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## DESCRIPTION OF THE MALE OF *CILLIBA ERLANGENSIS* (ACARI, UROPODINA, CILLIBIDAE) WITH A KEY TO MALES OF THE GENUS *CILLIBA*

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**Description of the Male of *Cilliba erlangensis* (Acari, Uropodina, Cillibidae) with a Key to Males of the Genus *Cilliba*.** Babaedian, E., Gwiazdowicz, D. J., Saboori, A. — A previously unknown male of *Cilliba erlangensis* (Hirschmann, Zirngiebl-Nicol, 1964) is described based on specimens from Northern Iran. Representatives of the species were found in soil, leaf-litter and moss or in galleries of bark beetles. The first description of the male of *Cilliba erlangensis* and an updated identification key to the known males of *Cilliba* are also presented.

Key words: *Cilliba*, description, Soil-inhabiting mites, Parasitiformes, Uropodina, Iran.

### Introduction

Suborder of Uropodina is one of the most diverse groups of mesostigmatic mites and up to now more than 2000 species and 300 nominal genera have been described worldwide (Wiśniewski, Hirschmann, 1993; Halliday, 2015). Most species show bizarre morphological specialisations that obscure their underlying taxonomic relationships. These mites are found in forest litter, but can also be found in large numbers in moss, under stones, in ant nests, in the nests and burrows made by vertebrates, and in dung and carrion (Lindquist et al., 2009).

*Cilliba* was initially described by von Heyden (1826), with *Notaspis cassideus* Hermann, 1804 as its type species. Some authors considered *Cilliba* as a member of the family Uropodidae (Hirschmann, Zirngiebl-Nicol, 1969; Karg, 1989; Wiśniewski, Hirschmann, 1993; Maśán, 2001; Kontschán, 2010) or Cillibidae (Evans, 1957; Hirschmann, 1979; Błozzyk et al., 2006; Stachowiak et al., 2008; Kontschán, 2013, 2014; Halliday, 2016).

Hirschmann, Zirngiebl-Nicol (1964) described *Cilliba erlangensis* based on females collected from Germany. It has a wide distribution in Europe and in many different microhabitats as litter, moss, beech forest (Stachowiak, et al., 2008; Kontschán, 2009, 2011, 2013, 2014).

During a survey in northern Iran 16 females, 8 deutonymphs and 10 males of *C. erlangensis* were founded. No male specimen of *C. erlangensis* has been described and the present work raised the number of known male of this genus from world to eight.

### Material and methods

The survey was conducted in 2014–2017 to investigate the mite fauna of Uropodina in Kheyrood forest, Nowshahr City, in Mazandaran Province, Iran (Babaeian, 2017). Mite specimens were extracted from soil and litter using a modified Berlese-Tullgren funnel and examined under a stereomicroscope. After clearing in Nesbitt's fluid, the mites were mounted in Faure medium on microscope slides. Morphological observations, measurements and illustrations were made using a BX51 phase contrast Olympus microscope equipped with a drawing tube. Measurements were made in micrometers ( $\mu\text{m}$ ) and are presented in the format: minimum–maximum size.

The specimens deposited in the Acarological Collection, Jalal Afshar Zoological Museum, Faculty of Agriculture, University of Tehran, Karaj, Iran (JAZM).

### Results

**Cillibidae** Trägårdh, 1944

***Cilliba*** von Heyden, 1826

Type species: *Notaspis cassideus* Hermann, 1804, by original designation.

The concept of *Cilliba* used here is based on that of Błoszyk et al. (2006).

***Cilliba erlangensis*** (Hirschmann & Zirngiebl-Nicol, 1964) (figs 1–8)

Material examined. Iran, Mazandaran Province, Nowshahr City. Garazbon, 36°33'06" N, 51°37'71" E, altitude 1151 m. s. l., in leaf litter, 6.07.2014, 3 ♂, 4 ♀; 36°34'73" N, 51°34'851" E, altitude 730 m, in leaf litter, 5.07.2014, 5 ♀; Namkhaneh, 3 DN, 36°34'94" N, 51°33'821" E, altitude 702 m, in soil and dead wood, 5.07.2014, Namkhaneh, 3 ♂, 5 DN, 36°35'99" N, 51°33'953" E, altitude 624 m, in leaf litter. Paatam, 20.06.2015, 5 ♀, 36°35'53" N, 51°34'230" E, altitude 489 m, in dead wood, 27.07.2015; Garazbon, 3 ♂, 36°29'21" N, 51°38'876" E, altitude 1491 m, in soil, 1.10.2015, Garazbon, 1 ♂, 2 ♀, 36°29'42" N, 51°39'495" E, altitude 1485 m, in leaf litter 1.10.2015 (E. Babaeian coll.) (JAZM).

