

New Species of *Arrenurus* Dugès (Acari: Hydrachnidia: Arrenuridae) from Taiwan

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Abstract

This paper describes a new water mite, *Arrenurus wengi* sp. nov. from the Guantian Wetland, Tainan City, Taiwan. Male total length (µm) 639, width 528, and height 434, female total length 992, and width 860. Scanning electron microscope images illustrate the structure of male and female species.

Keywords

Hydrachnidia, Arrenuridae, Taxonomy, New Species, Taiwan

1. Introduction

Arrenuridae is one of the largest families of Hydrachnidia, water mites. The classifications of some species are still inconsistent because of taxonomic research on the world's flora is still ongoing [1] [2] [3] [4]. *Arrenurus* Dugès 1834 is a prolific genus, known to be present in America [5] [6], Australia [7], China [1] [8] [9] [10], India [11], Laos [10], Neotropical [3], Subtropical [12], and Turkey [13], respectively. We try to describe this small group of organisms with high-resolution scanning electron microscope (SEM) images.

2. Materials and Methods

All specimens were collected from Guantian Wetland (23° 11'01"N, 120° 18'17"E) of Tainan City in February 12, 2004. The environment in Guantian Wetland features lotus field and shallow pond of freshwater [14]. A total of 20 water mites were collected. All specimens were preserved in 40% alcohol before being returned to the Kun-Shan University laboratory, where they were washed and preserved in 75% alcohol for subsequent identification.

The Arrenuridae specimens were identified using the methods described in

previous studies [1] [3] [8] [9] [10]. In total, 7 adult specimens were preserved in the National Museum of Natural Science (NMNS), Taichung, Taiwan (NMNS-4287-001 to NMNS-4287-004).

The images were captured using a JEOL JEM 1200-EX TEM scanning electron microscope to determine the species' characteristics. All measurements are given in micrometer (μm).

3. Results

A total 20 adult water mite specimens were Arrenuridae. These adult mites have glandular hairs, stubby palps, no chelicerae but pinched ends, sclerotic bodies, and ventral shells. Male water mites with dorsal furrow and palp not cante is of the genus *Arrenurus* Dugès, 1834.

The SEM graphs illustrate the morphology and detailed structures of the species, which allow them to be distinguished from other congeners by a male or female mite. The key and detailed description are as follows.

3.1. Key to Species of Arrenuridae from Taiwan

- | | |
|--|---------------------------------|
| 1) Male..... | 2 |
| Female..... | 3 |
| 2) Male, dorsal furrow complete, petiole bifurcated and sunken in the middle, one smooth setae on each P1 to P4 (Figure 5(B))..... | |
| | <i>Arrenurus wengi</i> sp. nov. |
| Male, dorsal furrow incomplete, petiole bifurcated and sunken in the middle; P2 has 10 long bristles..... | <i>A. decaspinosus</i> |
| 3) Female, dorsal furrow complete, anus is located between the genital field and in a horizontal band, P2 has 5 long bristles..... | <i>A. shih</i> |
| Female, dorsal furrow incomplete, anus is located between the genital field and in a slightly curved band, P2 has 5 smooth long setae (Figure 8(A)) | |
| | <i>A. wengi</i> sp. nov. |

3.2. *Arrenurus wengi* sp. nov. Weng and Ueng, 2022 (Figures 1-8)

Type material

Holotype: one male water mite specimen was collected from Guantian Wetland, Tainan City on February 12, 2004 (NMNS-4287-001) (**Figure 1(A)**).

Paratypes: one male (NMNS-4287-002) and one female (NMNS-4287-003) water mites were collected from the locality on the same date as the holotype by Tzu-Yang Weng and Yih-Tsong Ueng (**Figure 1(B)** and **Figure 7(A)**).

