



Brachytydeus armindae (Momen & Lundqvist, 2005); a new tydeid record (Acari : Prostigmata), with a revised key to *Brachytydeus* Thor species of Turkey

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ARTICLE INFO

Research Article

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Received: 19 June 2019 / Revised: 07 September 2019 / Accepted: 26 September 2019 / Online: 18 January 2021

ABSTRACT

Tydeoidea species (Acari: Prostigmata) are little and soft-bodied creatures and globally distributed. In the world, Tydeidae comprises 328 species in 30 genera, and *Brachytydeus* has the most number of species with 200. Tydeoidea presented by 23 species while *Brachytydeus* comprises eight species, gathered in orchards and shrub trees in Turkey. *Brachytydeus armindae* (Momen & Lundqvist 2005) (Acari: Tydeidae),

found in association with *Thuja orientalis* L. (Cupressaceae) trees and stored wheat, is reported as a new species of tydeid fauna of Turkey. Distribution and host details of *B. armindae* are provided along with descriptive photos and illustrations. An updated key to *Brachytydeus* Thor species is given.

Keywords: Mites; Tydeidae; *Brachytydeus armindae*; stored products; *Thuja*

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1. Introduction

Tydeoid mites (Acari: Prostigmata) are little and soft-bodied creatures with globally scattering. They live soil and herbaceous plants to relationships with invertebrates, slugs and backboned. They are mostly herbivore, mycophagist, pollen feeders, parasites on insects or decaying consumers. They are capable of surviving in regions with extreme climates like from the North to South Pole ecosystems (Krantz & Walter 2009). Tydeidae comprises 328 species in 30 genera, and *Brachytydeus* has a high amount of species with 200, subsequently *Tydeus* Koch have 50 species (Da-Silva et al. 2016).

Çobanoğlu & Kazmierski (1999), reported 4 *Brachytydeus* species collected from orchards and shrubs, *Brachytydeus amica* (Kazmierski 1998), *B. ferula* Baker 1944, *B. pulchra* (Oudemans 1929); *B. reticulata* (Oudemans 1928) were mentioned in Thrace region, and all around Turkey. Following that *B. livshitzii* (Kuznetsov 1974), *B. obnoxia* (Kuznetsov et Zapletina 1972, in Livshitz et al. 1972) and *B. paraobliqua* (Panou & Emmanuel 1996) were mentioned from hazelnut orchards in Northern part of country (Ozman-Sullivan et al. 2005; Akyazı et al. 2017). *Brachytydeus maga* (Kuznetsov & Livshitz 1973), *Tydeus kochi* (Oudemans 1928), *Tydeus californicus* (Banks 1904) and *Tydeus plumosus* Karg 1975 were mentioned recently for Tydeidae family of Turkey which are found in association with stored wheat, vegetables and ornamental plants (Kumral & Çobanoğlu 2016; Ueckermann et al. 2019; Çobanoğlu et al. 2020). Till date, eight species were reported under *Brachytydeus* Thor (Ueckermann et al. 2019). This paper aims to report the occurrence of *Brachytydeus armindae* in Turkey and present a revised key for *Brachytydeus* genus.

2. Material and Methods

The mites were collected randomly from *Thuja orientalis* L. (Cupressaceae) trees in Istanbul and different storage facilities of stored wheat bran in Diyarbakır and Mardin during 2013-2014.

In storages, wheat seed and debris were gathered from the different level of the bulk with a split probe, depending on the size of the pile. Finally, they were mixed and taken into half kg amounts. The plant samples were taken by randomly to the shoots and green parts of the *Thuja* trees, in 2008.

The mite specimens were observed under a stereomicroscope and they were pulled out by a Berlese funnel. The collected mite specimen was preserved in 70% ethyl-alcohol. Samples were clarified with lactophenol solution, and microscopic preparations were made at Hoyer's medium. Mounted mites were detected by a phase-contrast Leica microscope and measured by a Leica software image analysing system.

The taxonomical characteristics measurements were made in micrometres (μm). The gnathosoma was measured from the base of the chelicerae to the tip. Palpus; from femur to tip of tarsus, the length of the body measurement was considered from the base of the chelicerae to posterior end of the body. The width of the body was measured at the level of setae (c_2). Setae were measured from the setal base to their apex and the legs from trochanter to the end of the tarsal claw. Both setae and solenidia counts of the leg segments were considered and solenidia indicated in brackets.

