

A new subgenus representing a newly recorded genus from China, with a new species featured with special palps (Acari, Hydryphantoidea, Hydryphantidae, *Partnunia*)

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Original research

ABSTRACT

A new subgenus *Peculiaripalpus* **subgen. nov.** with a new species *Partnunia* (*Peculiaripalpus*) *longlingensis* **sp. nov.** which belongs to *Partnunia* Piersig, 1896 is described and illustrated. *Partnunia* represents a newly record genus of Protziinae Koenike, 1909 for Chinese fauna. The diagnosis of *Partnunia* is modified according to the new species. An updated key is provided for the subfamilies, genera and subgenera of Hydryphantidae.

Keywords water mites; new taxa; scanning electron microscope

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Introduction

The genus *Partnunia* belongs to Protziinae, Hydryphantidae, Hydryphantoidea, Acari, and is mainly distributed in Europe, North America, Japan and Indian Himalaya (Smit, 2020). The diagnosis of this genus focuses on its simple claws and setae-bearing sclerites, which are either located laterally to the base of most genital acetabula or completely absent. These characteristics are significantly different from the other two genera in Protziinae (Smit, 2020). Currently, there are no subgenera within this genus.

Through an intensive study of the watermite fauna of China, a species, *Partnunia* (*Peculiaripalpus*) *longlingensis* **sp. nov.**, was found to be new to science, representing a newly recorded genus and new subgenus for Chinese watermite fauna. The new species was distinguished from other species in genus *Partnunia* for its special shape of the palps. Meanwhile, the diagnosis of the genus was revised according to the new species.

Material and methods

Water mites were collected by a hand netting of 250 µm mesh size, two stacked sieves (mesh size 4 mm above, 250 µm below), a dropper and a white tray were used to capture water mites. Specimens were preserved in Koenike's fluid (glacial acetic acid 10 ml, glycerin 45 ml, distilled water 45 ml) and mounted in gelatin mounting fluid (gelatin 8–10 g, phenol 0.8 g, glycerin 50 ml, distilled water 50 ml) (Jin, 1997).


Specimens were observed and illustrated under a Nikon DS-Ri2 microscope, and the illustrations were edited with Adobe Photoshop CS 2019®. Specimens were measured and

Received 01 February 2024

Accepted 17 April 2024

Published 13 May 2024

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Academic editor

Auger, Philippe

<https://doi.org/10.24349/wet3-azzc>

ISSN 0044-586X (print)

ISSN 2107-7207 (electronic)



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How to cite this article Zhong H. *et al.* (2024), A new subgenus representing a newly recorded genus from China, with a new species featured with special palps (Acari, Hydryphantoidea, Hydryphantidae, *Partnunia*). *Acarologia* 64(2): 654-660. <https://doi.org/10.24349/wet3-azzc>

photographed using Nikon DS-Ri2. The treatments of scanning electron microscope referred to Li *et al.* (2022).

The following abbreviations are used (Jin 1997; Goldschmidt 2007): a.s.l. = above sea level, A_1 , A_2 = antenniform glandularia 1 and 2, Ap = anal pore, C_1 – C_4 = coxoglandularia 1–4, Cx-1–Cx-4 = coxae 1–4, D_1 – D_4 = dorsoglandularia 1–4, Gf = entire genital field, width measured by outer margin of both sides, Ib = infracapitular bay, Ib–Ap = distance between posterior limit of Ib and edge of Ap, Ib–Gf = distance from Ib to anterior edge of Gf, I–L-1–6, etc = the first leg segments 1–6, II–L-1–6, etc = the second leg segments 1–6, III–L-1–6, etc = the third leg segments 1–6, IV–L-1–6, etc = the fourth leg segments 1–6, L = length, L_1 – L_4 = lateroglandularia 1–4, O_1 , O_2 = ocularia 1 and 2, P–I–P–V = palp segments I–V, V_1 – V_4 = ventroglandularia 1–4, W = width.

All measurements were given in μm . The specimens examined were deposited in the Institute of Entomology, Guizhou University, Guizhou, P. R. China (GUGC).



