH01–1–11) mounted on separate microscope slides.

Fig 1 Line drawings of *Aceria artemiparia***sp. nov.**: **AD**. Prodorsal shield; **AL**. Lateral view of anterior body region; **CG**. Female coxigenital region; **em**. Empodium; **GM.** Male genital region; **IG**. Internal female genitalia; **LO**. Lateral view of annuli; **L1**. Leg I; **PM**. Lateral view of posterior opisthosoma; **PV**. Ventral view of posterior opisthosoma; **Scale bar:** 10 μm for AD, AL, CG, IG, PM, PV; 5 μm for LO, L1; 2.5 μm for em.

Other material

Mites extracted from the same sample as the type specimens were preserved in part in 70% ethanol (Walter and Krantz 2009) (tube code: AH01–1–P).

Etymology

The specific epithet *artemiparia*, is a combination of first six letters of the genus name and five last letters of species name of the host plant.

Differential diagnosis

*Aceria artemiparia***sp. nov.** is unique among 23 *Aceria* spp. associated with *Artemisia* species plants by having a smooth prodorsal shield and 8–rayed empodium. Whereas in comparison with other *Aceria* species, it appears to be close to *Aceria tamaricis* (Trotter 1900) which was originally found on *Tamarix* sp.(Tamaricaceae) and re–described by Castagnoli (1992). Later, de Lillo and Sobhian, (1994) described and compared specimens obtained from France to Greece and Asia Minor. Prodorsal shield, female genital cover flap, and Coxae I and II in both species without lines and ornamentation, and both species have a pit in the center of the rear shield margin. Furthermore, they exhibit other resemblances that include opisthosoma anuuli number (44–45 in *Aceria. tamaricis* and 45 (44–49) in *Aceria artemiparia***sp. nov.**), Body length (125–190 in *Aceria tamaricis* and 150–180 in *Aceria artemiparia***sp. nov.**), Genital coverflap length (7–9 in *Aceria tamaricis* and 8 (8–10) in *Aceria artemiparia***sp. nov.**), frontal lobe (2 in *Aceria tamaricis* and 45 2 in *Aceria artemiparia***sp. nov.**) and shape of Internal genitalia. The new species is distinguishable by empodium rays number (7 in *Aceria tamaricis* and 8 in *Aceria artemiparia***sp. nov.**), Scapular setae *sc* (31–40 in *Aceria tamaricis* and 31 (31–33) in *Aceria artemiparia***sp. nov.**), *c2* (30–40 in *Aceria tamaricis* and 25 (22–25) in *Aceria artemiparia***sp. nov.**), *d* (35–55 in *Aceria tamaricis* and 76 (68–75) in *Aceria artemiparia***sp. nov.**), *e* (30–40 in *Aceria tamaricis* and 39 (35–45) in *Aceria artemiparia***sp.**

nov.), *f* (25–35 in *Aceria tamaricis* and 43 (43–51) in *Aceria artemiparia***sp. nov.**), *3a* (25–35 in *Aceria tamaricis* and 65 (50–70) in *Aceria artemiparia***sp. nov.**) and host plants.

The morphological keys of eriophyoid mites associated with *Artemisia* spp. of the world.

1. Setae *sc* ahead of rear prodorsal shield margin ……..... 2

– Setae *sc* on rear prodorsal shield margin ……... 4

2. Opistosoma without ridges and furrows, *sc* convergent forward, coxae smooth, median and admedian lines complete …… *Phyllocoptes tenuirostris* (Nalepa, 1896)

– Opistosoma with ridges and furrows ……. 3

3. Middorsal ridge ending in a broad furrow before termination of subdorsal ridges, setae *c2* 46 ……..
…….. *Calepitrimerus cariniferus* Keifer, 1938

– Middorsal ridge fading simultaneously with subdorsal ridges, setae *c2* 25–26 …….
…… *Epitrimerus argyris* Xue, Song and Hong, 2007

