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A New Water Mite Species (Acariformes, Hydrachnidia) for the Fauna of Türkiye

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ABSTRACT

This study provides the first record and morphological description of the freshwater mite genus *Tartarothyas* Viets, 1934 and *Tartarothyas micrommata* Viets, 1934, from Aksu Stream in Isparta Province, Türkiye. The results of this study are expected to contribute significantly to a better understanding of the water tick fauna in Turkey. The findings emphasize the importance of comprehensive morphological reassessments and DNA analyses to better understand the species' evolutionary relationships.

Keywords: New record, Hydrachnidia, Acari, Tartarothyas, Türkiye

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Türkiye Faunası İçin Yeni Bir Su Akarı Türü (Acariformes, Hydrachnidia)

Öz: Bu çalışma, Türkiye'nin Isparta İli Aksu Deresi'nden *Tartarothyas* Viets, 1934 cinsi ve *Tartarothyas micrommata* Viets, 1934 türüne ait ilk kaydı ve morfolojik tanımını sunmaktadır. Bu çalışmanın sonuçlarının, Türkiye'deki su kenesi faunasının daha iyi anlaşılmasına önemli ölçüde katkı sağlayacağı düşünülmektedir. Bulgular, türün evrimsel ilişkilerini daha iyi anlamak için kapsamlı morfolojik yeniden değerlendirmelerin ve DNA analizlerinin önemini vurgulamaktadır.

Anahtar kelimeler: Yeni kayıt, Hydrachnidia, Acari, Tartarothyas, Türkiye

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Introduction

In freshwater habitats, the most notable group of Arachnida is the Hydrachnidia, also known as water mites. Globally, more than 6,000 species representing 57 families, 81 subfamilies, and more than 400 genera have been described (Cimpean and Battes 2018). Water mites, such as *Tartarothyas*, play a critical role in freshwater biodiversity and serve as valuable indicators for environmental quality assessment (Di Sabatino et al. 2008). With the highest number of reported species (1,642 species), the Palearctic region is among the most well-studied regions (Cimpean and Battes 2018) followed by Neotropical region with 1491 species (Goldschmidt et al. 2021).

The first studies on water mites in Türkiye were conducted by Thon (1905) on specimens collected in the vicinity of Mount Erciyes, where two new species were described. To date, 348 species belonging to 63 genera and 25 families have been recorded from Türkiye. With the addition of the present study; Türkiye presently comprises a total of 349 species and 64 genera (Erman et al. 2019, Esen 2022, Kijevcanin 2024).

Since the genus *Tartarothyas* Viets, 1934 was reported from Southeastern Europe (*T. micrommata* Viets, 1934), only a few findings have been reported from the Western Palearctic region. Currently, two species belonging to this genus, *T. micrommata* Viets, 1934 and *T. romanica* Husiatinschi, 1937, are recognized in the European fauna. (Gerecke 1996, Di Sabatino et al. 2010, Goldschmidt et al. 2021) The genus is mostly crenobiont, with almost all the finds from Europe, North America and the Indo-Australian

regions relating to springs, particularly helocrenes (Di Sabatino et al. 2008, 2010).

The aim of this study is to contribute to a better understanding of the ecosystem by incorporating a species that has not yet been recorded from Türkiye's freshwater systems into the fauna list.

Materials and Methods

The samples were collected from the Aksu stream near Pazarköy in Isparta province, at, 37° -44′ -31.97″ N, 30°-01′-32.96″ E (Fig 1).