Figure 1 Photo of the *Partnunia (Peculiaripalpus) longlingensis* sp. nov. site.

Systematics

Family Hydryphantidae Piersig, 1896

Subfamily Protziinae Koenike, 1909

Genus *Partnunia* Piersig, 1896, new record to China

Diagnosis revised (from Smit 2020) — Median eye present or absent. Muscle attachments not sclerotized. Genital flaps well developed and porose, flanking, and posteriorly embracing, a row of stalked acetabula. Palp chelate or not chelate, Legs without swimming setae. Leg claws simple.

Subgenus *Peculiaripalpus* subgen. nov.

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Diagnosis — Median eye absent. Cx-1+2 with a posteromedial projection. Palp not chelate, P-IV without a heavy dorsodistal seta. Legs without swimming setae. Leg claws without lateral clawlets.

Etymology — “*Peculiaris*”, Latin word, means special, “*palpus*” means palp; The subgenus is named after the shape of palp.

Type species — *Partnunia (Peculiaripalpus) longlingensis* sp. nov.

Partnunia (Peculiaripalpus) longlingensis sp. nov.

Zoobank: FD6B07C7-90B4-46B5-8826-5B8DCADAE3B0

Figures 2–5

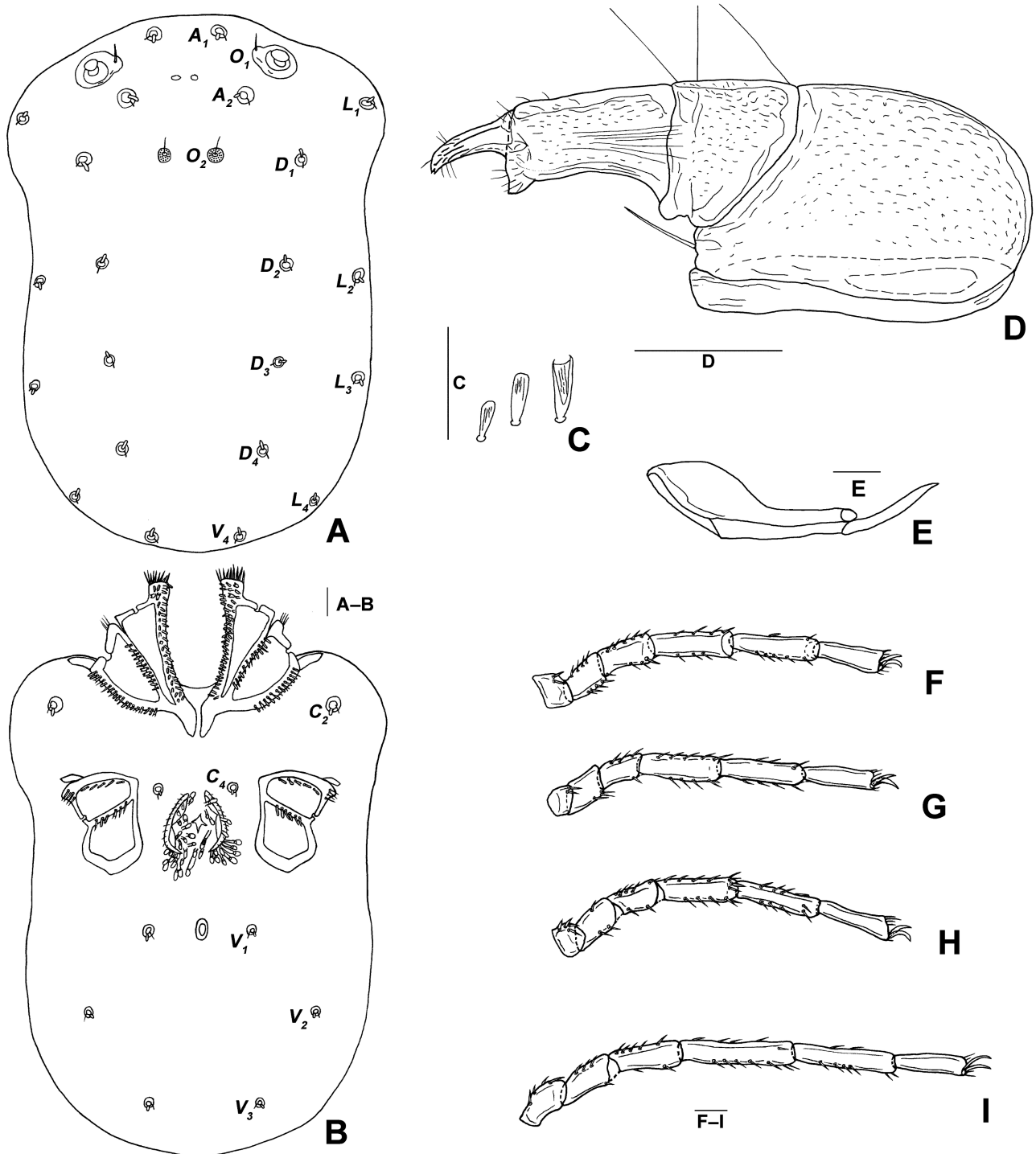


Figure 2 *Partnunia (Peculiaripalpus) longlingensis* sp. nov., male, A – idiosoma, dorsal view; B – idiosoma, ventral view; C – spatulate setae; D – palp; E – chelicera; F – leg I; G – leg II; H – leg III; I – leg IV. Scale bars: 100 μ m.