The following publications were consulted for the identification of the species: Momen & Lundqvist (2005), Da-Silva et al. (2016) and Ueckermann et al. (2019). The voucher specimen were kept among the mite collection at Ankara University, Plant Protection Department.

3. Results and Discussion

Tydeioidea Kramer 1877

Tydeidae Kramer 1877

Brachytydeus Thor 1931

Brachytydeus armindae (Momen & Lundqvist 2005); Da-Silva et al. (2016): 10.

Tydeus armindae Momen & Lundqvist 2005: 229

Diagnosis: Opisthosoma striated transversal between setae d_1 to behind setae f_1 ; some of the dorsal setae length, longer than half distance next behind.

Female (n= 2)

Dorsum (Figures 1-13, 15). Idiosomal length 305, width 218, with sparsely serrated dorsal setae, trichobothria (sci) filiform, slender and smooth. Setae f_2 , h_1 , h_2 and ps_1 longer than the other setae and blunt shaped. Dorsum simply striated, lack of reticulation. Prodorsum striated longitudinally, on opisthosoma transversal striation between setae c_1 and d .

Dorsal setae lengths of: vi 17-23, ve 13-14, sci 45, sce 16, c_1 14-15, c_2 15-24, d 15-16, e 16, f_1 20-24, f_2 20-27, h_1 21-25, h_2 22- 26, ps_1 26; $sci-sce$ 39; h_1-h_2 24; h_2-c_2 46; c_1-c_1 42; $d-d$ 28; $d-c_1$ 67 (Figs 1-3; 5-7).

Venter (Figures 14, 16). Distance of setae $3a$ and $4a$ longitudinally striated. Genital cleft flanked by 6 pairs of short setae ($gl-g_6$) (9-5) and 4 pairs agential setae ($agl-ag_4$) (11-12). Anal opening surrounded by anal setae ps_2 (11-17).

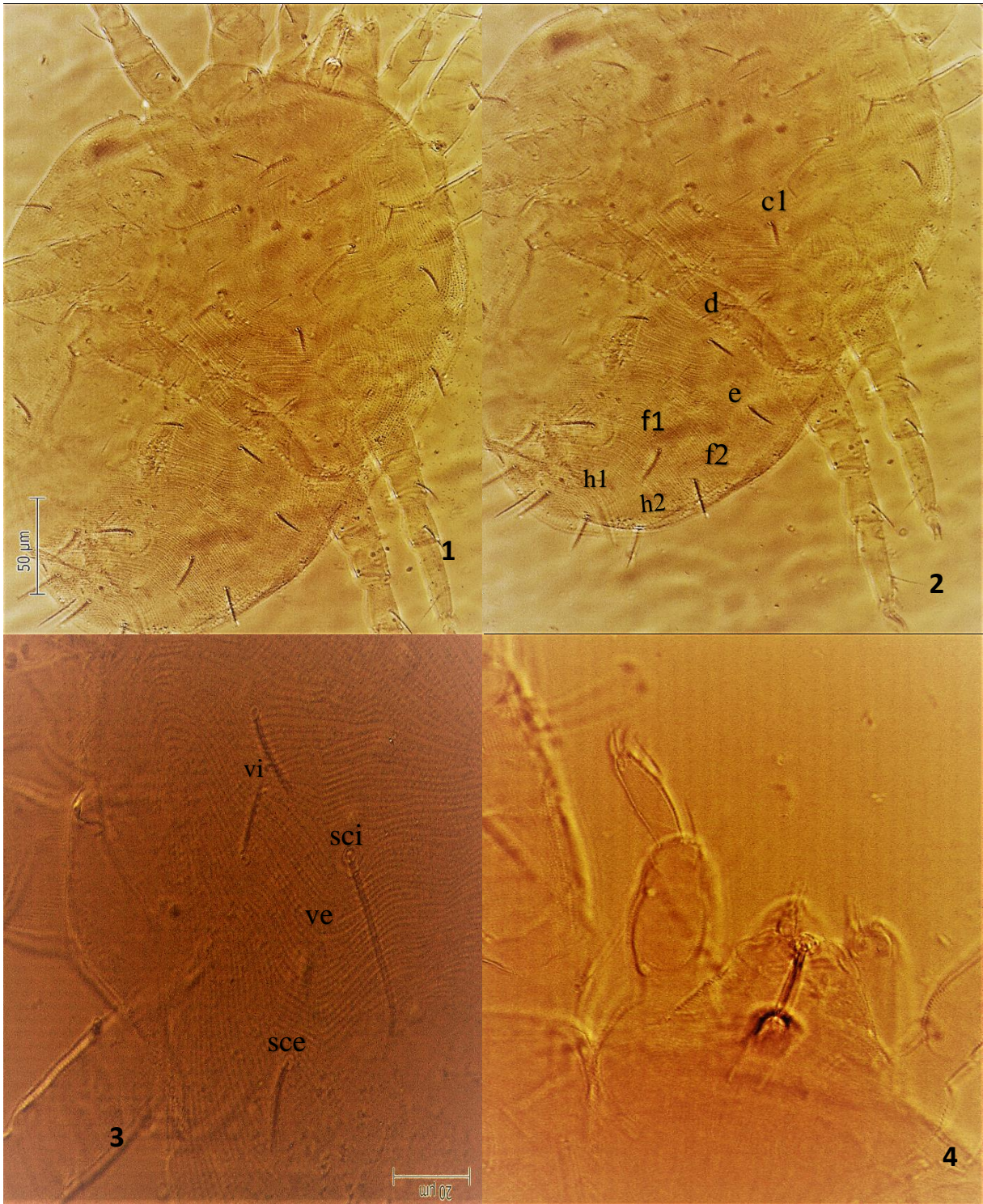
Gnathosoma (Figures 4, 8-9). Palp 71-81 long. The setal formula of palp (genua-tarsus) 2-2-6 (ω , not included in count), seta (d) forked distally. Palp tibial claw as long as palp tarsi.