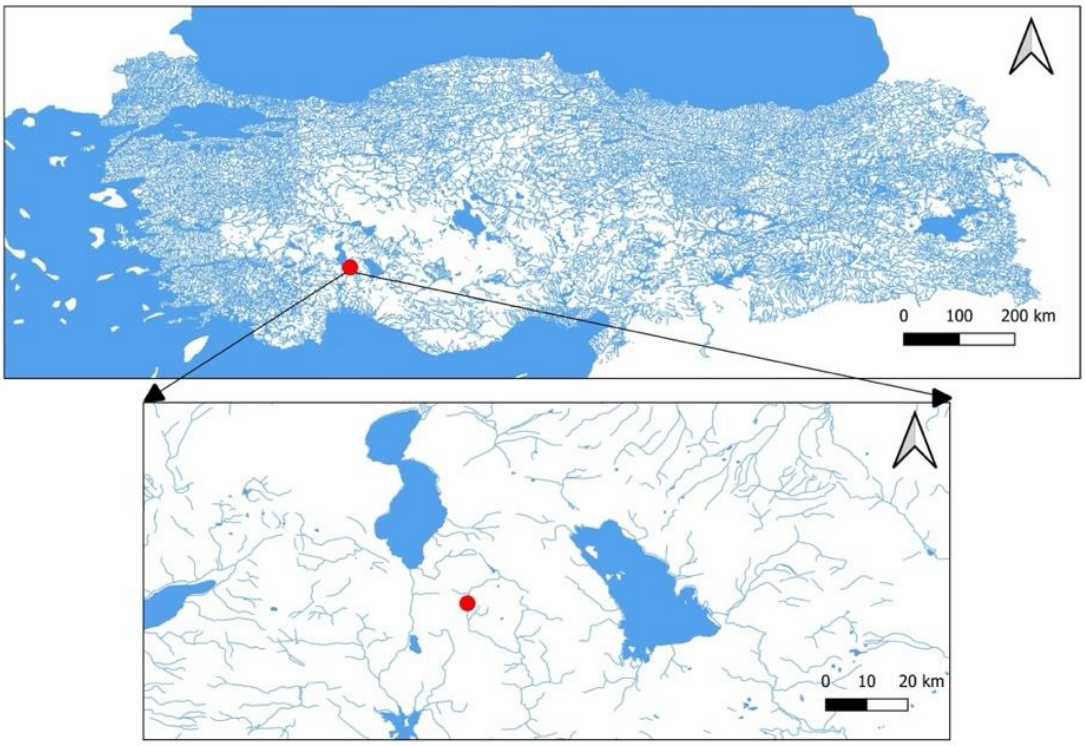

Figure 1. Map of the study area

Water mites were collected from habitats with vegetation growth along the smaller tributaries of the Aksu River using with hand nets and were fixed in Koenike's solution. The specimen were dissected and exhibited in a laboratory. All measurements are given in micrometers. The following abbreviations are used: Ac: acetabula, Cx-I: the first coxae, P-1: palp segment 1, and IV-L-5: fourth leg, fifth segment.

Result

Family: Hydryphantidae
Subfamily: Tartarothyadinae
Genus: *Tartarothyas* Viets, 1934

Lateral eyes reduced in size, not encapsulated; Ac oval, in the membranous area between the gonopore and genital flaps; suture line separating Cx-I/II nearly parallel to the longitudinal idiosomal axis; chelicerae with very strong claws (Harvey 1987).

Tartarothyas micrommata Viets, 1934
Synonimes: *Tartarothyas fonticola Motas & Tanasachi, 1957*
Tartarothyas vietsi Motas & Tanasachi, 1962

Diagnosis; (Adult-Female) legs without swimming setae; dorsal plates absent; glandularia platelets absent; lateral eyes reduced; body not elongated (Harvey 1987).

Description: Adults. Integument smooth. Genital flaps with 2-3 pairs of setae and 3 pairs of acetabula; the first pair was longest, and the third pair was ovoid (Fig. 2A). Female: body 835/545; Capitulum with two seate on anterior margin, capitulum L 213, P-1 with a thickened, sub-distal seta on the medial surface and with distal extension; P-5, with two slightly processes (Fig. 2.B). P-1-5: 30-62-57-100-42. Cx I-II with 1-2 stout setae on distal ends (Fig. 2.A). Legs without swimming setae; claws completely smooth; leg IV: 95-120-110-175-212-190 (Fig.3). Anus without associated sclerite (Fig 2A). genital field L/W 112/125. Palp (Fig 4A-B): Inside the palp, thickened, sub-distal seta is observed on the medial surface and with distal extension. Chelicerae (Fig 4C).