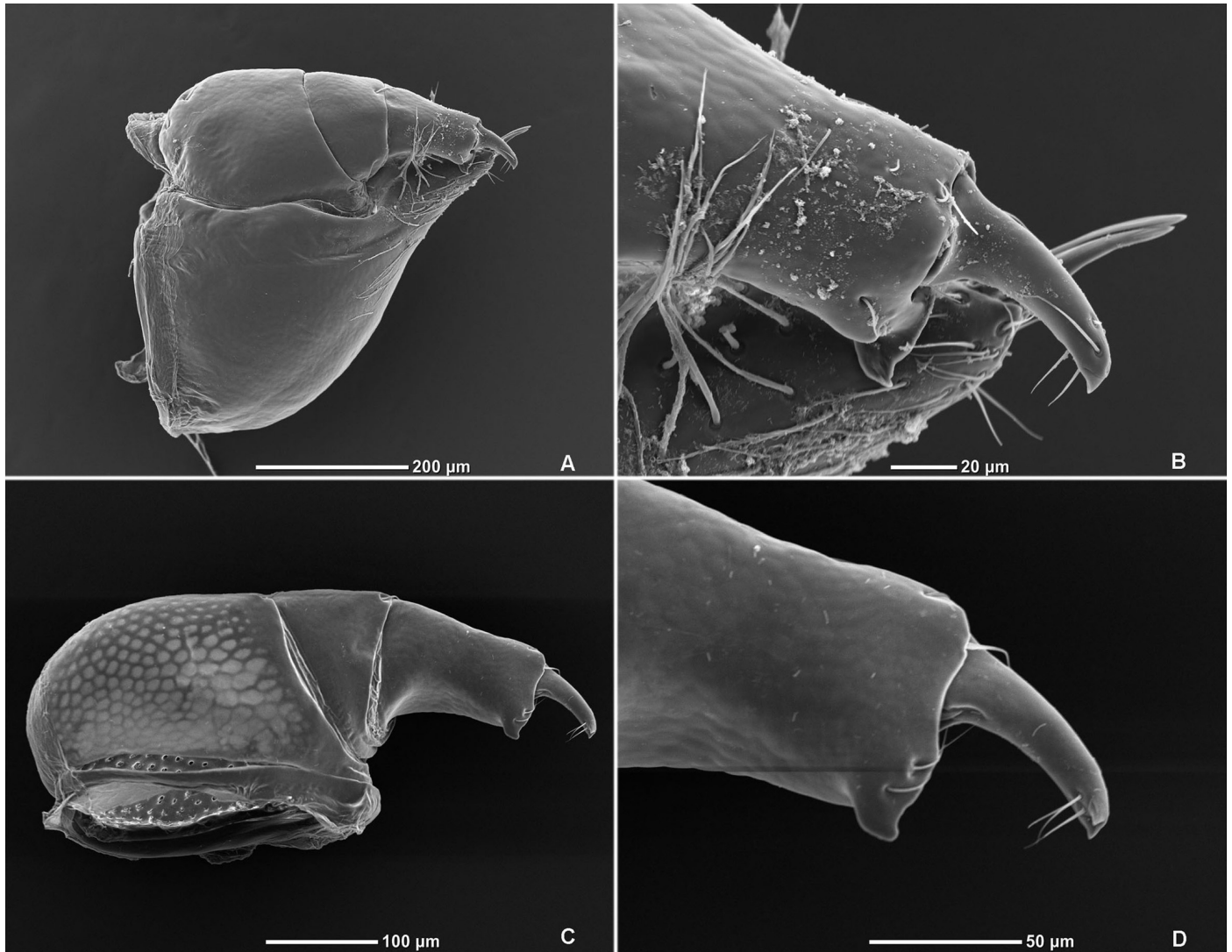


Figure 3 *Partnunia (Peculiaripalpus) longlingensis* sp. nov., female. A – gnathosoma; B – forepart of gnathosoma; C – palp; D – P-V.

Habitat — A stream let in mountain forest with trees and grasses.

Material examined — Holotype: adult male, Longling County, Baoshan City, Yunnan Province, P. R. China (24.8462° N, 98.7607° E; 2027.8 m a.s.l.), collected by Pin Li and Lan Jia (Figure 1), 30-VII-2023. Allotype: adult female, same data as holotype. Paratype: one adult female, same data as holotype.

Etymology — The species is named after the name of its collection site, Longling County.

Description — *Male* (Holotype). Body soft, red in color (Figure 2A–B). Length of idiosoma 1856.2, width 1228.8. Median eye absent, *O1* fused with the capsules of the lateral eyes, *O2* on a small platelet. Coxae in four groups, covered with reticulate ornamentation, on which with plenty of setae, some hair-like, some heavy setae, and some spatulate in shape (Figures 2C, 4B). Cx-1+2 apically blunt and ending posteriorly with a sharply vertical pointed subcutaneous apodeme, the lateral end of Cx-2 with an apodeme (Figure 4A). Cx-1+2 L/W 601.7/479.9. Every plate around the coxal cavities of legs with an incision except Cx-4 (Figure 4B). Cx-3+4 anterolaterally with a thick apodeme. Cx-3+4 L/W 406.5/301.1. Ib-Ap 1075.3. Ib-Gf 588.9. Genital field (except stalks acetabula) 256.3 in length, 268.9 in width. Genital field with a large number of acetabula on stalks, about more than 30 pairs; genital sclerites