4. Opistosoma with broad dorsal semiannuli ……... 5

– Opistosoma without broad dorsal semiannuli …… *Aceria* spp. ……. 10

5. First 4 semiannuli posterior to shield margin narrow and next 9 semiannuli broad until the caudal annuli, submedian lines forked at ¼ anterior shield …….. ……
Heterotergum artemisiae Hong and Kuang, 1989

– Broad annuli at the posterior half of the opistosoma ……. *Paraphytoptus* spp. …… 6

6. Empodium 4–rays, coxae smooth …….... *P. artemisiae* Wilson, 1959

– Empodium 5 rays, coxae not smooth …… 7

7. *sc* length equal to prodorsal shield length ……. *P. californicus* Hall, 1910

– *sc* length one and half time the shield length ……... 8

8. One pair of submedian lines, genital cover flap smooth ……. *P. septemscutatus* Nalepa, 1900

– Two pair of submedian lines, genital cover flap with striae ……. 9

9. Opisthosoma with 23 dorsal semiannuli, shield median lines incomplete ……..
…….. *P. inaequalis* Keifer, 1939

– Opisthosoma with 34–41 (Gol *et al*., 2019) or 50–65 (Vidović *et al*., 2008) dorsal semiannuli, median line complete …….. *P. paradoxus* Nalepa, 1896

10. Prodorsal shield smooth, empodium 8–rayed ……. *Aceria artemiparia* **sp. nov.**

– Prodorsal shield ornamented with lines, empodium with less than 8 rays ……. 11

11. Empodium 3–rayed ……. *Aceria trifila* Keifer, 1965

– Empodiun with more than 3 rays ……12

12. Empodium 4–rayed ……. 13

– Empodium with more than 4 rays (5 or 6 rays) …… 19

13. Setae *sc* length equal to shield length …… 14

– Setae *sc* longer or shorter than the shield length ……. 15

14. Female genital coverflap smooth …….. *Aceria paracalifornicus* (Keifer, 1939)

– Female genital cover flap with 9 longitudinal striae …….. *Aceria dracunculi* Keifer 1939

15. Setae *sc* length equal to half of the shield length …….. *Aceria artemisiae* Canestrini, 1891

Note: Nalepa (1892 and1917) named four subspecies of *Aceria artemisiae* (*Aceria subtilis* (Nalepa, 1892), *Aceria tingens* (Nalepa, 1917), *Aceria pontica* (Nalepa, 1917) and *Aceria horrida* (Nalepa, 1917)). Their host plants and symptoms are mentioned by Nalepa, but their descriptions are insufficient. According to Amrine and de Lillo database probably they are not subspecies and are valid species.

– Setae *sc* longer than the shield length …… 16

16. Median line not reaching the anterior of the shield …… 17

– Median line reaching the anterior of the shield ……... 18

17. Opisthosoma with 55–60 dorsal semiannuli, setae *3a* 20–24, female genital coverflap with 12 longitudinal striae ……. *Aceria alghoorii* Honarmand, Sadeghi Namaghi and de Lillo 2020

– Opisthosoma with 70–75 dorsal semiannuli, setae *3a* 14, female genital coverflap with 6 longitudinal striae …… *Aceria neoartemisiae* Keifer, 1938

18. Opistosoma with 79 dorsal semianulli …… *Aceria absinthii* Liro, 1943

– Opistosoma with 56 dorsal semianulli …… *Aceria affinis* Nalepa, 1900

19. Median, admedian and Inner submedian lines with equal length …… 20

– Inner submedian lines distinctly shorter than admedian lines …… 24

20. Prodorsal shield with one pair of submedian lines, numerous short lines on shield lateral sides … ……. *Aceria kunminensis* Kuang and Hong, 1991

– Prodorsal shield with two pair of submedian lines ……21

21.Outer submedian lines present at anterior 4/5 of the shield ……. 22

– Outer submedian lines absent and replaced with dashes or transverse lines …… 23

23. Prodorsal shield with distinct median, admedian and inner submedian lines, setae *sc* 50 long, empodium 5-rayed …….. *Aceria marginemvolvens* Corti, 1910