Male

Idiosoma color dark green, 639 in length, 528 in width, and 434 in height. Body nearly oval, sclerotic throughout, small pores scattered on the surface, and dorsal shield complete. Posterior margins of cauda with a median cleft and cauda oblique. Petiole with a petiole ridge. Body nearly oval, sclerotic throughout, and with small pores scattered on the surface (**Figure 1**). Cauda is volcano-cone

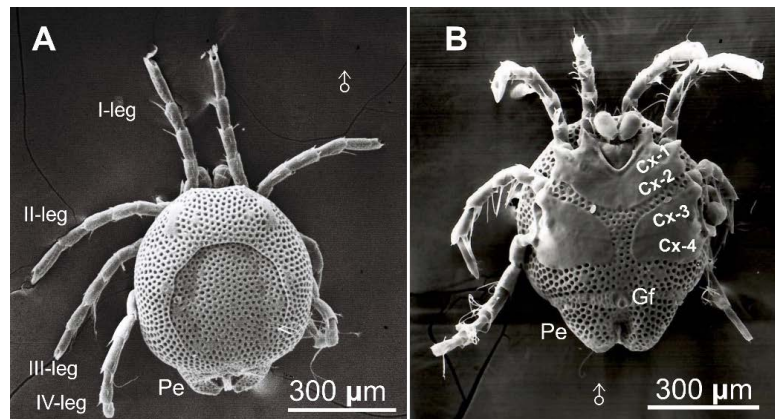


Figure 1. Adult male of water mite *Arrenurus wengi* sp. nov. (A) Dorsal view of holotype (NMNS-4287-001), (B) Ventral view (SEM), Cx1 to 4: coxa 1 to 4, Gf: genital field, I to IV-leg: front to back legs, Pe: petiole.

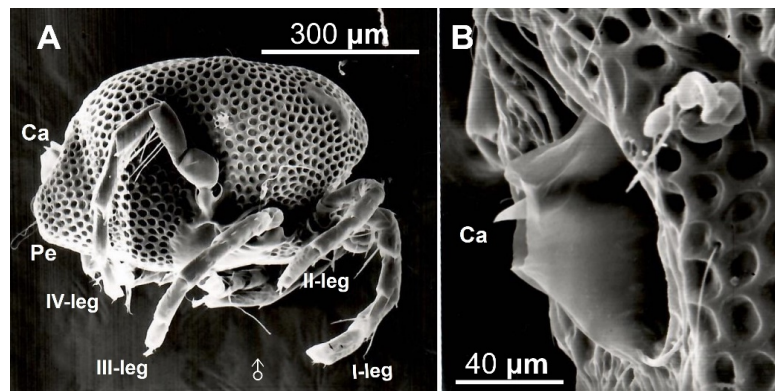


Figure 2. Adult male of water mite *Arrenurus wengi* sp. nov. (A) Lateral view of paratype (NMNS-4287-002), (B) Cauda of tail part (SEM). I to IV-legs: front to back legs, Pe: petiole, Ca: cauda.

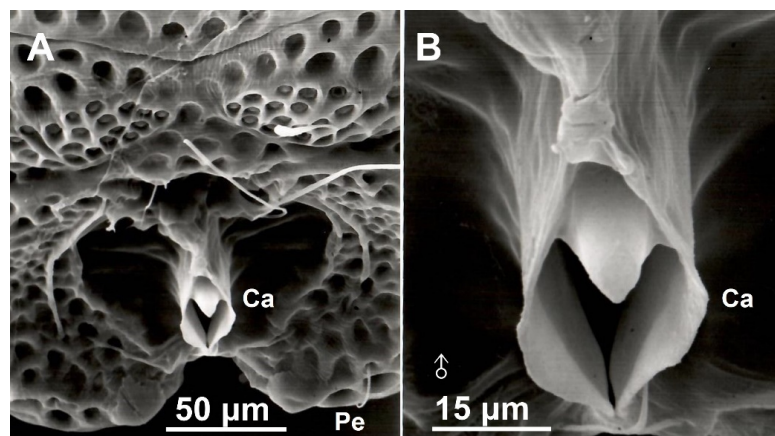


Figure 3. Body tail of male water mite *Arrenurus wengi* sp. nov. (A) Dorsal view of tail part, (B) Detail of cauda (SEM). Pe: petiole, Ca: cauda.

shaped (Figure 2). Dorsal view of tail part, the petiole ridge is shorter than cauda and hidden in petiole (Figure 3). Ventral view of petiole ridge slightly accen-

tuates the seam of petiole, and the petiole median ridge is trident shaped (Figure 4). Length of palp segments P1 to 4: 9, 22, 36, and 74, for each of P1 to P4 with 1 smooth setae (Figure 5). Length of I-leg-2 to 6: 53, 99, 123, 133, and 150 (Figure 6).

