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Contribution to knowledge of the genus *Gibbauropoda* Hirschmann, 1979 (Acari: Uropodidae) with the description of a new species from Vietnam

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Abstract
A new species of *Gibbauropoda* (*G. vietnamica* **sp. nov**.) is discovered and described based on four females and one male from Vietnam. The new species differs from its congeners in having a triangular prolongation of the lateral depression on the dorsal shield, as well as in the setation and sculptural pattern of the dorsal and ventral idiosoma. An updated diagnosis of the genus, accompanied by a new list of known species, is given.

Key words Uropodina, taxonomy, morphology, Southeast Asia.

Introduction

Hirschmann (1976) established the *Uropoda gibba*-species group for five species in the genus *Uropoda*. Hirschmann (1979) promoted the *Uropoda gibba*-species group to the genus level as *Gibbauropoda* Hirschmann, 1979, but Wiśniewski & Hirschmann (1993) again placed these species in a species group within *Uropoda* sensu lato. Kontschán (2024) resurrected the genus and provided a short diagnosis.

Currently, nine species belong to this genus, recorded from Japan (Hiramatsu 1976), from New Guinea (Hirschmann 1976, Hiramatsu & Hirschmann 1978, 1983), and from Vietnam (Hirschmann 1981, Kontschán & Starý 2011). Subsequently, Kontschán et al. (2012) discovered an already known Vietnamese species in Jeju Island, South Korea.

During an investigation of the Southeast Asian soil-dwelling Uropodina in the collection of the Natural History Museum, Geneva (Switzerland), we found a new *Gibbauropoda* species, which we present in this paper.

Material and methods

Specimens examined were placed in lactic acid and cleared for two weeks, then moved to half-covered slides and examined using a Leica 1000 microscope with a drawing tube. Photographs were taken with a Keyence VHX 5000 digital microscope. Specimens examined are stored in 70% ethanol and deposited in the Natural History Museum, Geneva (NHMG). Setae *h* = hypostomal seta, *st* = sternal seta, *eu* = eugenital setae, *lf* = lyriform fissure, *p* = pore, *v* = ventral setae of palp trochanter. All measurements and the scales in the figures are given in micrometres (μm).

Systematic part

Uropodidae Kramer, 1882

***Gibbauropoda* Hirschmann, 1979**
Uropoda gibba-species group Hirschmann, 1976: 55.
Gibbauropoda Hirschmann, 1979: 58.
Gibbauropoda – Halliday 2015: 115; Kontschán 2024: 97.
Uropoda gibba-group – Wiśniewski & Hirschmann 1993: 196–197.

Diagnosis. Idiosoma oval. Dorsal shield completely separated from marginal shield. Central area of dorsal shield elevated from neighbouring areas and divided into a large anterior and a small posterior part. Marginal shield reduced, posterior area of dorsal idiosoma covered by membranous cuticle. Genital shield of female oval or scutiform, without anterior process. Male genital shield oval, situated between coxae IV and bearing eugenital setae. Setae *v2* situated on a long and wide prolongation on palp trochanter.

Type species. *Uropoda* (*Uropoda*) *gibba* Hiramatsu, 1976, by original designation.

Occurrence. Members of this genus have been reported only from New Guinea, Vietnam, Japan, and South Korea.

List of the known species

***Gibbauropoda gibba* (Hiramatsu, 1976)**
Uropoda (Uropoda) gibba Hiramatsu, 1976: 57–60.
Gibbauropoda gibba – Kontschán 2024: 97.
Occurrence. Japan (Hiramatsu 1976).
Habitat. Leaf-litter (Hiramatsu 1976).

***Gibbauropoda hiramatsui* (Hirschmann, 1976)**
Uropoda (Uropoda) hiramatsui Hirschmann, 1976: 54.
Gibbauropoda hiramatsui – Kontschán 2024: 97.
Occurrence. New Guinea (Hirschmann 1976).
Habitat. No information.