– Prodorsal shield with faint median, admedian and inner submedian lines, setae *sc* 40–43 long, empodium 6-rayed ……. *Aceria jolfae* Lotfollahi, 2024

23. Outer submedian lines replaced with two oblique transverse lines ……. ……. *Aceria artemisiaecampestris* Liro, 1943

–Some long and short dashes between inner submedian lines and lateral margin of shield …… ……. *Aceria gallartae* Honarmand, Sadeghi Namaghi and de Lillo, 2020

24. Setae *sc* shorter than the shield, equal with half of the shield ……. ……. *Aceria douglasiana* Wilson and Oldfield, 1966

– Setae *sc* longer than the shield ……. 25

25. Setae *sc* shorter than 40 ……26

– Setae *sc* longer than 40 ……27

26. Opisthosoma with 57–62 dorsal semiannuli, setae *sc* 32 …… *Aceria oreadis* Keifer, 1966

– Opisthosoma with 80–85 dorsal semiannuli, setae *sc* 35 …… *Aceria pycnocephalae* Keifer, 1955

27. Setae *3a* 22–24 …… *Aceria khaniensis* Honarmand, Sadeghi Namaghi & de Lillo, 2020

– Setae *3a* shorter than 20 …… 28

28. Opisthosoma with 75 dorsal semiannuli, setae *3a* 18 …… *Aceria abalis* (Keifer, 1940)

– Opisthosoma with 66 dorsal semiannuli, setae *3a* shorter than 14 …… *Aceria portalis* Keifer, 1965

Declarations

Acknowledgments: This research was supported by Azarbaijan Shahid Madani University (Iran).

Funding: This research was funded by Iran National Science Foundation (4001458) and by the National Natural Science Foundation of China (32161143014).

Conflicts of Interest: The authors declare no conflict of interest.

Ethical approval: No approval of research ethics committees was required to accomplish the goals of this study because experimental work was conducted with an unregulated invertebrate species.

Informed consent: No Informed consent was required to accomplish the goals of this study because experimental work was conducted with an unregulated invertebrate species.

Author Contributions: Conceptualization, P.L.; methodology, P.L.; sampling, Z.H.-K. and S.H.; investigation, A.H., P.L. and X.-F.X.; writing—original draft preparation, A.H. and P.L.; writing—review and editing, A.H., P.L. and X.-F.X.; funding acquisition, P.L. All authors have read and agreed to the published version of the manuscript.

Data Availability Statement: Data are contained within the article.

References

1. Amrine JWJr, Manson DCM (1996) 1.6. 3 Preparation, mounting and descriptive study of eriophyoid mites. In: Lindquist EE, Sabelis, MW, Bruin, J (eds): Eriophyoid Mites – Their Biology, Natural Enemies and Control. World Crop Pests, vol. 6, Elsevier Science pp. 383–396. https://doi.org/10.1016/S1572-4379(96)80023-6
2. Amrine JWJr, Stasny TAH, Flechtmann CHW (2003) Revised Keys to World Genera of Eriophyoidea (Acari: Prostigmata). West Bloomfield, Michigan, USA, p 244
3. Canestrini G (1891) Nuove specie di fitoptidi. Bollettino della Società Entomologica Italiana 23:221–224
4. Castagnoli M (1992) Redescription of *Aceria tamaricis* (Trotter, 1901) (Acari, Eriophyidae). Redia 75(2): 446–452
5. Corti A (1910) Le Galle della Valtellina. Terzo contributo alla conoscenza della Cecidologia Valtellinese. Atti della Società. Italiana di Scienze Naturali e del Museo Civico di Storia Naturale di Milano 49:297–354
6. de Lillo E, Sobhian R (1994) Taxonomy, distribution, and host specificity of a gall–making mite, *Aceria tamaricis* (Trotter) (Acari: Eriophyoidea), associated with *Tamarix gallica* L. (Parietales: Tamaricaceae) in southern France. Entomologica 28:5–16. https://doi.org/10.15162/0425-1016/647
7. de Lillo E, Craemer C, Amrine JWJr, Nuzzaci G (2010) Recommended procedures and techniques for morphological studies of Eriophyoidea (Acari: Prostigmata). In: Ueckermann EA (ed) Eriophyoid

