



New record of *Allothrombium incarnatum* Oudemans (Prostigmata: Trombidiidae) from Türkiye, with the report of a new synonym

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ABSTRACT: The larval instar of *Allothrombium incarnatum* Oudemans, 1905 was detected for the first time by experimental rearing from field-collected females. Based on its morphological characters, *Allothrombium monosolenidion* Kamran and Alatawi, 2020 **syn. nov.**, known only from larval instar, is considered a junior synonym of *A. incarnatum*. Data on the habitat and host of this species are also presented.

Keywords: Acari, host preference, laboratory rearing, morphometric data, Parasitengonina

Zoobank: <https://zoobank.org/89E245EB-D9A7-4E40-B213-95DB3EEAA6C0>

INTRODUCTION

The genus *Allothrombium* Berlese, 1903 (Acari: Parasitengonina: Trombidiidae) currently comprises more than 70 species worldwide (Mağol and Wohltmann, 2012, 2013; Haitlinger and Šundić, 2018; Kamran and Alatawi, 2020). Most of them are known either only from the postlarval or only from the larval stage, while only seven species of the genus *Allothrombium* are known from both the larval and the postlarval instars (Mağol and Wohltmann, 2012). Only twelve species of *Allothrombium* have been reported from Türkiye so far (Sevsay, 2017; Yıldırım and Sevsay, 2019; Oner et al., 2021; Karakurt, 2022). *Allothrombium incarnatum* was originally described by Oudemans (1905) based on male and female specimens from The Netherlands. Mağol (2005) provided a detailed description and illustrations of this species based on active postlarval instars collected in Poland. *Allothrombium monosolenidion*, known only from larval forms, was described and illustrated by Kamran and Alatawi (2020) from Saudi Arabia.

The present work provides the first correlation between larval and postlarval instars of *A. incarnatum* by laboratory rearing. *Allothrombium monosolenidion* Kamran and Alatawi, 2020 is considered here as a junior synonym of *A. incarnatum* Oudemans, 1905. Data on the habitat and host of this species are also presented.

MATERIALS AND METHODS

Two ovigerous females, collected directly in the field, were placed in glass vials containing a mixture of charcoal and plaster of Paris (9:1). After laying eggs, the females were transferred to 70% ethyl alcohol. The eggs were supplied with 2-3 ml of distilled water every three days, which was added to the substrate to maintain humidity. The glass vials were kept at room temperature (22-25 °C). All samples were fixed on microscope slides in Hoyer's

medium (Walter and Krantz, 2009). An Olympus BX63-CBH microscope was used for measurements, photographs, and drawings. The morphological terminology follows Mağol (2005) except for the following terms and abbreviation IL (body length without gnathosoma); IW (body width); L (scutum length); W (scutum width). All measurements are given in micrometers (µm).

Material examined: A female collected manually from soil samples in Tunceli province, Türkiye (39°07'N 39°37'E, 924 m a.s.l., moist moss and grass, 24.05.2019, col. E. Buğa), and 35 larvae obtaining from the collected female. Another female collected manually from soil samples in Erzincan province, Türkiye (39°12'N 38°34'E, 1059 m a.s.l., moist moss, 23.04.2023, col. İ. Karakurt), and 32 larvae obtaining from the collected female. The specimens representing females and remain of larvae freshly obtained from two collected females are deposited in the Acarology Laboratory of Erzincan Binali Yıldırım University, Erzincan, Türkiye (EBYU).

RESULTS AND DISCUSSION

Family Trombidiidae Leach, 1815

Genus *Allothrombium* Berlese, 1903

Type species: *Trombidium fuliginosum* Hermann, 1804, by original designation.

***Allothrombium incarnatum* Oudemans, 1905** (Figures 1-3)

Allothrombidium [sic] *incarnatum* Oudemans, 1905: 18 [P].

Allothrombium incarnatum Oudemans, 1905: Mağol 2005: 178 [P].

Allothrombium monosolenidion Kamran and Alatawi, 2020: 736, **syn. nov.** [L].

