



## *Aceria resedae* Lotfollahi sp. nov. (Acari: Eriophyidae) from Resedaceae in Iran

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**Abstract.** A new eriophyid species, *Aceria resedae* Lotfollahi sp. nov. was found on *Reseda luteola* L. (Resedaceae) during the survey of the eriophyoid mite fauna of Maku county, West Azerbaijan province, Iran, in the summer of 2020. This is the first eriophyoid species found on the plants of the family Resedaceae, herein described and illustrated.

**Keywords:** Maku, New record, Reseda, West Azerbaijan

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## Introduction

Genus *Reseda* L. is one of the eleven genera of the family Resedaceae. It is widely distributed in the Mediterranean and the Southwestern Asian areas (Dougan, 2001; Dogan *et al.*, 2008). About 14 *Reseda* species have been reported in Iran (Noori *et al.*, 2012). During this study, *R. luteola* L. was found in Maku region of West Azerbaijan province of Iran. This is a biennial or polycarpic perennial herbaceous plant that is known for its use in coloring food substrate, leather, and wood as well as natural fibers like wool, silk, cotton, and flax as major areas of application since ancient times (Shahid *et al.*, 2012). Until now more than 980 *Aceria* species have been found in the world, 118 of which were described from Iran. No eriophyoid mites were found from the plants of the family Resedaceae until now.

## Material and methods

In order to survey the eriophyoid mite fauna of Maku region, samplings were done on plants of family Resedaceae. Eriophyoid mites were recovered from the plant material by means of a modified washing method developed by Monfreda *et al.* (2007). The collected specimens were slide mounted according to Mehri-Heyran *et al.* (2020).

The terminology and the setal notation in the morphological description of the mite follow mainly Lindquist (1996). All morphological measurements were taken using an Olympus BX53 microscope, through a phase contrast 100x oil immersion objective at 1,000 magnification, according to Amrine & Manson (1996) as modified by de Lillo *et al.* (2010). Counting of dorsal, ventral, and coxigenital semiannuli follows Lotfollahi *et al.* (2020). Measurements and means are rounded off to the nearest integer when required, except for characters with very short lengths. Measurements are of the length of the morphological trait unless otherwise specified and are in micrometers (µm). 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

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and immature stages. The mean values of the paratypes are reported in a few cases and 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 hand-drawn through a *camera lucida* according to de Lillo *et al.* (2010). Abbreviations of schematic drawings in figures follow mainly Amrine *et al.* (2003). Plates were edited with Adobe Photoshop® CC 2017.

The genus classification follows Amrine *et al.* (2003) and comparisons were also made with new genera described since that publication.

Host plant names and their synonymies are in accordance with "The World Flora Online" (2023).

Type materials are deposited at the Acarology Laboratory, Department of Plant Protection, Faculty of Agriculture, Azarbaijan Shahid Madani University, Tabriz (Iran) except for one paratype which is 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