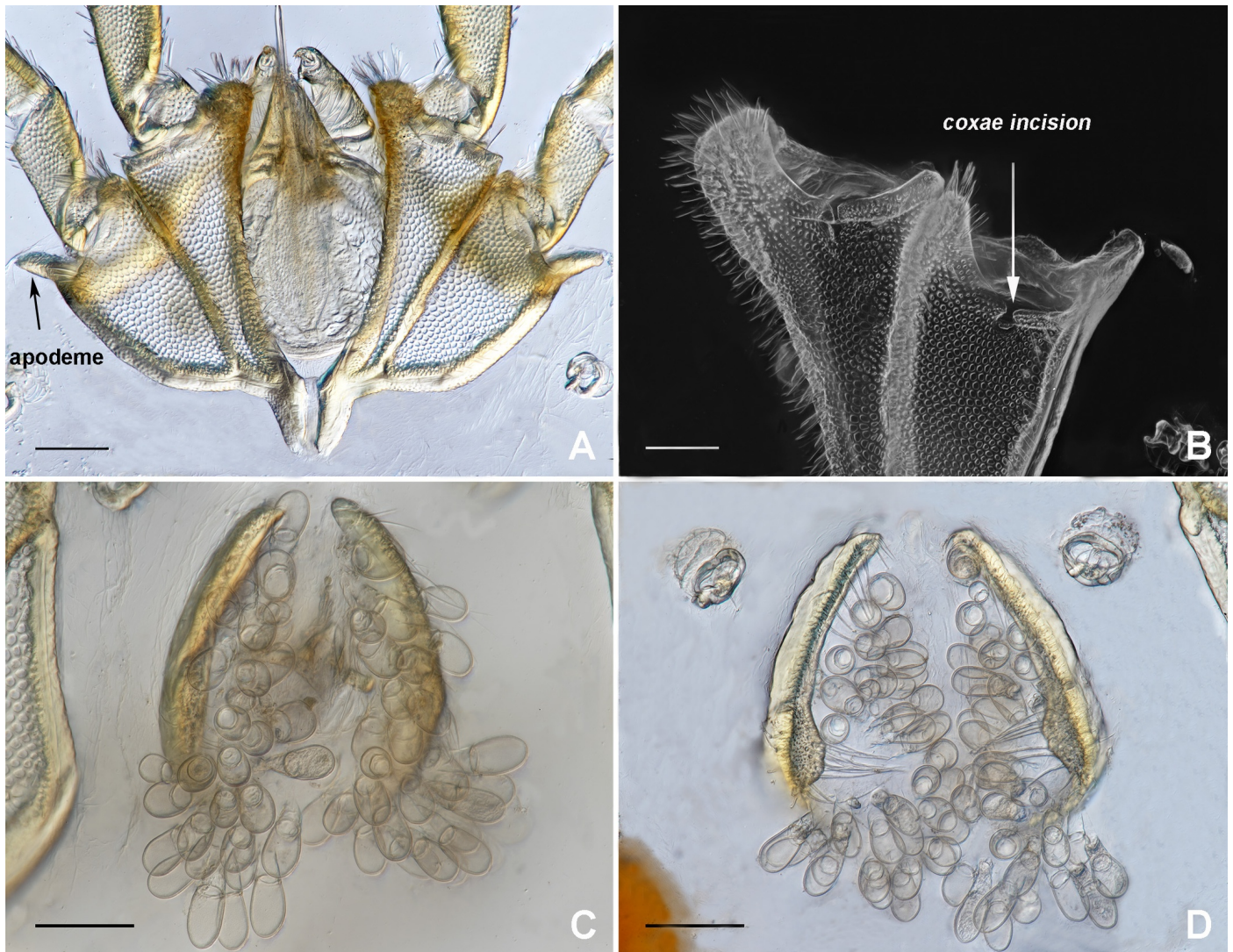


Figure 4 *Partnunia (Peculiaripalpus) longlingensis* sp. nov., A – Cx-1+2 (male); B – Cx-1+2 (female); C – genital field (male); D – genital field (female). Scale bars: 100 μ m.

“C”-shaped, bearing fewer setae (Figure 4C). Sclerotized ring surrounding excretory pore. Gnathosoma protrusible (Figure 5A); Infracapitulum 409.1 in length; Chelicera length 435.1 (Figure 2E), palp not chelate, relatively stout and short, P-II with one long seta on the ventral; P-III with three long hair-like setae on the dorsal; P-IV with three small hair-like setae on the dorsal and five on anterior ventral; more than five setae on P-V (Figures 2D, 5B). Lengths of the segments of palp: P-I, 17.9; P-II, 213.3; P-III, 75.6; P-IV, 105.7; P-V, 58.57. Legs without swimming hairs, claws simple, the terminal segments expanded distally (Figures 2F–I, 5D). Dorsal lengths of segments of leg I–IV: I-L-1, 67.8; I-L-2, 169.2; I-L-3, 150.2; I-L-4, 269.9; I-L-5, 315.9; I-L-6, 242.4; II-L-1, 61.7; II-L-2, 143.8; II-L-3, 157.5; II-L-4, 252.1; II-L-5, 299.7; II-L-6, 256.9; III-L-1, 58.3; III-L-2, 130.6; III-L-3, 139.5; III-L-4, 253.6; III-L-5, 287.5; III-L-6, 271.3; IV-L-1, 120.3; IV-L-2, 146.9; IV-L-3, 235.5; IV-L-4, 399.8; IV-L-5, 372.1; IV-L-6, 267.6.