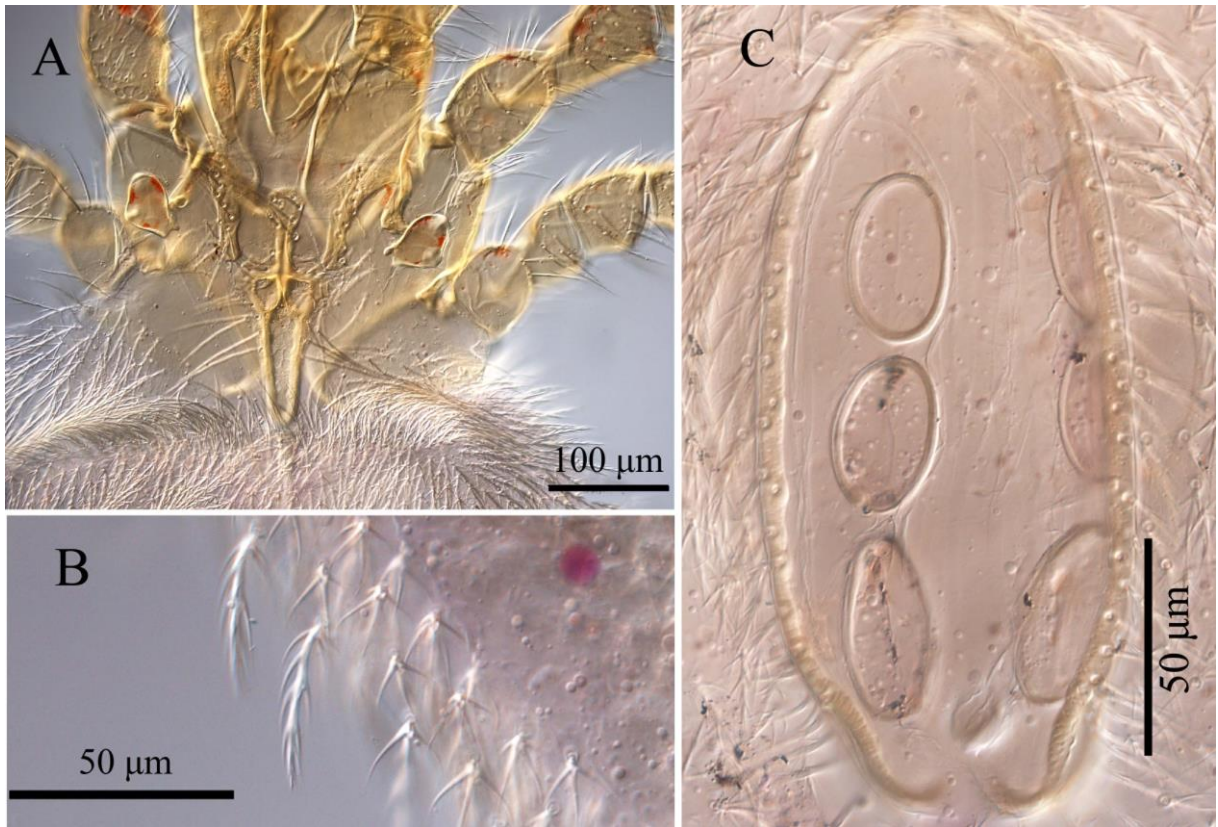


Figure 1. Photomicrographs of *Allothrombium incarnatum* (female): **A.** Crista metopica, **B.** Posterior dorsal setae, **C.** Genital opening.