Legs (Figs 10-14). Legs: I 170, II 132, III 140, IV 158. Leg segments setal formulae: Tarsi 8(ω)-6(ω)-5-5, tibiae 3(+1)-2-2-2, genua 3-2-1-1, femora 3-3-2-1, trochanters 1-0-1-0. Solenidia on tarsi II (3) shorter than solenidia on tarsi I (8-11). All tarsi include claws and empodium with a well-developed claw. Seta (κ) on tibia I is forked.

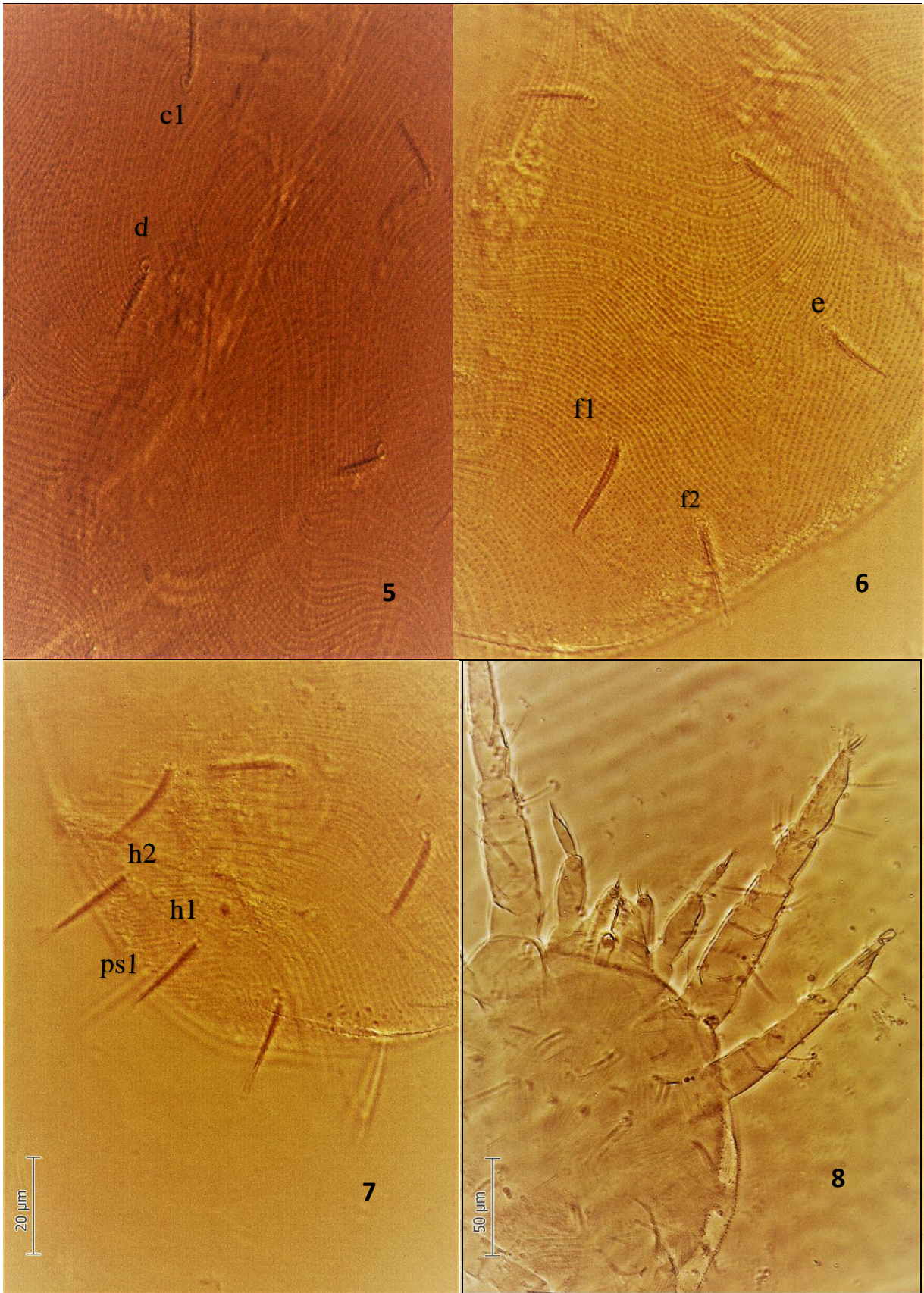
Material Examined: (1♀), (02.03.2008) *Thuja orientalis* L. (Cupressaceae), Kuleli-Istanbul; (40°58'46.2"N; 29°03'19.8"E); (1♀), (03-07-2014), wheat bran, Diyarbakır (37° 5'65.066"N: 40°1'40.041"E).

Distribution: It was reported from Sweden on lichens in mosses (Momen & Lundqvist 2005; Da-Silva et al. 2016) and Turkey with this study.