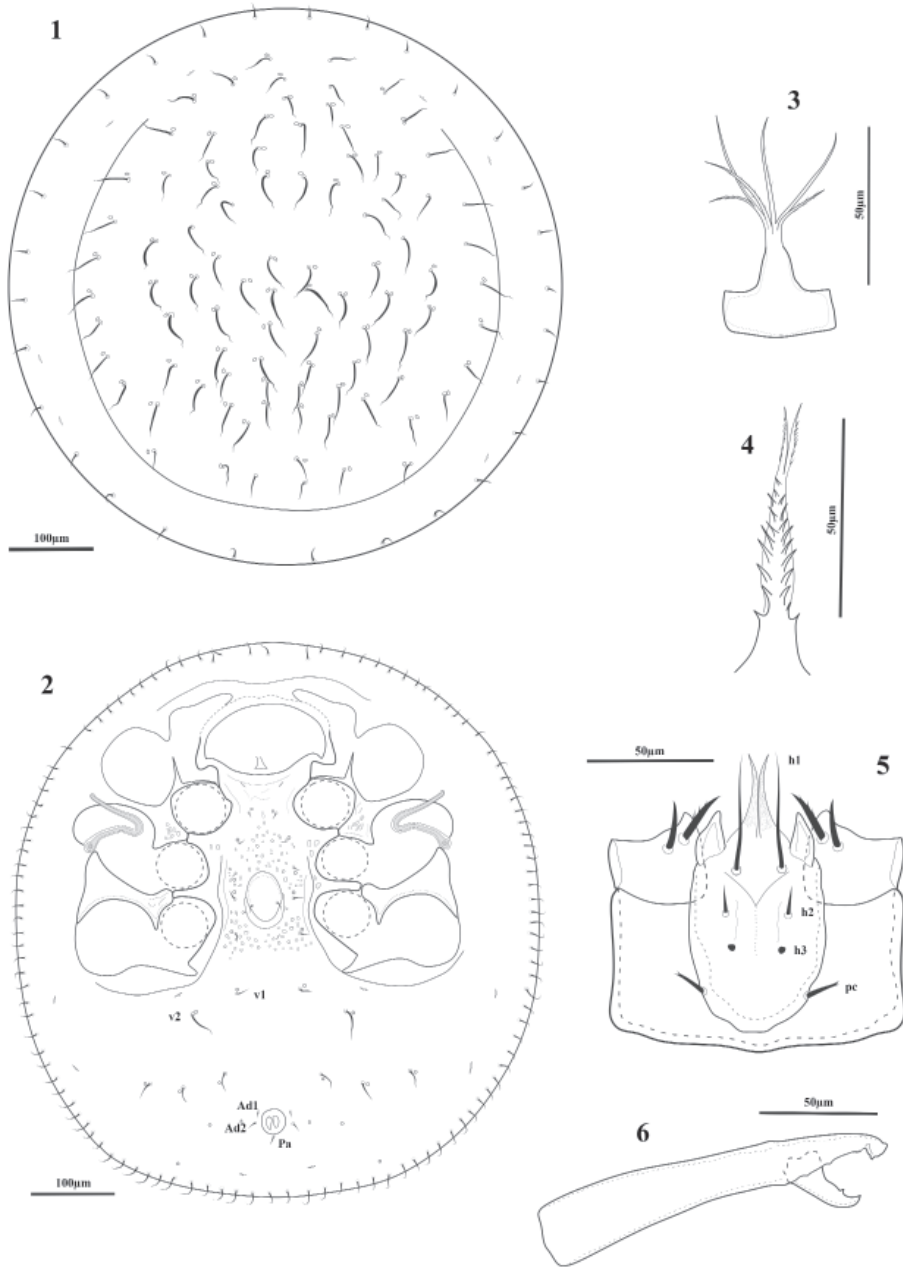
### Description

Male (n = 7). Length 663–708, width 675–700.