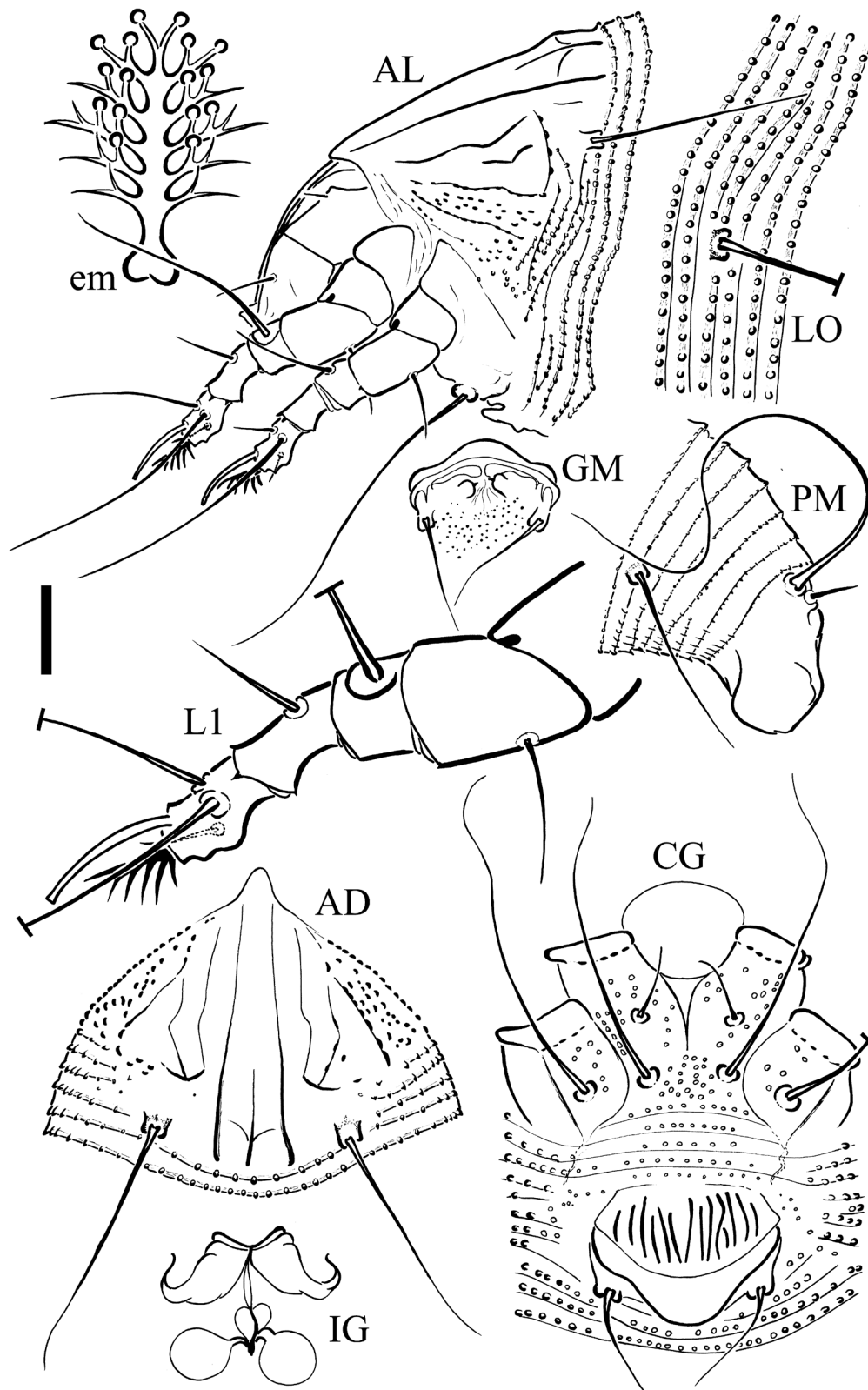
#### Tribe Aceriini Amrine & Stasny

#### Genus *Aceria* Keifer

#### *Aceria resedae* Lotfollahi sp. nov.

#### Description.

FEMALE (Fig. 1; measured specimens n = 8). **Body** vermiform, 285 (221–304, excluding gnathosoma), 62\* (58–66) thick, 48 (50–58) wide. **Gnathosoma** projecting obliquely downwards, cheliceral stylets 21 (21–27), palp 24 (20–28), palp coxal setae *ep* 3 (3–5), dorsal palp genual setae *d* 6 (5–7), unbranched. Suboral plate rounded anteriorly, smooth. **Prodorsal shield** 37 (31–39) including frontal lobe, 37 (32–37) wide, sub-triangular; with a short blunt frontal lobe, 5 (4–6), over gnathosomal base. Shield pattern distinct, consisting of short median line on basal fourth of the shield with V shaped mark at its middle, complete admedian lines, complete inner and outer submedian lines connected together basally, one pair of lateral lines made by connected dashes, several small granules between lateral sides of prodorsal shield and coxal region. Tubercles of scapular setae *sc* on rear shield margin, 20 (20–21) apart, setae *sc* 29 (25–31), directed posterior divergently. **Legs** with all usual segments and setae. Leg I 34 (33–36), trochanter 5 (5–7), femur 10 (10–12), genu 7 (5–7), tibia 9 (6–10), tarsus 8 (7–8), tarsal solenidion  $\omega$  9 (8–10), curved down, distally tapered, empodium simple, 8 (7–8), 6-rayed; femoral setae *bv* 8 (8–11), genual setae *I''* 25 (20–26), paraxial tibial setae *I'7* (6–8), located in basal third of tibia, paraxial fastigial tarsal setae *ft'* 19 (17–21), antaxial fastigial tarsal setae *ft''* 27 (24–28), paraxial unguinal tarsal setae *u'4* (4–5). Leg II 31 (27–34), trochanter 6 (6–7), femur 11 (10–11), genu 6 (5–6), tibia 8 (6–8), tarsus 8 (7–8), tarsal solenidion  $\omega$  9 (9–10), curved down, distally rounded, empodium simple, 7 (7–8), 6-rayed; femoral setae *bv* 8 (7–9), genual setae *I''* 13 (10–14), paraxial fastigial tarsal setae *ft'6* (5–7), antaxial fastigial tarsal setae *ft''* 25 (24–28), paraxial unguinal tarsal setae *u'4* (4–5). **Coxisternal region.** Prosternal apodeme 10 (10–11), entire, anterior setae on coxisternum I *1b* 7 (6–8), 10 (9–10) apart; proximal setae on coxisternum I *1a* 34\* (31–38), 8 (7–8) apart; proximal setae on coxisternum II *2a* 40 (40–43), 23 (21–23) apart; 5 (5–6) microtuberculate semiannuli between coxae and genital coverflap plus 2 (1–2) transversal rows of lined granules at the base of the coverflap. Coxae with sparse and lined granules. **External genitalia** 16 (15–18), 22 (22–25) wide, coverflap with one rank of 12 (12–13) longitudinal striae; setae *3a* 18 (15–21), 17 (15–17) apart.