***Gibbauropoda hiramatsuiformis* (Hirschmann, 1976)**
Uropoda (Uropoda) hiramatsuiformis Hirschmann, 1976: 55.
Gibbauropoda hiramatsuiformis – Kontschán 2024: 97.
Occurrence. New Guinea (Hirschmann 1976).
Habitat. No information.

***Gibbauropoda hiramatsuioides* (Hirschmann, 1976)**
Uropoda (Uropoda) hiramatsuioides Hirschmann, 1976: 55.
Gibbauropoda hiramatsuioides – Kontschán 2024: 97.
Occurrence. New Guinea (Hirschmann 1976).
Habitat. No information.

***Gibbauropoda hiramatsuisimilis* (Hirschmann, 1976)**
Uropoda (Uropoda) hiramatsuisimilis Hirschmann, 1976: 54.
Gibbauropoda hiramatsuisimilis – Kontschán 2024: 97.
Occurrence. New Guinea (Hirschmann 1976).
Habitat. No information.

***Gibbauropoda lauta* (Hiramatsu & Hirschmann, 1983)**
Uropoda (Uropoda) lauta Hiramatsu & Hirschmann, 1983: 144–145.
Gibbauropoda lauta – Kontschán 2024: 97.
Occurrence. New Guinea (Hiramatsu & Hirschman 1983).
Habitat. No information.

***Gibbauropoda matskasii* (Hirschmann, 1981)**
Uropoda (Phaulodinychus) matskasii Hirschmann, 1981: 115.
Gibbauropoda matskasii – Kontschán 2024: 97.
Occurrence. Vietnam (Hirschman 1981).
Habitat. No information.

***Gibbauropoda meridiana* (Hiramatsu & Hirschmann, 1978)**
Uropoda (Uropoda) meridiana Hiramatsu & Hirschmann, 1987: 84–85.
Gibbauropoda meridiana – Kontschán 2024: 97.
Occurrence. New Guinea (Hiramatsu & Hirschman 1978).
Habitat. No information.

***Gibbauropoda setata* (Kontschán & Starý, 2011)**
Uropoda setata Kontschán & Starý, 2011: 17–18.
Gibbauropoda setata – Kontschán 2024: 97.
Occurrence. Vietnam (Kontschán & Starý 2011) and South Korea (Kontschán et al. 2012).
Habitat. This species was collected in Vietnam in a submontane foggy forest from leaf litter (Kontschán & Starý 2011) and from leaf litter and soil in Jeju Island, South Korea (Kontschán et al. 2012).

Gibbauropoda vietnamica **sp. nov.**
https://www.zoobank.org/urn:lsid:zoobank.org:act:5765F68F-2E1C-4971-AFEB-01B2577E6EF7
(Figures 1–4)

Material examined. *Holotype.* Vietnam, Vinh Puhc Province, evergreen forest, 1 km SE of Tam Dao city, 21°26’49”N, 105°39’06”E, 1000-1200 m, 13/14 May 2012, P. Schwendinger & A. Schultz coll. Female. *Paratypes.* Three female and one male. Locality and date same as in holotype.

Diagnosis. Anterior part of elevated central area bearing four pairs of shorter and three pairs of longer setae. Posterior margin of anterior elevated area strongly sclerotized. Posterior elevated area with two pairs of setae. Trench between anterior and posterior elevated area bearing one pair of seta. Margins of dorsal trench with strongly sclerotized area with and triangular protuberance. Ventral shield with five pairs of long setae.

Description. *Female* (n = 4). Length of idiosoma 770–778, width 618–623. Shape of idiosoma oval, posterior margin. Colour reddish-brown.