Mites: Progress and Prognoses. Springer, Dordrecht, pp 283–307. https://doi.org/10.1007/978-90-481–9562–6_15

8. Ding J, Wang L, He C, Zhao J, Si L, Huang H (2021) *Artemisia scoparia*: Traditional uses, active constituents and pharmacological effects. J Ethnopharmacol 273:113960. https://doi.org/10.1016/j.jep.2021.113960
9. Evans GO (1992) Principles of acarology. CAB International, Wallingford, xviii + 563 pp
10. Gol A, Sadeghi Namaghi H, de Lillo E (2019) A new species, a redescription of *Aceria lamii* (Liro, 1943) and two new records of eriophyoid mites (Acari: Trombidiformes: Eriophyoidea) on weeds in Golestan province, Iran. Systematic and Applied Acarology 24(2): 198–208. https://doi.org/10.11158/saa.24.2.3
11. Hall HVM (1910) A phytoptid gall on *Artemisia californica*. Pomona Coll J Entomol Zool 2:280–281
12. Honarmand A, Sadeghi Namaghi H, de Lillo E (2020) Three new *Aceria* spp. (Acari: Trombidiformes: Eriophyoidea) associated to *Artemisia* spp. (Compositae) from South Khorasan province, East Iran. Syst Appl Acarology 25(2):349–360. https://doi.org/10.11158/saa.25.2.11
13. Iram S, Hayat MQ, Tahir M, Gul A, Abdullah A, Ahmed I (2019) Chloroplast genome sequence of *Artemisia scoparia*: comparative analyses and screening of mutational hotspots. Plants 8(11):476 https://doi.org/10.3390/plants8110476
14. Kamali H (2011) Current knowledge on Eriophyoidea (Acari: Prostigmata) as biological control agent of weeds in Iran. First Persian Congress Acarology, 22–23 December, p. 72
15. Keifer HH (1938) Eriophyid studies II. Bull Department Agric Calif (27): 301–323
16. Keifer HH (1939) Eriophyid Studies V. Bulletin Department of Agriculture, California (28): 328–345
17. Keifer HH (1940) Eriophyid studies X. Bull Calif Department Agric 29(3):160–179
18. Keifer HH (1955) Eriophyd mites – notes and new species. (Acarina). Pan–Pacific Entomol 31(3):109–116
19. Keifer HH (1965) Eriophyid Studies B–15. Bureau of Entomology. Calif Department Agric 1–20
20. Keifer HH (1965) Eriophyid Studies B–16. Bureau of Entomology. Calif Department Agric 1–20
21. Keifer HH (1966) Eriophyid Studies B–17. Bureau of Entomology. Calif Department Agric 1–20
22. Kuang HY, Hong XY, Zhang JL (1991) Four new species and a new subspecies of the genus *Aceria* from China (Acari: Eriophyidae). Acta Zootaxonomica Sinica 16(3):297–303
23. Liro JI (1941) Über neue und seltene Eriophyiden (Acarina). Annales zoologici Societatis zoologicae–botanicae. Fennicae Vanamo 8(7):1–53
24. Liro JI (1943) Über neue oder sonst bemerkenswerte finnische Eriophyiden (Acarina). Annales zoologici Societatis zoologicae–botanicae. Fennicae Vanamo 9(3):1–50
25. Lotfollahi P, Masoudi-Rad S (2024) One new Aceria species (Acari: Eriophyoidea) from Jolfa, Iran. Persian Journal of Acarology. [accepted]
26. Nalepa A (1892) Les acarocécides de Lorraine (Suite). Feuille des jeunes naturalistes. Revue mensuelle d'histoire naturelle sér 3(258):1–8