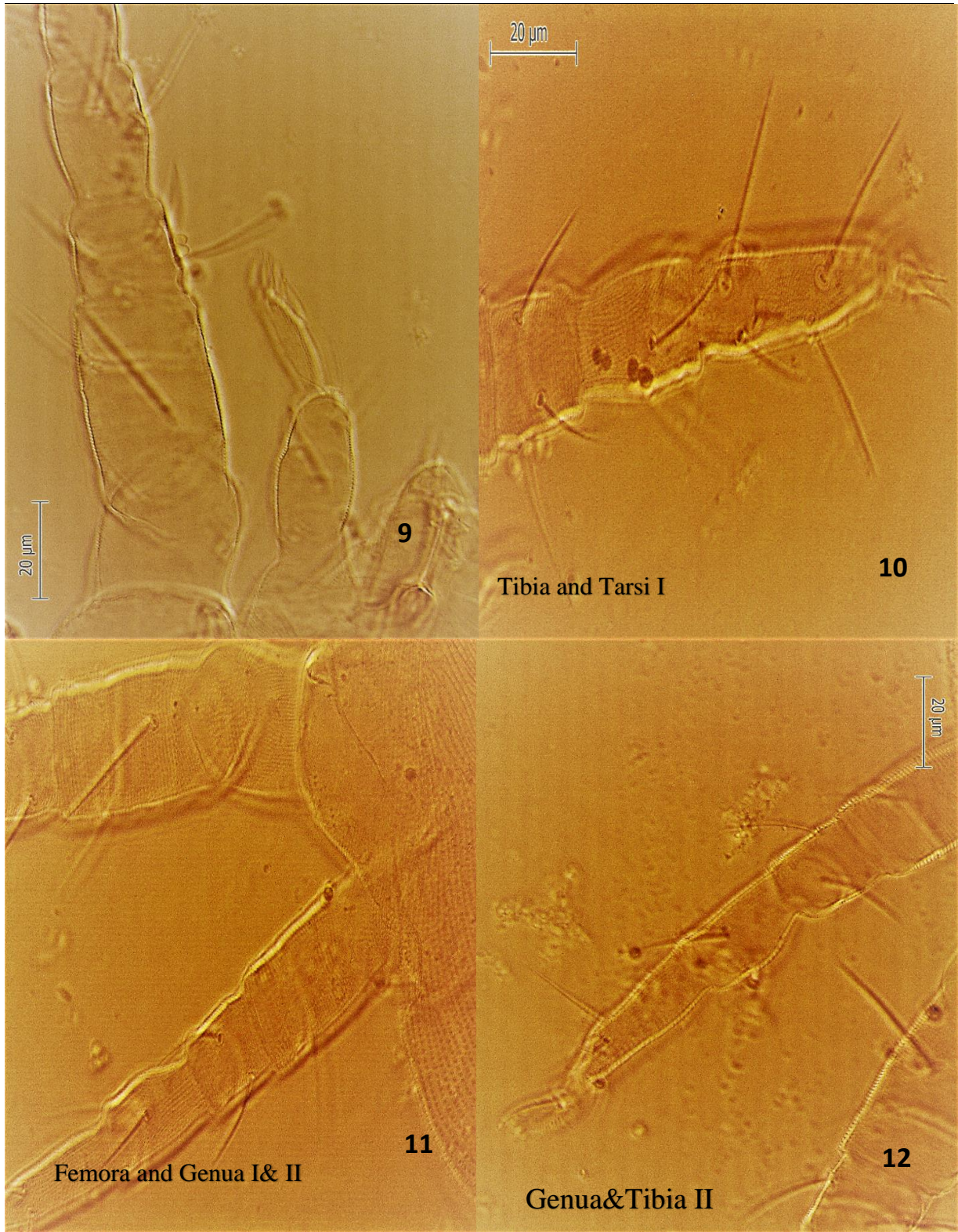
Remarks. *Brachytydeus armindae* specimens from Turkey is similar to the original description in all taxonomical characteristics. This species is separated easily from the other closest species by thick and blunt setae of