Female (n=2). Similar with the males. Length of idiosoma 2279.6 (2293.9), width 1595.1 (1586.2). Cx-1+2 L/W 697.7/688.6 (707.3/611.7) (Figure 4B). Cx-3+4 L/W 575.1/355.5 (528.1/377.9) (Figure 5C). Ib-Ap 1181.1 (1097.8). Ib-Gf 646.5 (451.3). Genital field (except

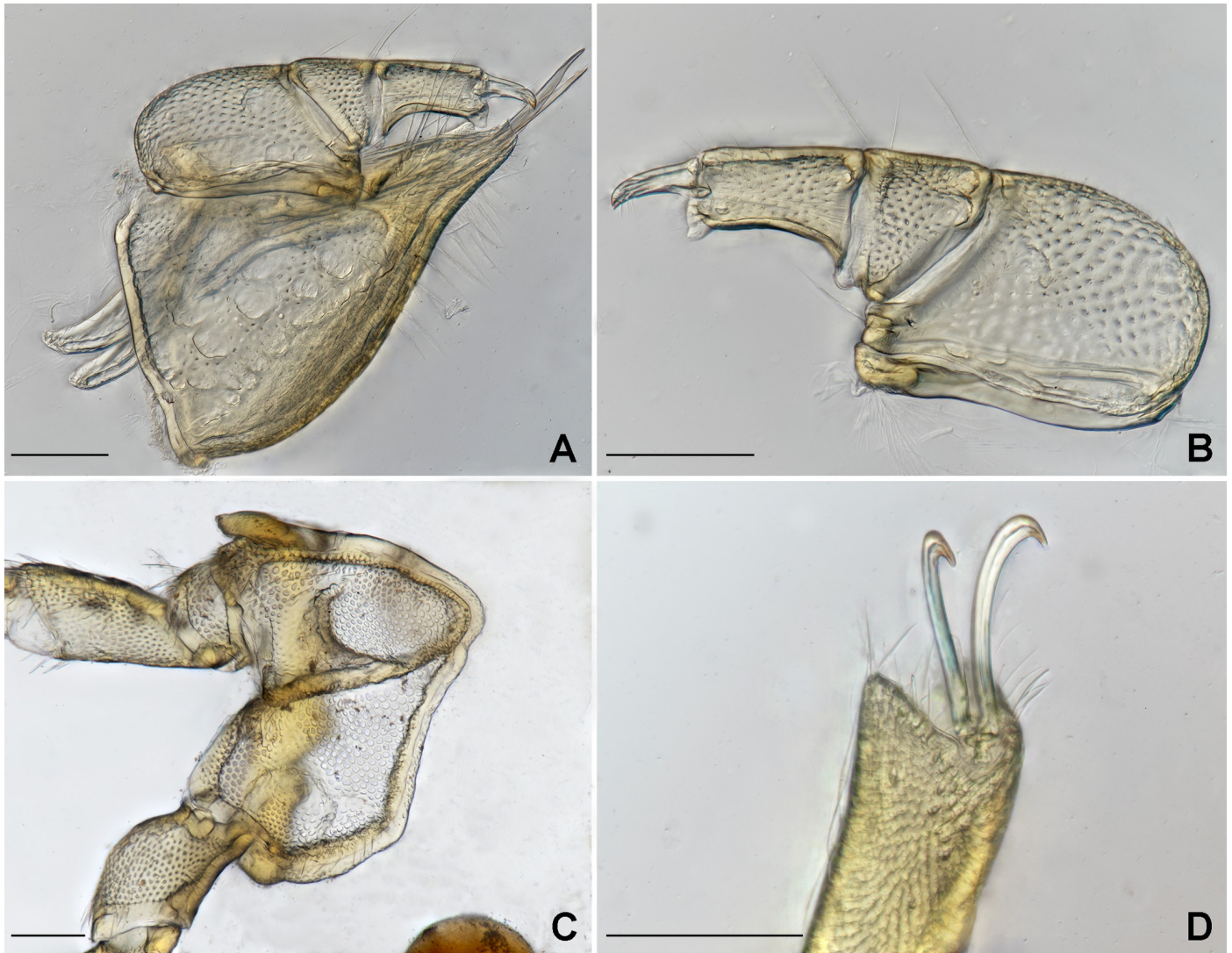


Figure 5 *Partnunia (Peculiaripalpus) longlingensis* sp. nov., A – gnathosoma (male); B – palp (male); C – Cx-3+4 (female); D – leg I (male). Scale bars: 100 μ m.

acetabula on stalks) 371.5 (313.6) in length, 413.3 (365.1) in width. With many thick and long setae at the posterior end of genital sclerites (Figure 4D). Infracapitulum 537.5 (463.2) in length, chelicera length 481.2 (446.2). P-II with one long seta on the dorsal; P-III with one long hair-like seta on the dorsal; P-IV with three fine setae on the dorsal and four on the anterior ventral; More than five setae around the P-V (Figure 3A–D). Lengths of segments of palp: P-I, 23.2 (22.3); P-II, 311.3 (299.7); P-III, 123.8 (119.9); P-IV, 161.2 (138.7); P-V, 75.7 (78.1). Dorsal lengths of segments of leg I-IV: I-L-1, 98.1 (120.3); I-L-2, 185.63 (198.5); I-L-3, 195.66 (185.3); I-L-4, 318.3 (312.9); I-L-5, 358.5 (362.5); I-L-6, 323.6 (337.9); II-L-1, 97.6 (100.1); II-L-2, 192.5 (185.7); II-L-3, 177.8 (187.5); II-L-4, 310.9 (285.1); II-L-5, 359.5 (337.3); II-L-6, 319.2 (273.3); III-L-1, 106.4 (83.5); III-L-2, 212.2 (168.3); III-L-3, 230.6 (167.8); III-L-4, 352.9 (298.1); III-L-5, 382.2 (319.4); III-L-6, 303.5 (252.7); IV-L-1, 177.8 (162.7); IV-L-2, 213.3 (212.2); IV-L-3, 289.4 (273.2); IV-L-4, 535.9 (451.8); IV-L-5, 479.1 (428.9); IV-L-6, 330.1 (333.1).