27. Nalepa A (1896) Neue Gallmilben (13 Fort.). Anzeiger der Kaiserlichen Akademie Wissenschaften. Mathematische–naturwissenschaftliche Klasse Wien 33(10):108–110
28. Nalepa A (1896) *Paraphytoptus*, eine neue Phytoptiden Gattung. Anzeiger der kaiserlichen Akademie der Wissenschaften. Mathematische–Naturwissenschaftliche Klasse 33(7):55–56
29. Nalepa A (1900) Neue Gallmilben. (20 Fort.) Anzeiger der Kaiserlichen Akademie Wissenschaften. Mathematische–naturwissenschaftliche Klasse Wien 37(15):154–156
30. Nalepa A (1917) Neue Gallmilben. (34 Fort.) Anzeiger der Kaiserlichen Akademie Wissenschaften. Mathematische–naturwissenschaftliche Klasse Wien 54(12):151–153
31. Petanović R (1985) Studies on eriophyid mites (Acarida: Eriophyoidea) of Yugoslavia, I. Acta Entomologica Jugoslavica (21): 43–48
32. POWO (2024) Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Published on the Internet; http://www.plantsoftheworldonline.org/ Retrieved 22 January 2024
33. Shahrivari S, Alizadeh S, Ghassemi–Golezani K, Aryakia E (2022) A comprehensive study on essential oil compositions, antioxidant, anticholinesterase and antityrosinase activities of three Iranian *Artemisia* species. Sci Rep 12(1):7234. https://doi.org/10.1038/s41598-022-11375–6
34. WFO (2024) World Flora Online. Published on the Internet; http://www.worldfloraonline.org. Accessed on: 22 Jan 2024"
35. Trotter A (1901) Di una nuova specie d'acaro (Eriophyes) d'Asia minore produttore di galle su *Tamarix*. Atti R Ist Veneto Sci Lett Arti 60:953–955
36. Vidović B, Stojnić B, Petanović R (2008) Eriophyoid Mites: *Aceria absinthii* (Liro, 1943) and *Paraphytoptus paradoxus* Nalepa, 1896 (Acari: Eriophyoidea) on Wormwood, *Artemisia absinthium* L. Serbia – Supplement Descriptions Ann Zool 58(2):373–377. https://doi.org/10.3161/000345408X326690
37. Walter DE, Krantz GW (2009) Collecting, rearing, and preparing specimens. In: Krantz GW, Walter DE (eds) A Manual of Acarology, (3rd edn.). Lubbock, Texas Tech University Press 83–96
38. Wilson NS (1959) Eight new species of eriophyid mites. Ann Entomol Soc Am 52(2):141–149. https://doi.org/10.1093/aesa/52.2.141
39. Wilson NS, Oldfield GN (1966) New species of eriophyid mites from western North America, with a discussion of eriophyid mites on *Populus*. Ann Entomol Soc Am 59(3):585–599. https://doi.org/10.1093/aesa/59.3.585
40. Hong XY, Kuang HY (1989) Three new genera and seven new species of the subfamily Phyllocoptinae (Acari: Eriophyidae) from China. Int J Acarol 15(3):145–152. https://doi.org/10.1080/01647958908683840
41. Xue XF, Song ZW, Hong XY (2007) Seven new species of the genus *Epitrimerus* Nalepa (Acari: Eriophyidae: Phyllocoptinae) from China. Zootaxa 1406(1):1–15. https://doi.org/10.11646/zootaxa.1406.1.1