f_2 , h_2 and Ps_2 . *Brachytydeus armindae* is a new record for the Tydeidae fauna of Turkey.



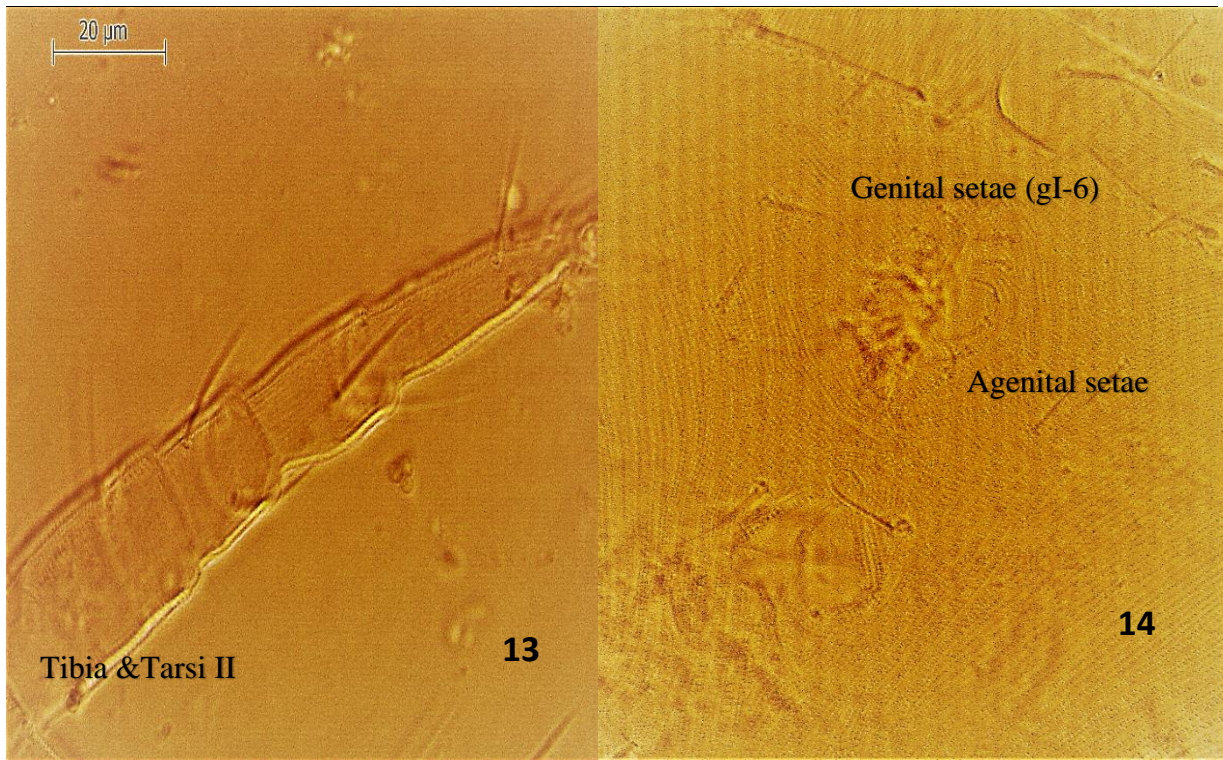
Figures 1-4. *Brachytydeus armindae* (Momen & Lundqvist) (Female), 1. General view, 2. Idiosoma, 3. Prodorsum, 4. Chelicera.