**Fig. 1.** Schematic drawings of *Aceria resedae* Lotfolahi 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. Scale bar: 10  $\mu$ m for AD, AL, CG, GM, IG, pg, PM; 7.5  $\mu$ m for LO; 5  $\mu$ m for L1; 2.5  $\mu$ m for em.

**Internal genitalia:** spermathecae ovoid, oriented posterolaterad; spermathecal tubes relatively short as long as 1/3 spermathecae length; transverse genital apodeme trapezoidal, distally folded. **Opisthosoma** dorsally evenly rounded, with 75 (75–82) dorsal semiannuli, 65 (63–81) ventral semiannuli. **Microtubercles:** circular on posterior margin of dorsal semiannuli, more distinct on annuli edge; circular on posterior margin of ventral

semiannuli; spiny on the rear margin of the last 4 (3–4) dorsal semiannuli and elongated and linear on last 4 (4–5) ventral semiannuli. Setae *c2* 44 (37–46) on ventral semiannulus 10 (8–15), setae *d* 60 (55–61) on ventral semiannulus 25 (22–29); setae *e* 22 (20–22) on ventral semiannulus 43 (34–49); setae *f* 30 (25–35) on ventral semiannulus 67 (55–75); 5 (4–5) annuli posterior to setae *f*. Setae *h2* 79 (79–83) apically very fine, *h1* 7 (6–8).

**MALE** (Fig. 1-GM; measured specimen  $n = 1$ ). Similar in shape and prodorsal shield arrangement to female. Body smaller than female, 186, 45 wide; palp genual setae *d* 5; prodorsal shield 36, 37 wide; setae *sc* 24, 18 apart. Opisthosoma with 62 dorsal semiannuli and 54 ventral semiannuli; 7 semiannuli between coxae and genitalia, with microtubercles similar to that of female. Setae: *1b* 7, 9 apart; *1a* 17, 6 apart; *2a* 20, 18 apart; *c2* 29, on ventral semiannulus 10; *d* 50, on ventral semiannulus 19; *e* 15, on ventral semiannulus 34; *f* 23, on ventral semiannulus 58; *h1* 5, *h2* 60. Male genitalia 18 wide, setae *3a* 14, 12 apart. Legs I and II empodium 6-rayed.

**NYMPH** (Fig. 2; measured specimen  $n = 1$ ). Body vermiform, 173 (excluding gnathosoma), 41 wide; palp genual setae *d* 5. Prodorsal shield 31 including frontal lobe, 22 wide, sub-semicircular; with a very short blunt frontal lobe, 4, over gnathosomal base. Shield pattern distinct, consisting of short median line on basal half of the shield with V shaped mark at its basal third, complete admedian lines, shorter inner submedian lines, one pair of short lateral lines made by connected dashes, several small granules between lateral side of prodorsal shield and coxal region. Tubercles of *sc* setae on rear shield margin, 12 apart, setae *sc* 12, directed posterior. Opisthosoma with 66 dorsal semiannuli and 59 ventral semiannuli with circular microtubercles, elongated on the posterior ventral semiannuli. Setae: *1b* 7, 8 apart; *1a* 11, 5 apart; *2a* 22, 17 apart; *c2* 26, on ventral semiannulus 12; *d* 32, on ventral semiannulus 23; *e* 14, on ventral semiannulus 38; *f* 22, on ventral semiannulus 55; *h1* 6, *h2* 54. Setae *3a* 10, 7 apart on semiannulus 6 after coxae. Legs I and II empodium 5-rayed.