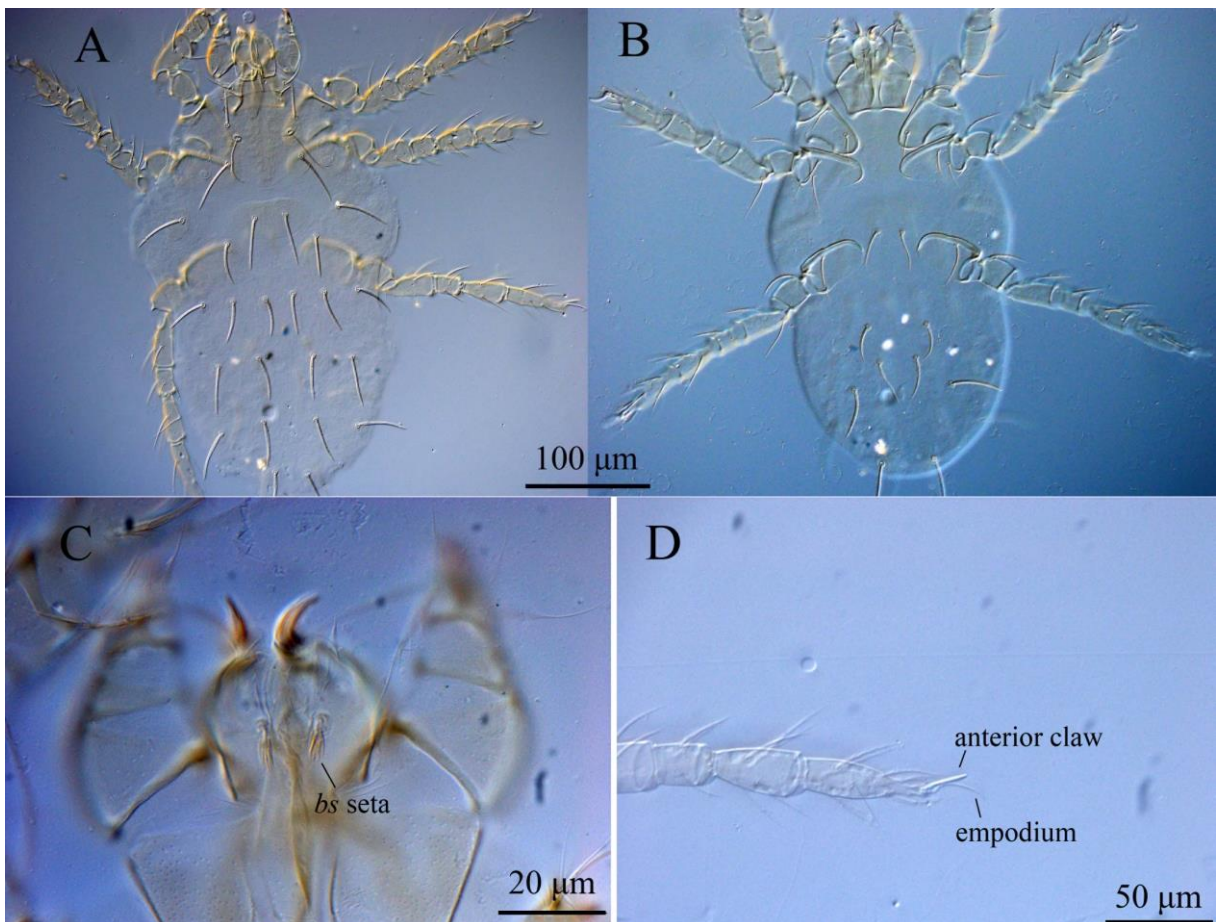


Figure 2. Photomicrographs of *Allothrombium incarnatum* (larva): **A.** Dorsal view, **B.** Ventral view, **C.** *bs* seta, **D.** Leg III (genu-tarsus).

Table 1. Morphometric data on females of *Allothrombium incarnatum*.

Character	from Mağol (2005)		present work	
	Sample size	Min. -Max.	Sample size	Min. - Max.
IL	9	1062.6-1971.2	2	1335-1678
IW	12	569.8-954.8	2	750-840
IL/IW	7	1.7-2.1	2	1.78-1.99
CML	19	94.8-138.2	2	195-270
S	0	-	1	72-75
E	19	39.5-63.2	2	50-65
SB	19	23.7-43.4	2	32-35
Ch	18	39.5-51.3	2	70-72
Ti Cl	19	35.5-63.2	2	70-72
Pa Ta	19	55.3-86.9	2	70-92
pDS	17	35.5-43.14	1	38-43
GOP I	14	162.-225.1	1	208
GOP w	10	90.8-126.4	1	125
GOP I/w	10	1.5-2.2	1	1.55
Ti II	19	94.8-142.2	2	180-190
Ta II	19	158.0-244.9	2	240-255
Ta I w	19	82.9-110.6	2	104-107
Ta II/w	19	1.8-2.4	2	2.3-2.45

Diagnosis: Adult and Deutonymph. See Mağol (2005).