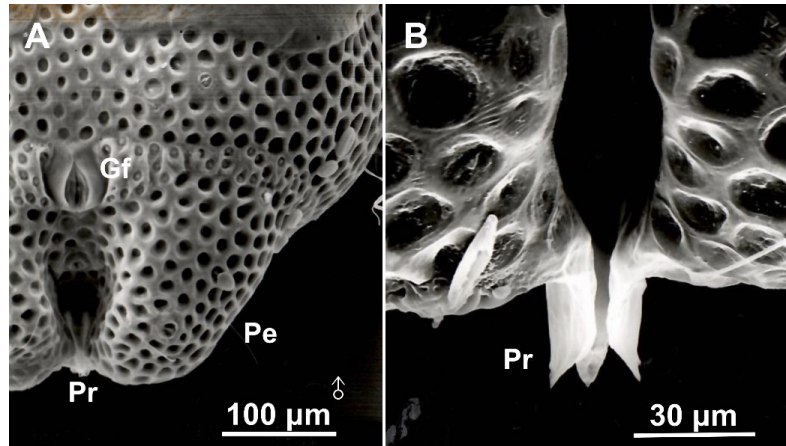


Figure 4. Adult water mite of *Arrenurus wengi* sp. nov. (A) Ventral view of part tail, (B) Detail of petiole ridge (SEM). Gf: genital field, Pe: petiole, Pr: petiole ridge.

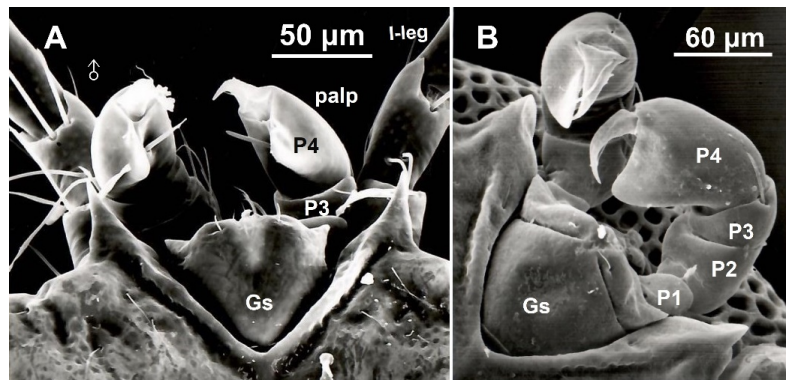


Figure 5. Palps of water mite *Arrenurus wengi* sp. nov. (A) Lateral view of male, (B) Ventral view of male (SEM). Gs: gnathosoma, P1 to 4: palp segments.

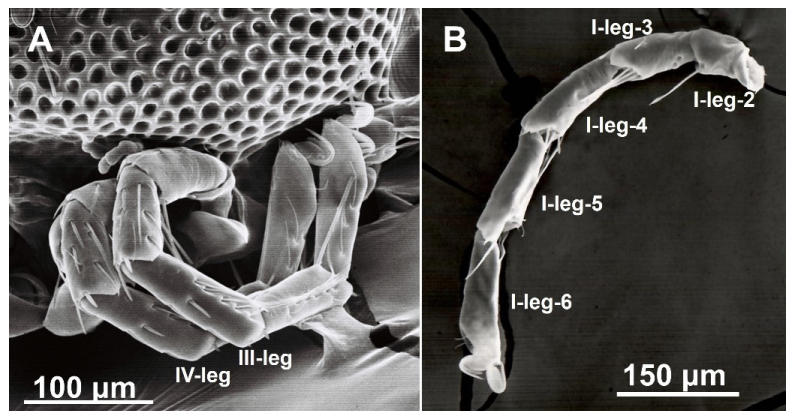


Figure 6. Water mite of *Arrenurus wengi* sp. nov. (A) Lateral view of legs, (B) Lateral view of I-leg (SEM). I-leg-2 to 6: I-leg segments 2 to 6.