Dorsal idiosoma (fig. 1). Dorsal shield circular, smooth and with dense small punctation. Marginal shield fused anteriorly with dorsal shield. Dorsal shield setae 42–55 long, slender and lanceolate. Submarginal setae shorter, 15–17 long, smooth and needle-like. Marginal setae simple, numerous and short, located ventrally and hook-like.

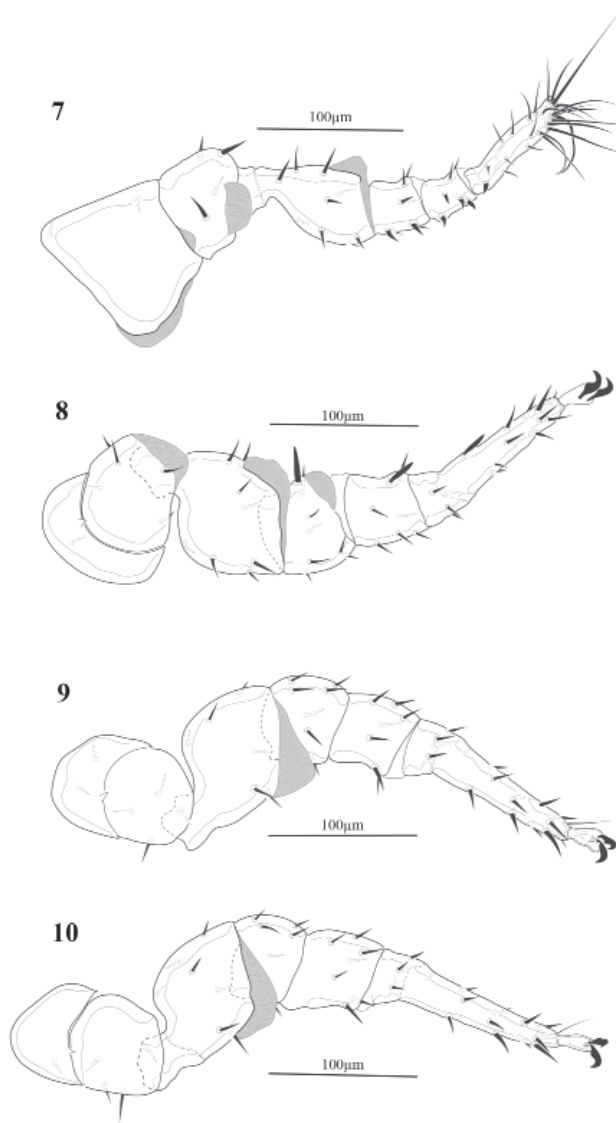
Ventral idiosoma (fig. 2). Tritosternal base wide, rectangular, lacinia finely pilose, six-branched apically (fig. 3). Sternal region between coxae II–IV with subcircular pits. Sternal setae simple, *st1*–*st3* shorter, 4–5 long, *st4* and *st5* 11–13 long. Operculum oval-shape, smooth, 63–72 long and 48–67 wide, located in the area between coxae III–IV, bearing a pair of eugenital setae. Opisthogaster smooth, with five pairs of simple ventral setae (*v1*–*v5*), *v1* = 1/2 *v2*; *v3*, *v4* and *v5* nearly similar in length. Pedofossae II–IV well developed. Adanal setae *Ad1* very short, 5–6 long, *Ad2* 10–12 (about twice as long as *Ad1*), post-anal seta similar in length to *Ad2*. Anal opening oval-shape. Peritremes V-shaped, 126–130 long.

Gnathosoma (figs 4–6). Epistome narrow, denticulated laterally and bifid apically (fig. 4). Corniculi horn-like; internal malae elongate and finely pilose (fig. 5). Hypostomal setae *h1* smooth and 42–45 long, *h2* 9–12 shorter and smooth, *h3* short, blunted and rounded, palpcoxal setae *pc* serrate, 17–18 long (longer than *h3*). Deutosternal groove smooth. Chelicera (fig. 6) without nodus, fixed digit 44–50 long, bearing one large subdistal tooth and a row of 8–9 teeth of regular size, movable digit 32–37 long, bearing one large tooth. Setae *v1* on trochanter thickened and barbed, *v2* slightly thickened and smooth, all other setae smooth. Palp-apotele two-tined.