Larva (after Kamran and Alatawi, 2020). Colour in live specimens yellowish orange. Hypostomal setae (*bs*) calyx, with 4-7 finger-like digitations. fD = 24, fV = 6, fnCx 2-2-1. Genua II and III each with one solenidion. Pretarsi I and II with two claws and a claw-like empodium. Pretarsus III with anterior claw and a claw-like empodium. Posterior claw on pretarsus III absent.

Description: Adult (Fig. 1) and Deutonymph, See Mağol (2005).

Larva (Figs 2, 3), See Kamran and Alatawi (2020). Male. Not collected and reared in this study. Deutonymph. Not collected and reared in this study.

Distribution: Hungary, Italy [?], Poland and The Netherlands (Mağol, 2005, 2007; Mağol and Wohltmann, 2012). New record from Türkiye (present work).

Laboratory observations and biology: The one female, collected on May 2019, laid 40 yellowish-orange eggs in a cluster two days after capture. A total of 35 larvae hatched within 21-22 days after oviposition. Another female, collected on April 2023, laid 35 yellowish-orange eggs in a cluster seventeen days after capture. A total of 32 larvae hatched within 21-22 days after oviposition.

Ten unfed members of the latter group of larvae were exposed to different host candidates (Diptera, Lepidoptera, Orthoptera and Homoptera). Of these, however, only representatives of *Aphis* (Hemiptera: Sternorrhyncha: Aphididae) were parasitized by the larvae of *A. incarnatum*.

Table 2. Morphometric data on larvae of *Allothrombium incarnatum*.

Character	present work	from Kamran and Alatawi (2020)
	(n=25)	(n=9)
IL	271-375	390-435
IW	159-190	212-260
AA	40-48	42-47
AW	55-61	58-63
PW	60-70	60-69
SB	41-50	39-49
ASB	50-60	46-58
PSB	35-45	-
L	90-104	84-103
W	72-89	70-84
<i>or</i>	4.5-7.2	5-7
<i>bs</i>	7.5-9	8-10
<i>1a</i>	32-44	32-42
<i>1b</i>	30-40	30-37
<i>2a</i>	39-45	40-45
<i>2b</i>	35-41	37-42
<i>3a</i>	33-43	34-42
<i>3b</i>	35-42	38-43
<i>h₁</i>	35-40	33-39
<i>h₂</i>	38-48	38-47
AP	28-34	28-35
AM	30-36	32-36
AL	26-34	26-33
PL	45-55	45-52
S	43-57	49-58
MA	29-35	-
HS	32-40	34-44
LSS	55-74	54-60
SL	40-50	39-50
SS	24-30	24-30
DS_MIN	30-35	30-35
DS_MAX	39-49	41-47
Cx_I	40-57	38-45
Tr_I	28-38	29-33
Fe_I	40-48	40-46
Ge_I	26-32	29-33
Ti_I	35-46	40-47
Ta_I	50-64	55-65
LEG I	240-262	245-260
Cx_II	48-55	47-52
Tr_II	25-32	25-32
Fe_II	38-48	38-49
Ge_II	22-30	25-32
Ti_II	34-42	39-43
Ta_II	49-57	50-58
LEG II	230-247	231-251
Cx_III	48-56	51-54
Tr_III	30-40	30-38
Fe_III	39-50	41-50
Ge_III	25-33	28-34
Ti_III	38-48	45-51
Ta_III	50-60	55-65
LEG III	240-260	254-283
IP	715-765	737-791