Dorsal idiosoma (Figures 1, 4A–D). Dorsal shield completely separated from marginal shield, *ca* 730–742 long and *ca* 430–435 wide. Central area of dorsal shield elevated from neighbouring areas. Elevated area subdivided into larger anterior (*ca* 360–365 long and *ca* 321–324 wide) and smaller posterior (*ca* 182–186 long and *ca* 205–208 wide) parts with a horizontal trench. Anterior part of elevated central area bearing four pairs of shorter (*ca* 70–88) and three pairs of longer (*ca* 140–2175) smooth setae. Posterior margin of anterior elevated area strongly sclerotized, anterior to strongly sclerotized part with a V-shaped furrow and some oval pits (*ca* 9–10×15–17). Posterior elevated area with two pairs of setae (*ca* 72–77). Trench between anterior and posterior elevated area bearing one pair of setae (*ca* 52–55). Margins of trench strongly sclerotized with one pair of triangular prolongation (*ca* 17-20) on caudal part. Margins of dorsal shield bearing 11–12 pairs of smooth setae (*ca* 54-55).

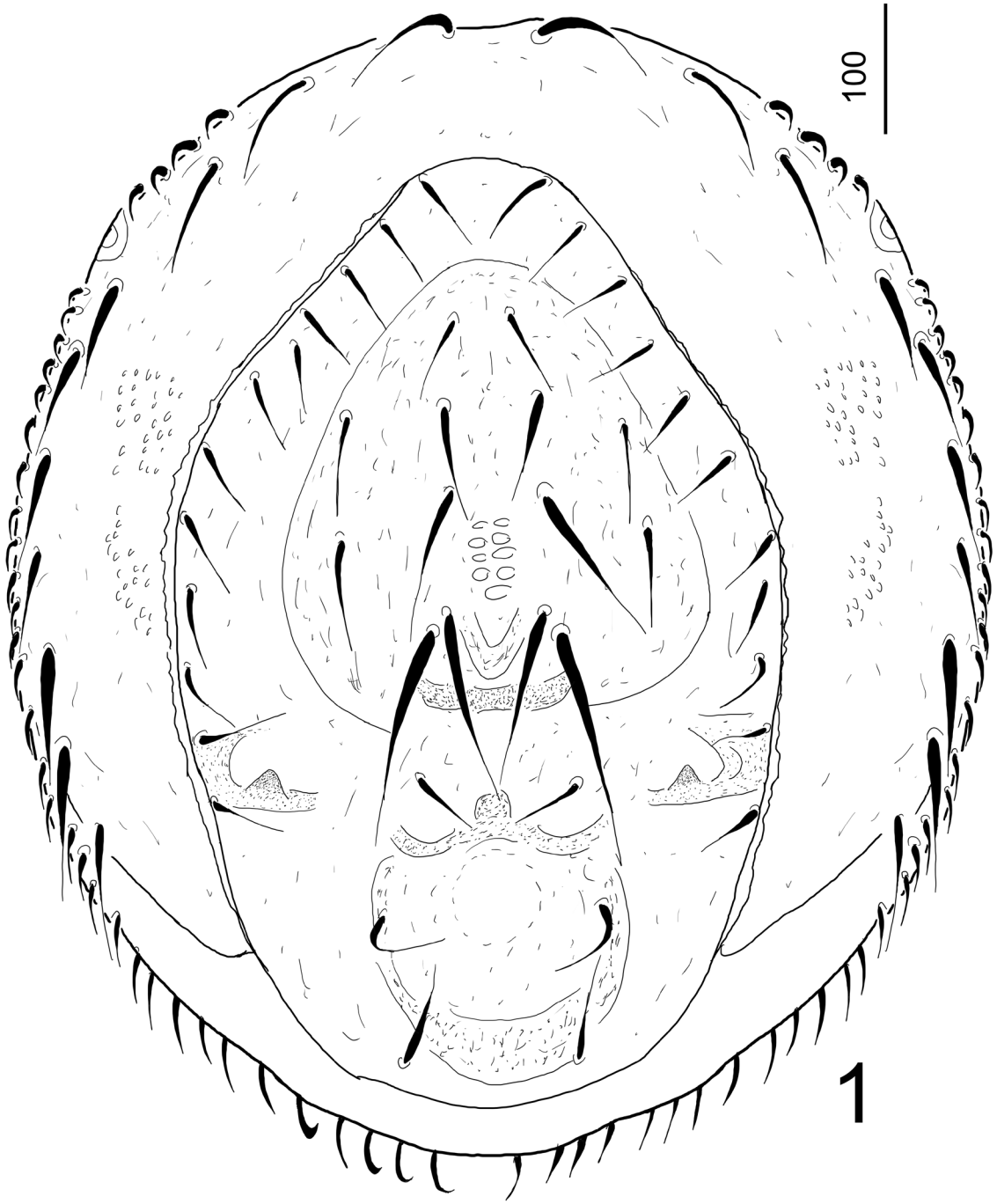


Figure 1. Dorsal view of *Gibbauropoda vietnamica* **sp. nov.**, holotype, female.

Caudal part of marginal shield reduced. Caudal area of dorsal idiosoma covered by membranous cuticle. Marginal shield wide and bearing ten pairs of long and smooth setae (*ca* 86–116) and numerous short (*ca* 28–32) and curved smooth setae. Surface of marginal shield with numerous small oval pits (*ca* 9–10×6–7).

Ventral idiosoma (Figures 2, 4e). Sternal shield without sculptural pattern. All sternal setae smooth, short (*ca* 12–20) and needle-like. Setae *st1* situated close to anterior margin of genital shield, *st2* at level of posterior margin of coxae II, *st3* at level of midcoxae III, *st4* at level of anterior margin of coxae IV, *st5* near basal edges of genital shield.

Ventral shield without sculptural pattern. Five pairs of very long (*ca* 135–178) and smooth ventral setae situated on ventral shield. Anal opening oval, *ca* 28–30 long and *ca* 19–22 wide. Two pairs of adanal setae short (*ca* 12–18) and needle-like.

Genital shield linguliform 200–208 long and 110–114 wide at level of *st4*. Surface of genital shield smooth.