Figures 5-8. *Brachytydeus armindae* (Momen & Lundqvist) (Female), 5. Dorsal setae (c1-d), 6. Dorsal setae (e, f1, f2), 7. Opisthosomal setae (h1-h3, ps1), 8. Gnathosoma.



Figures 9-12. *Brachytydeus armindae* (Momen & Lundqvist) (Female), 9. Palp, 10. Tibia and Tarsi I, 11. Femora and Genua I & II, 12. Genua & Tibia II.



Figures 3-14. *Brachytydeus armindae* (Momen & Lundqvist) (Female), 13. Tibia & Tibia II, 14. Ventral view.

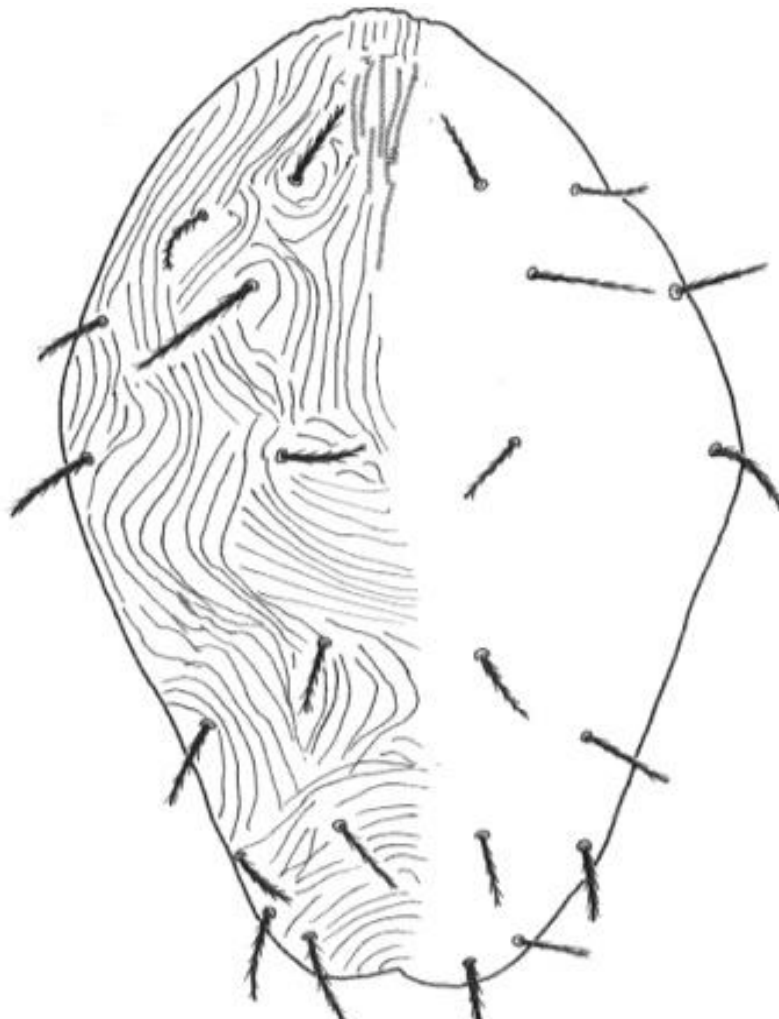


Figure 15- *Brachytydeus armindae* (Momen & Lundqvist) (Female), dorsal view.