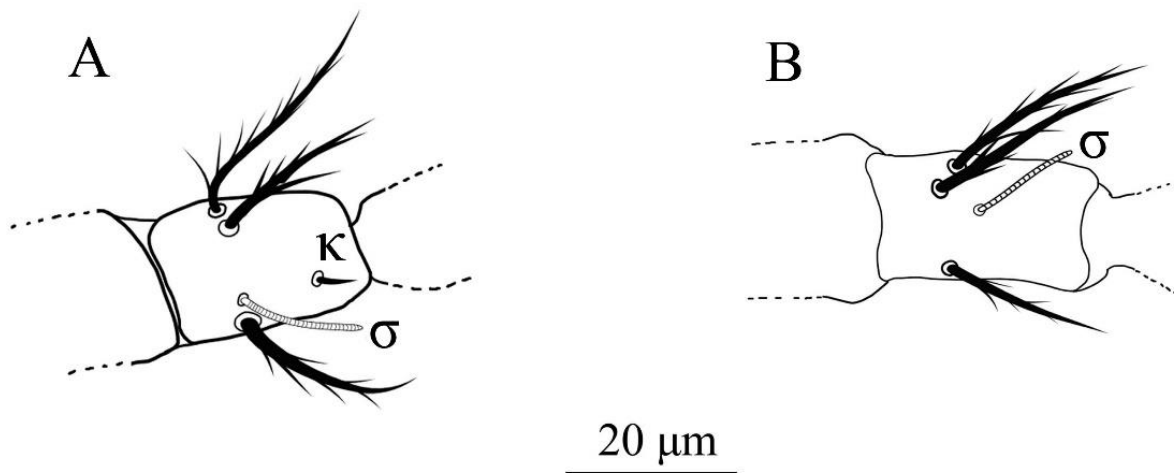


Figure 3. *Allothrombium incarnatum* (larva): **A.** Genu II, **B.** Genu III.

Remarks: The crista metopica and the dorsal seta structures of the females, from which the larvae were obtained, are compatible with the species *A. incarnatum* (Figs 1 A, B). These females have three pairs of papillae in their genital openings (Fig. 1 C). In the morphometric comparison of Polish and Turkish females of *A. incarnatum* (see Table 1), the differences in the length of the following characters are striking; CML (94.8-138.2 vs. 195-270) and tibia I (94.8-142.2 vs. 180-190). However, the structure and length of the pDS setae of both groups of specimens are compatible. In our opinion, the reason for these measurement differences is that the range of variation is larger for some character lengths. The fact that Oudemans (1916) gave the length of tarsus I of the female specimen of this species as 370 (op. cit., p. 42) supports our opinion. Of all the larval species described in the genus *Allothrombium*, only *A. monosolenidion* is characterized by having one solenidion on genua II and III (other species have two solenidia) (Kamran and Alatawi, 2020). The larva of *A. incarnatum* (Fig. 2) also has one solenidion on genua II and III (Fig. 3). Morphologically, there are no differences between the larval forms of these species. Furthermore, the present work shows that the metric data of the larvae of these two species overlap (see Table 2). As a result, we consider *A. monosolenidion* as a subjective junior synonym of *A. incarnatum*.

Additionally, the genus *Monotrombium* Zhang, 1995 in Zhang and Norbakhsh (1995), which is represented by only one larval species, *M. simplicium* Zhang, 1995, is characterized by the presence of a single solenidion on genua II-III and a single seta on coxa II (Zhang and Norbakhsh, 1995). The larva of *M. simplicium* differs from the larva of *A. incarnatum* by the presence of only a single seta on coxa II (coxa II has two setae in the larva of *A. incarnatum*). Future experimental and/or molecular studies could clarify the taxonomic status of the genus *Monotrombium*.

Authors' contributions

İbrahim Karakurt: Supervision, resources, investigation, visualization, writing – review & editing. **Evren Buğa:** Supervision, project administration, investigation, visualization, writing - review & editing. **Sevgi Sevsay:**

Supervision, project administration, investigation, visualization, writing - review & editing.

This study is part of the second author's PhD thesis.

Statement of ethics approval

Not applicable.

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Conflict of interest

All authors declare that there is no potential conflict of interest.

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