Remarks — The new species can be easily distinguished by following characteristics: (1) non-chelated palps are much stout and small; (2) with a vertical pointed subcutaneous apodeme

at the ending posteriorly of Cx-1+2; (3) the lateral end of Cx-2 with an apodeme.

Discussion

There are three genera in the subfamily Protziinae Koenike, 1909 i.e., *Neocalonyx* Walter, 1919, *Partnunia* Piersig, 1896 and *Protzia* Piersig, 1896 (Cook, 1974). The shapes of palps are very important characteristics in Protziinae, even palp chelate or not are a character of diagnostic significance for the whole family Hydryphantidae (Goldschmidt & Gerecke, 2003). In the new species, the non-chelated palps are very special, extreme swelling of the base, like a cannon, very short and much stout, P-I is almost invisible, P-II is extremely inflated, and the longest segment; P-IV is without the dorsodistal projection, and the second segment in length, contrasted with the other species in the genus *Partnunia*, which are both with normal chelated palps. As we know, palps are the auxiliary predation organ, and very important features in biology evolution. Its change in morphology usually presents its development in evolution, which usually means different taxonomic levels, which has been proved in the other watermite groups, e.g. *Neoatractides* Lundblad, 1941 in Torrenticolidae (see Wiles 1997). Therefore, we erect a new subgenus *Peculiaripalpus* according to its special palp in shape.

Acknowledgements

This research was supported by National Natural Science Foundation of China (32260125) and Guizhou Provincial Science and Technology Projects (Qiankehe Pingtai Rencai-GCC [2022] 029-1).

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