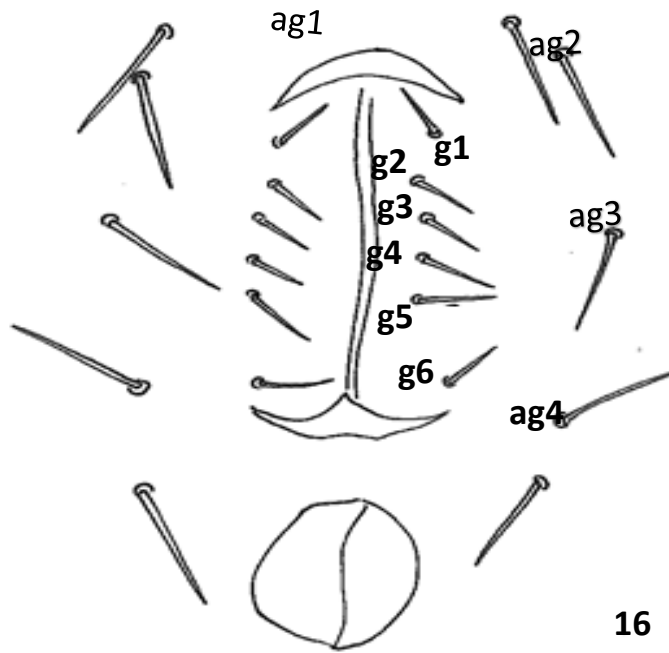


Figure 16- *Brachytydeus armindae* (Momen & Lundqvist) (Female), female genital area.

Key to the *Brachytydeus* Thor, species of Turkey, Females (Based on Ueckermann et al. 2019)

- 1 -Two setae on femur III*Brachytydeus* Thor.....2
- One seta on femur III..... *Tydeus* Koch.....3
- 2 -Dorsum with completely reticulated.....3
- Dorsum with smooth small areas, without complete reticulation.....4
- 3 -Dorsum with setae various-shaped caudally, at most half length of the distance between afterwards*B. pulchra* (Oudemans).....4
- Dorsum with rod like setae, longer than half the distances or longer than distances between afterwards..... *B. reticulata* (Oudemans).....5
- 4 -Hysterosoma striated with vertically between setae *d1* or extending to *f1* 5
- Hysterosoma striated with horizontally between setae *d1*6
- 5 -Setae *h1-2* and *ps1* dull edge at end
.....*B. amica* (Kazmierski) (*f2* apically sharpened). *B. ferula* (Baker) (*f2* obtuse at the tip)
-Hysterosomal setae, short and hairy apart from *sci*,*B. maga* (Kuznetsov).....7
- 6 -Dorsum of idiosoma with various little web like areas *B. livshitzii* (Kuznetsov).....7
- Dorsum of idiosoma lack of web like areas8
- 7 -Hysterosomal setae mostly rounded edge with *f1*, *f2*, *h1*, *h2* and *ps1* clavate;.....
..... *B. paraobliqua* (Panou & Emmanouel).....8
- Hysterosomal setae mostly short in size, similar shape or some of the longer of blunt shaped.....8
- 8 -Hysterosomal setae short and similar in shape*B. obnoxia* (Kuznetsov & Zapletina).....8
- Some dorsal setae (*f2* *h1*, *h2*, *ps1*) longer than others and blunt shaped distally. Prodorsal setae moderately notched*B. armindae* (Momen & Lundqvist).....8

Acknowledgements

This publication has formed a part of the PhD study of Ayhan Öğreten. We thanks Prof. Mohammad Khanjani (Bu-Ali Sina University, College of Agriculture, Hamedan, Iran) and his colleagues for confirmation of the identification of species. We wish to thanks Dr Sreerama Kumar Prakya (Principal Scientist (Plant Pathology; India) early reading of this manuscript.

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