Figs 1–6 (male): 1 — dorsal idiosoma; 2 — ventral idiosoma; 3 — tritosternum; 4 — epistome; 5 — hypostome; 6 — chelicera.

Legs (figs 7–10). Length of leg I 345–358, leg II 388–490, leg III 350–365, leg IV 370–385. Leg chaetotaxy (as female): coxae 2-2-2-1; trochanters 6-5-5-5, femora 9-9-6-7, genua 8-8-7-6, tibiae 7-7-7-7, tarsi II–IV 18-18-18. Ventral setae on genu and tibia II and dorsal setae on genu and tibia I thickened. The chaetotaxy of some leg segments (such femura II, IV and genua II, II) in examined material are differ in comparison to *Cilliba* genus presented by Błoszyk et al. (2006). Pretarsi, excluding leg I, with distinct claws.



Figs 7–10 (male): 7 — leg I; 8 — leg II; 9 — leg III; 10 — leg IV.

**Key to the known male of the genus *Cilliba* (partly according to Stachowiak et al., 2008)**

- 1. Ventral setae  $v1 = v2$  ..... 2
- Ventral seta  $v1 = 1/2$  or  $2/3 v2$  ..... 5
- 2. Trochanter III with a ventral apophys ..... 3
- Trochanter III without a ventral apophys ..... 4
- 3. Centro-dorsal region of dorsal shield separate from marginal shield .....  
    ..... *C. stammeri* Hirschmann & Zirngiebl-Nicol, 1964
- Centro-dorsal region of dorsal shield fused anteriorly with marginal shield .....  
    ..... *C. insularis* Willmann, 1938
- 4.  $Pa = 2 Ad1$ , the most anterior dorsal seta pilose, with M-shaped sclerotised ridges near posterior margin of centro-dorsal region ..... *C. vellas* Kontschán, 2010
- $Pa = Ad1$ , the most anterior dorsal seta smooth and needle-like, without M-shaped sclerotised ridges on centro-dorsal region .....  
    ..... *C. cassidea* (Hermann, 1804)

5. Seta *v1* = 2/3 *v2*, hypostomal seta *h4* absent .....  
 ..... *C. cassidoidea* (Hirschmann & Zirngiebl-Nicol, 1964)
- Seta *v1* = 1/2 *v2*, hypostomal seta *h4* present ..... 6
6. Centro-dorsal region smooth, *Pa* = *Ad2* .....  
 ..... *C. erlangensis* (Hirschmann & Zirngiebl-Nicol, 1964)
- Centro-dorsal region with small circular pits on whole surface or on posterior half, *Pa* = *Ad1* ..... 7
7. Circular pits present on whole surface of dorsal shield, hypostomal seta *h4* short and smooth, seta *v1* on palp trochanter narrowly thickened and nearly as long as *v2* .....  
 ..... *C. athiasae* (Hirschmann & Zirngiebl-Nicol, 1964)
- Circular pits present on posterior half of dorsal shield, hypostomal seta *h4* long and pilose distally, seta *v1* on palp trochanter sharply thickened and about two times longer than *v2* .. *C. sellnicki* (Hirschmann & Zirngiebl-Nicol, 1964)

## Remarks

*Cilliba* is a small genus of edaphic predatory mites, which currently comprises about nine valid species distributed in various areas of Eurasia (8 spp.) and North Africa. Stachowiak et al. (2008) reviewed the genus and attempted to clarify the concept of *Cilliba* by removing some species that obviously belong to other genera.

There is another dubious *Cilliba* species, which does not completely conform our concept of the genus *Cilliba*, namely *C. vellas* Kontschán, 2010 from Greece. The dorsal shield has a sclerotized m-shaped sculpture near posterior margin of dorsal shield and this feature has not been observed in other species of *Cilliba*. Also, the most anterior dorsal setae are small and smooth in other species of *Cilliba*, but elongate and pilose in *C. vellas*. We provisionally accept this as a species of *Cilliba* until a comprehensive revision of all genera resolves their relationships.