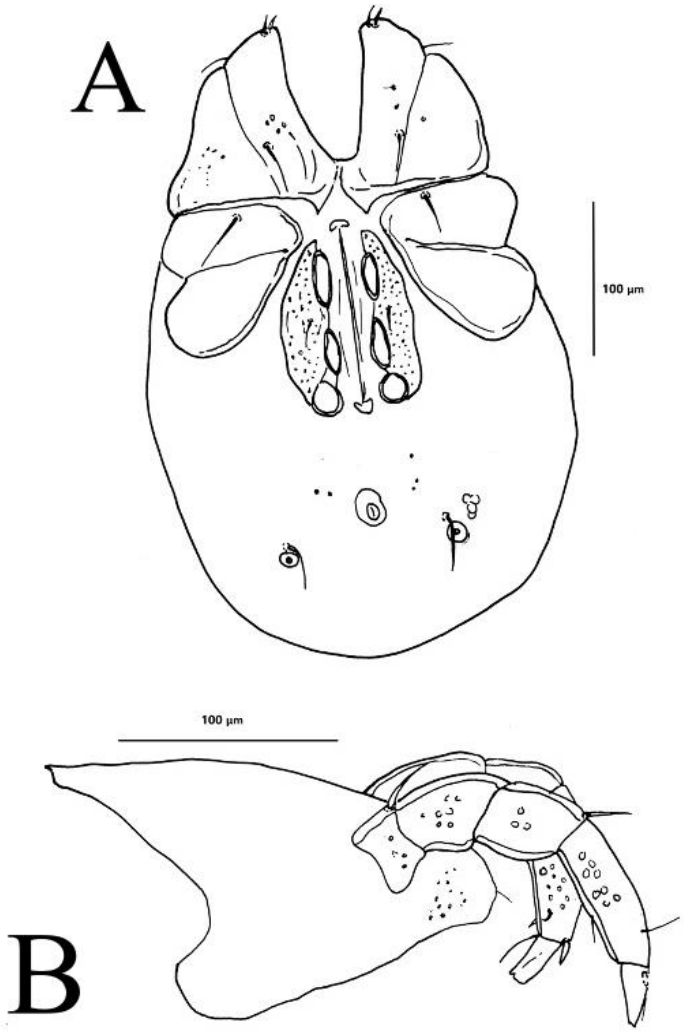

Figure 2. *Tartarothyas micrommata* Female ; A) Ventral view B) Capitulum, palps.

Figure 3. *Tartarothyas micrommata* IV. Leg

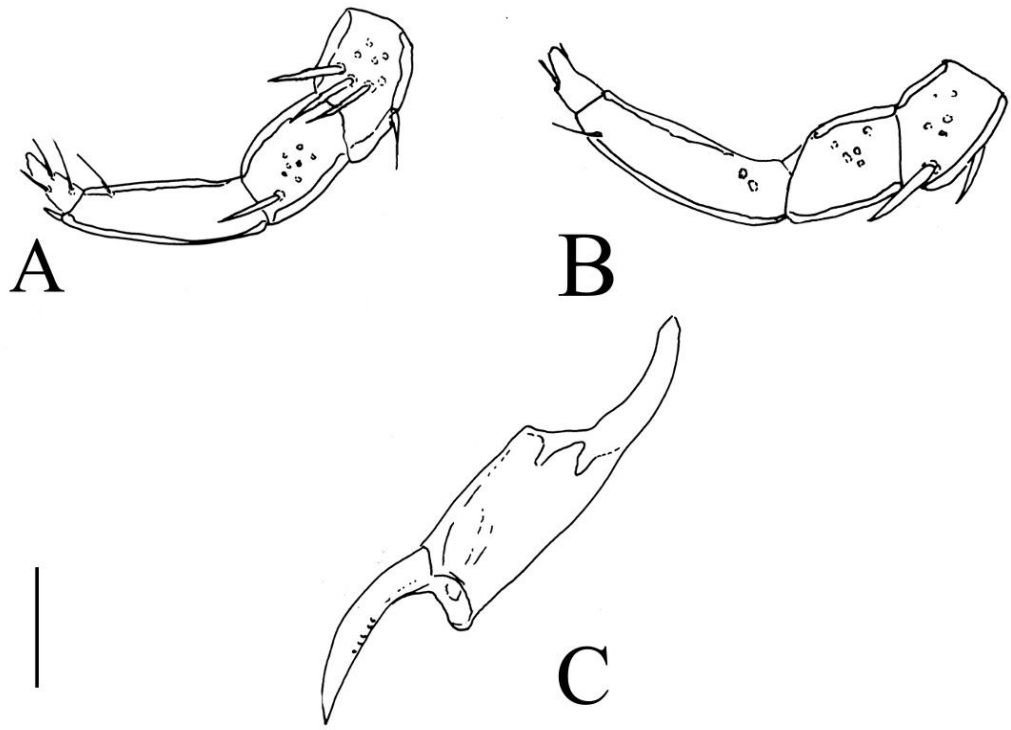

Figure 4. A) Palp inside, B) Palp outside C) Chelicerae (bar represents 100µm)

Discussion

It is noteworthy that, among the few previously described species of *Tartarothyas*, nine are currently known across four different continents, all of which exhibit remarkable morphological similarity. Moreover, the morphological differences used for species separation in Europe have shown considerable variability within larger populations, leading to the synonymization of three out of five temporarily described European species (*T. fonticola* (Motas and Tanasachi 1957), *T. raetica* Bader, 1989 and *T. suecica* Bader, 1989) (Gerecke 1996; Di Sabatino et al. 2008). In addition to size differences, the species primarily vary in palpal setation. However, some setae are challenging to recognize, making the available explanations frequently incomplete and the illustrations unreliable. Additional differences pertain to the size and shape of the acetabula and cheliceral claws. Published measurements of genital field length are difficult to compare, as previous species descriptions did not specify the distances used.

Thus, a comprehensive reassessment of the variability in morphological characteristics across all currently recognized taxa would be beneficial. Furthermore, molecular data would be invaluable in elucidating the evolutionary relationships within this fascinating genus. According to Goldschmidt and Ramirez (2020), water mites play a crucial role in the diversity of freshwater systems and are excellent indicators for assessing water quality and environmental integrity. Due to the limited number of available specimens, the evaluation and study of these species will be difficult.

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