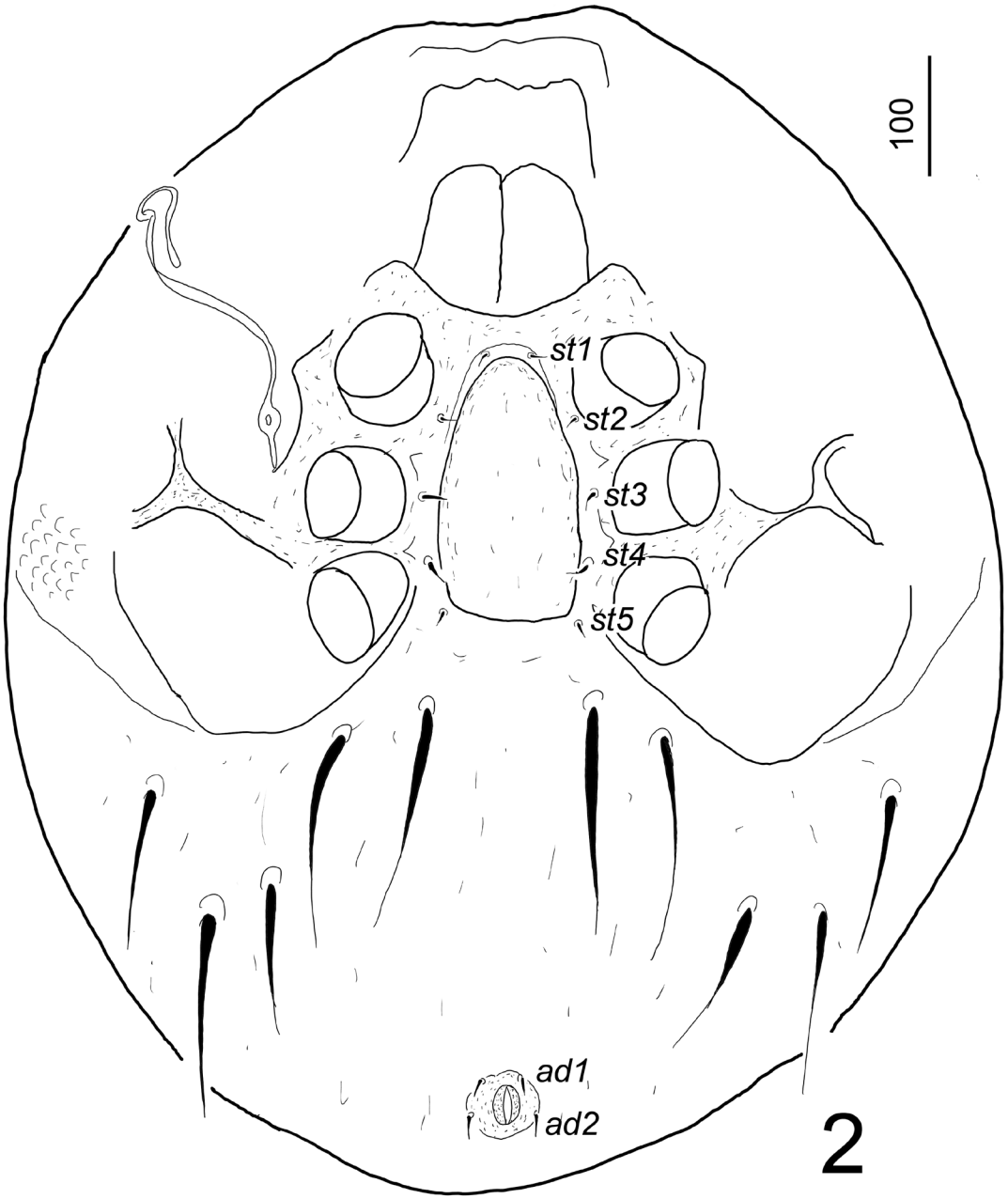