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## References

- Babaian, E. 2017. *Identification of mites of Uropodina Cohort (Acari: Mesostigmata) in Kheyroud forest*. Ph.D thesis. Department of Plant Protection, University of Tehran, Tehran, 1–256 [In Persian with English summary].
- Błoszyk, J., Stachowiak, M., Halliday, B. 2006. Two new species of *Cilliba* von Heyden from Poland, with discussion of the *Cilliba cassidea* (Hermann) species complex (Acari: Mesostigmata: Uropodina: Cillibidae). *Zootaxa*, **1219**, 1–45.
- Evans, G. O. 1957. An introduction to the British Mesostigmata (Acarina) with keys to families and genera. *Journal of the Linnean Society, Zoology*, **43**, 203–259.
- Halliday, R. B. 2015. Catalogue of genera and their type species in the mite Suborder Uropodina (Acari: Mesostigmata). *Zootaxa*, **3972**, 101–147.
- Halliday, R. B. 2016. Catalogue of families and their type genera in the mite suborder Uropodina (Acari: Mesostigmata). *Zootaxa*. **4061**, 347–366.
- Heyden, C. H. G. von. 1826. Versuch einer systematischen Einteilung der Acariden. *Isis*, **18**, 608–613.
- Hirschmann, W. 1979. Stadiensystematik der Parasitiformes. Teil 1. Stadienfamilien und Stadiengattungen der Atrichopygidiina, erstellt im Vergleich zum Gangsystem Hirschmann 1979. *Acarologie. Schriftenreihe für Vergleichende Milbenkunde*, **26**, 57–70.
- Hirschmann, W., Zirngiebl-Nicol, I. 1964. Gangsystematik der Parasitiformes. Teil 7. Uropodiden. Das Gangsystem der Familie Uropodidae (Berlese 1892) Hirschmann und Zirngiebl-Nicol nov. comb. Bestimmungstabellen. Kurzdiagnosen. Operculum-Bestimmungstabellen. *Acarologie. Schriftenreihe für Vergleichende Milbenkunde*, **6**, 1–22 + Plates 1–5.
- Hirschmann, W., Zirngiebl-Nicol, I. 1969. Gangsystematik der Parasitiformes. Teil 39. Neunzehn neue *Uropoda* Arten. *Acarologie. Schriftenreihe für Vergleichende Milbenkunde*, **12**, 20–31 + Plates 1–3.
- Karg, W. 1989. *Acari (Acarina), Milben. Unterordnung Parasitiformes (Anactinochaeta) Uropodina Kramer, Schildkrötenmilben*. Die Tierwelt Deutschlands, **67**, 1–203.
- Kontschán, J. 2009. First record of eleven Uropodina species from Slovenia (Acari: Mesostigmata). *Acta Entomologica Slovenica*, **17**, 107–114.

- Kontschán, J. 2010. Taxonomical and faunistical studies on the Uropodina mites of Greece (Acari: Mesostigmata). *Opuscula Zoology*, **41**, 29–38.
- Kontschán, J. 2011. New Uropodina records from Switzerland (Acari: Mesostigmata) with the description of *Discourella helvetica* n. sp. *Revue Suisse de Zoologie*, **118**, 99–106.
- Kontschán, J. 2013. Uropodina mites of the Balkan Peninsula (Acari: Mesostigmata). *Opuscula Zoology*, **44**, 97–131.
- Kontschán, J. 2014. *Uropodina (Acari: Mesostigmata) of Transylvania (Romania)*. Acarological studies 3. AdLibrum, Budapest, 140
- Lindquist, E. E., Krantz, G. W., Walter, D. E. 2009. Order Mesostigmata. In: Krantz, G. W., Walter, D. E., eds. *A Manual of Acarology*. 3rd ed. Texas Tech University Press, Lubbock, 124–232.
- Mašán, P. 2001. Roztoèe kohorty Uropodina (Acarina, Mesostigmata) Slovenska. *Annotationes Zoologicae et Botanicae*, **223**, 1–320.
- Stachowiak, M., Błoszyk, J., Halliday, B. 2008. Review of the genus *Cilliba* von Heyden (Acari: Uropodina: Cillibidae). *Zootaxa*, **1881**, 1–42.
- Wiśniewski, J., Hirschmann, W. 1993. Gangsystematik der Parasitiformes. Teil 548. Katalog der Ganggattungen, Untergattungen, Gruppen und Arten der Uropodiden der Erde (Taxonomie, Literatur, Grösse, Verbreitung, Vorkommen). *Acarologie. Schriftenreihe für Vergleichende Milbenkunde*, **40**, 1–220.

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