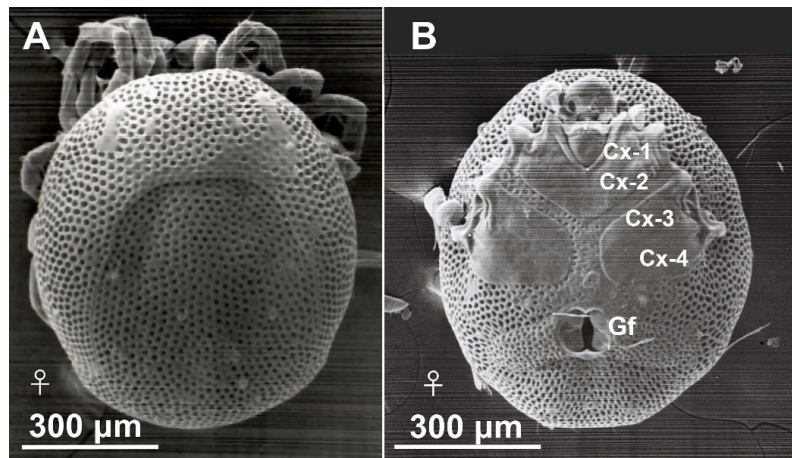


Figure 7. Adult female water mite of *Arrenurus wengi* sp. nov. (A) Dorsal view of paratype (NMNS-4287-003), (B) Ventral view (SEM). Gf: genital field, Cx1 to 4: coxa 1 to 4.

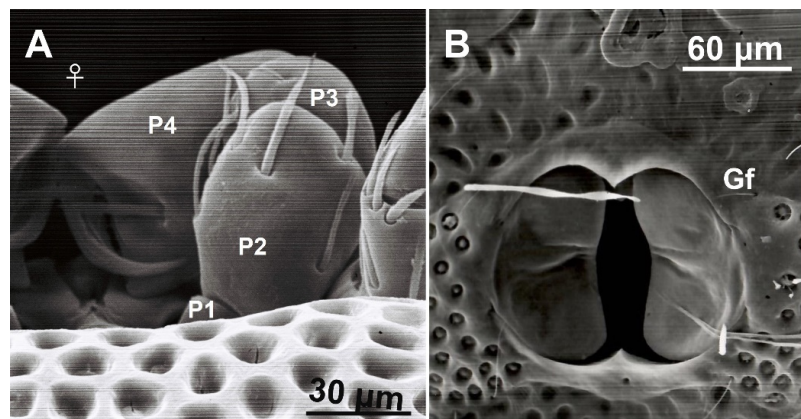


Figure 8. Female water mite *Arrenurus wengi* sp. nov. (A) Ventral view of palp, (B) Anus (SEM). Gf: genital field, P1 - 4: palp segments 1 to 4.

Female

Idiosoma color dark green, 992 in length, and 860 in width. Body nearly oval, sclerotic throughout, small pores scattered on the surface, and dorsal shield incomplete (**Figure 7**). Length of palp segments P2 to 4: 56, 39, and 58, P2 with 5 smooth setae, and P3 and P4 with 1 smooth setae (**Figure 8(A)**). Small holes adjacent to the anus with protrusions (**Figure 8(B)**).

Ecology

Freshwater wetland.

Distribution

Taiwan.

4. Discussion

A. madarasi, *A. madarasiatus*, *A. huazhongensis* of the same genus have more setae on legs and plaps than *A. wengi* [1] [8] [9] [10]. The setae of P2 of *A. shih* and *A. decaspinos* were long bristles [12], but *A. wengi* were smooth setae. Therefore, in addition to the cauda of *A. wengi* is the volcano's cone-shaped

structured (**Figure 2(B)**), and the petiole median ridge is like a trident (**Figure 4(B)**), can be clearly separated from other congeners by male mites [1] [8] [9] [10].

The water mite figure of *A. decaspinos*, which 623 in length, and 547 in width (in Lin 2005: Figure 4(A) and Figure 4(B)) is more like the report of male water mites of *A. madarasziatus* taxa, which figures 1A and 1C in Jin and Guo's reported (1992) [8] [9]. Even if it is really a female mite, it can also be distinguished from *A. wengi* according to the characteristics of palps. Further pointed out, the water mite figure of *A. shih* (in Lin 2005: Figure 5(A) and Figure 5(B)), were 780 in length, and 687 in width [12].

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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