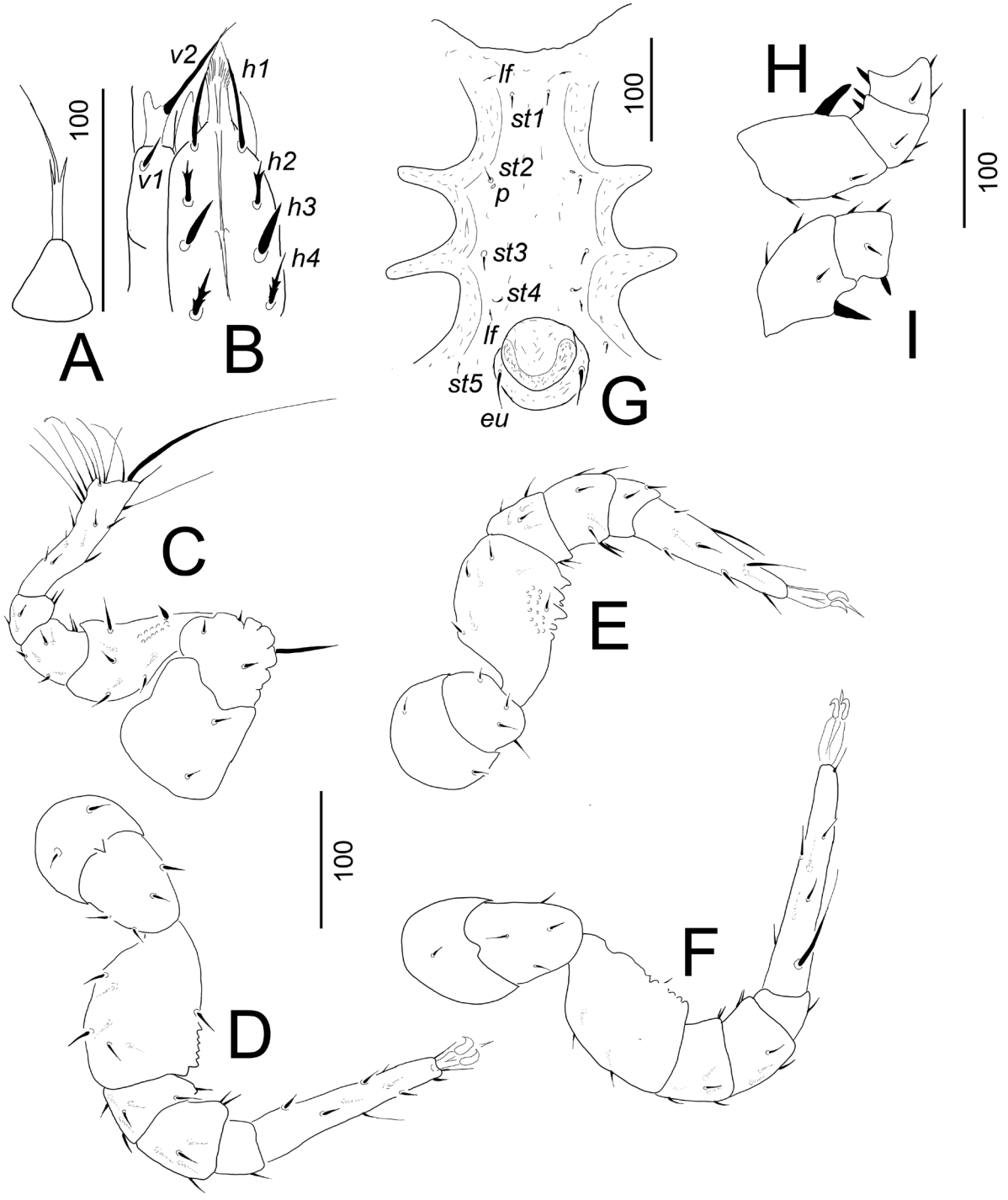