Figures

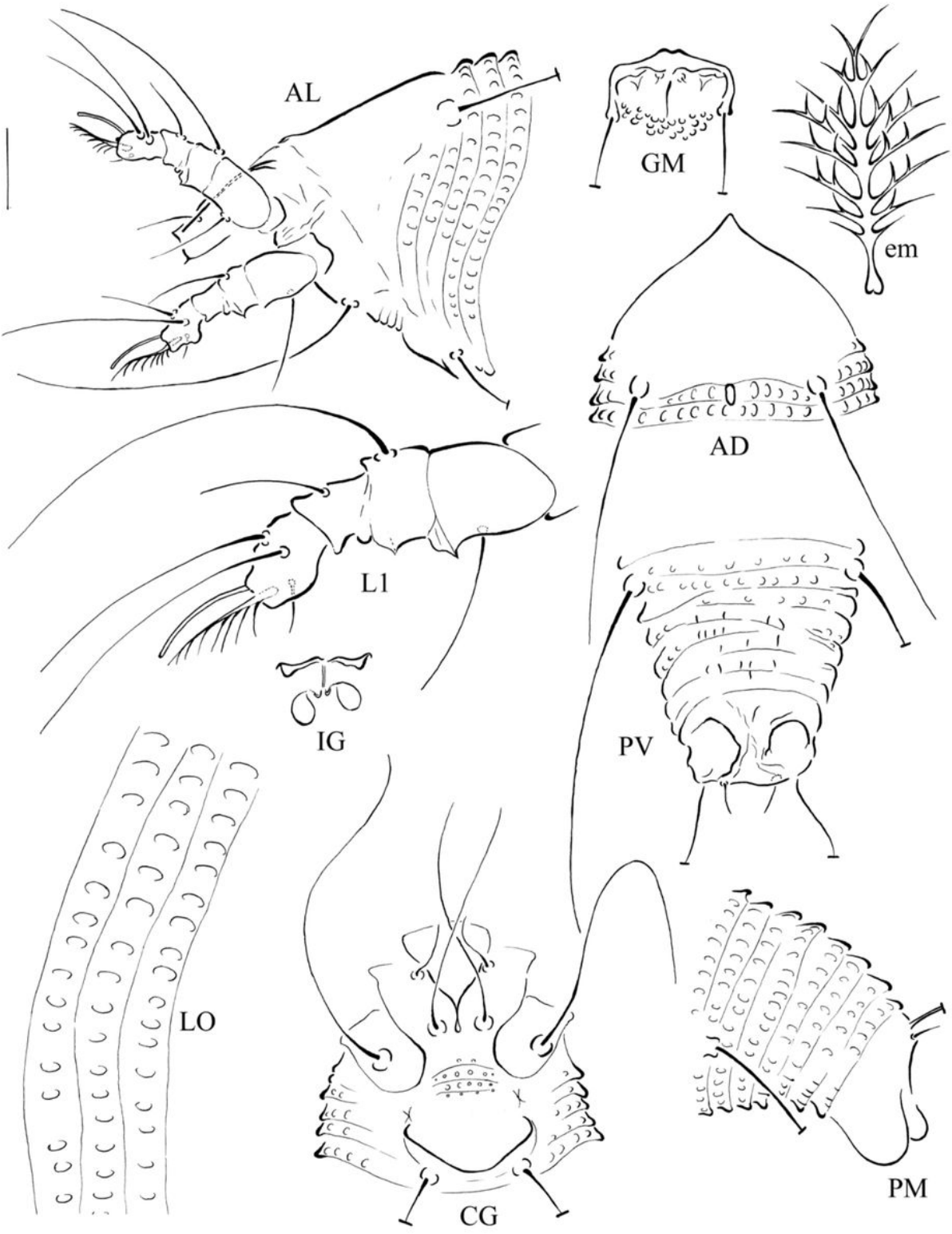

Figure 1

Line drawings of *Aceria artemiparia* **sp. nov.**: **AD**. Prodorsal shield; **AL**. Lateral view of anterior body region; **CG**. Female coxigenital region; **em**. Empodium; **GM.** Male genital region; **IG**. Internal female

genitalia; **LO**. Lateral view of annuli; **L1**. Leg I; **PM**. Lateral view of posterior opisthosoma; **PV**. Ventral view of posterior opisthosoma; **Scale bar:** 10 μm for AD, AL, CG, IG, PM, PV; 5 μm for LO, L1;2.5 μm for em.