### Type host plant

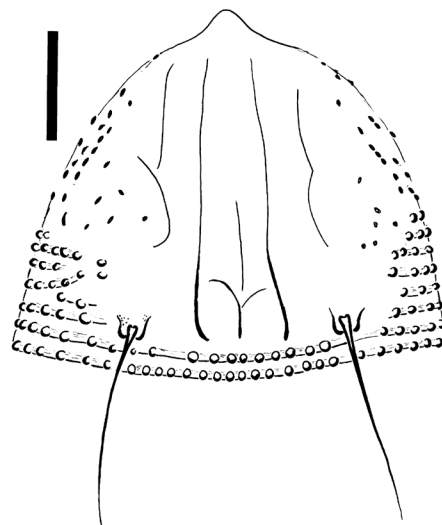
*Reseda luteola* L. (Resedaceae), dyer's rocket, dyer's weed, weld, woold, yellow weed.

### Type locality

Gajoot, Maku county, West Azerbaijan Province, Iran (39°20'45"N, 44°22'43"E), 1,415 m above sea level, coll. K. Aghazadeh, August 2020.

### Type material

Holotype: single female on a microscope slide (RL-IWA-MU-GT-20A-1). Paratypes: seven females, one male and one nymph mounted singly on separate microscope slides (RL-IWA-MU-GT-20A-2–10).



**Fig. 2.** Schematic drawing of *Aceria resedae* Lotfollahi sp. nov. nymph prodorsal shield. **Scale bar:** 10  $\mu$ m.

## Other material

Mites preserved in a vial (RL-IWA-MU-GT-20A) of Oudemans' fluid (Walter & Krantz, 2009) as extracted from the same sample as the type specimens.

## Relation to the host plant

Vagrant; no symptoms were observed.

## Etymology

This species is named after *Reseda*, the genus name of its host plant.

## Differential diagnosis

No eriophyoid mite were found on the plants of family Resedaceae. Therefore, the new species was compared with the *Aceria* species found in Iran and *Aceria sheldoni* (Ewing, 1937) was found more close to that. Two species are similar in presence of median, admedian and submedian lines on their prodorsal shield, V-shape mark at median line base and empodium rays number of leg II. But the median line of the new species is shorter and empodium rays number of the first leg is 6 in the new species, while it is 5-rayed in *A. sheldoni*. Also they are different in dorsal semiannuli number (75–82 in the new species *versus* 65–70 in *A. sheldoni*), ventral semiannuli number (63–81 in the new species *versus* 65–70 in *A. sheldoni*) and the length of setae *sc* (28–31 in the new species *versus* 16 in *A. sheldoni*), *c2* (37–46 in the new species *versus* 19 in *A. sheldoni*), *d* (55–61 in the new species *versus* 30 in *A. sheldoni*), *e* (20–22 in the new species *versus* 8.5 in *A. sheldoni*), *f* (27–35 in the new species *versus* 16.5 in *A. sheldoni*) and *3a* (18–21 in the new species *versus* 10.5 in *A. sheldoni*) (Keifer, 1938).

## Remarks

This new species is the first eriophyoid species recorded on the plants of family Resedaceae.

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## گونه جدید (*Aceria resedae* Lotfollahi sp. nov. (Acari: Eriophyidae) از روی Resedaceae در ایران

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### چکیده

در طی بررسی فون کنه‌های اریوفید شهرستان ماکو، استان آذربایجان غربی ایران طی تابستان ۱۳۹۹، گونه جدید *Aceria resedae* Lotfollahi sp. nov. روی *Reseda luteola* L. (Resedaceae) یافت شد. این اولین گونه اریوفیوئید است که روی گیاهان خانواده Resedaceae یافت می‌شود و در اینجا توصیف و ترسیم شده است.

**کلمات کلیدی:** ماکو، رکورد جدید، *Reseda*، آذربایجان غربی

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