Figure 2. Ventral view of *Gibbauropoda vietnamica* **sp. nov.**, holotype, female.

Pedofossae deep, smooth and separate furrow for tarsi IV absent. Lateral to pedofossae IV with several irregular pits. Stigmata situated between coxae II and III. Prestigmatid part of peritreme long and hook-shaped, poststigmatid part short and straight.

Tritosternum with triangular basis, its laciniae trifurcated for two short lateral and one long central branch. Margins of trifurcated branches smooth (Figure 3A).



Figures 3. *Gibbauropoda vietnamica* **sp. nov.**, (A–F holotype female, H-I paratype male). A. Tritosternum. B. Ventral view of gnathosoma and palp trochanter. C. Ventrolateral view of leg I. D. Leg II, lateral view. E. Leg III, lateral view; F. Leg IV, lateral view. G. Intercoxal area. H. Leg II, femur, genu, and basal part of tarsus. I. Leg III, femur and genu.

Gnathosoma (Figure 3B). Corniculi horn-like, internal malae longer than corniculi and apically pilose. Hypostomal setae *h1* long (*ca* 53–55) and smooth, *h2*, *h3* and *h4* shorter (*ca* 18–24), *h2*

trifurcated, *h3* smooth, *h4* marginally serrate. Palp with two smooth ventral setae, *v2* (*ca* 50–53 long) situated on robust prolongation. Other setae on palp smooth. Epistome with serrate margins, chelicerae not visible.

Legs (Figures 3C–E). Leg I without ambulacral claws, all setae on legs smooth and needle-like setae; surface of femora I-IV with some globular protrusion. Leg I 380–384, leg II 462–464, leg III 416–421, leg IV 483–485.

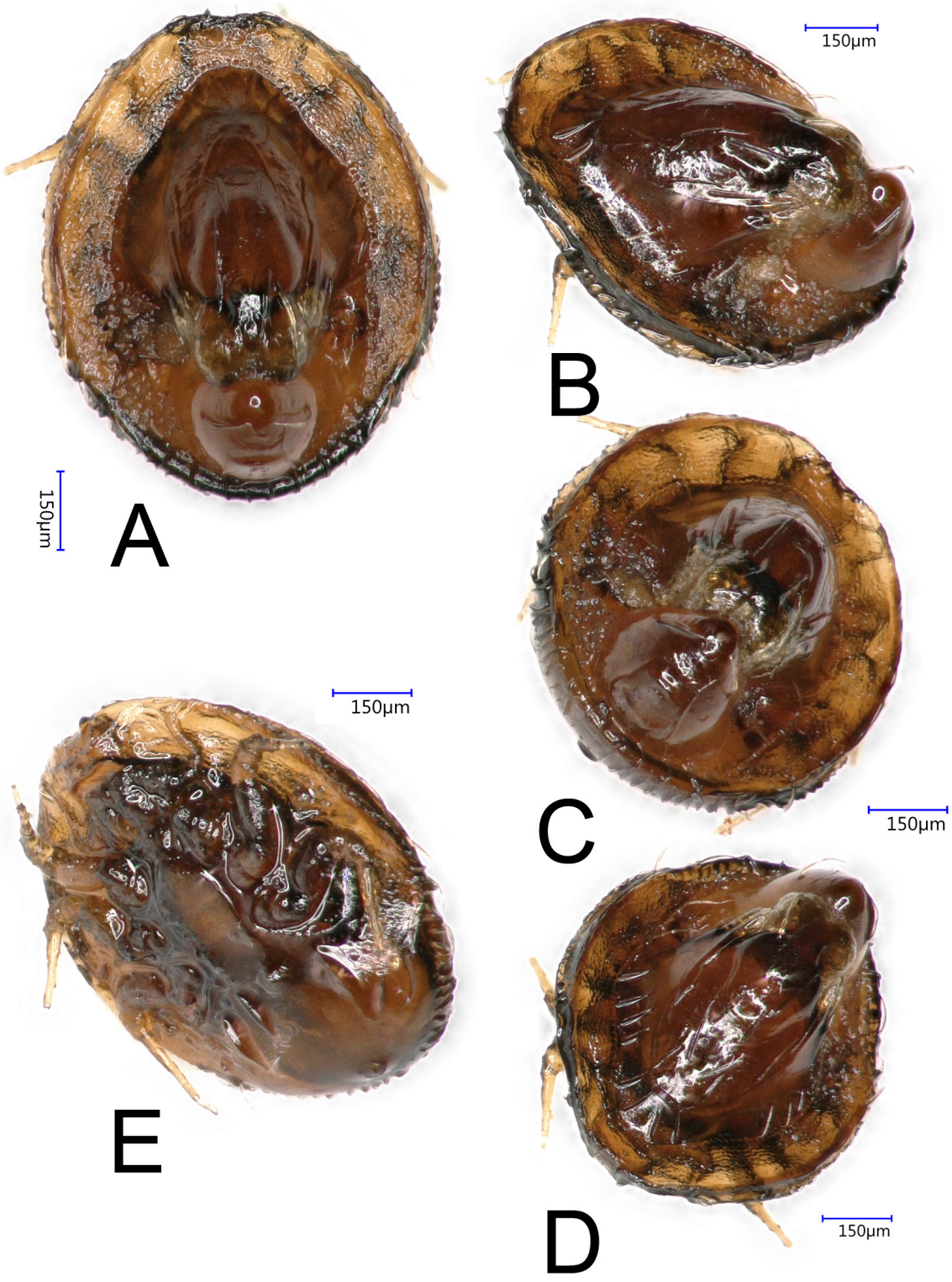


Figure 4. Photos about *Gibbauropoda vietnamica* **sp. nov.**, holotype, female. A. Dorsal view. B. Lateral view. C. Posterior view, D. Anterior view. E. Lateroventral view.

Male (n = 1). Length of idiosoma 610–630, width 390–405.

Dorsal idiosoma. Ornamentation and chaetotaxy as in female.

Ventral idiosoma. Surface of sternal shield without sculptural pattern. Five pairs of short (*ca* 10–14) and smooth sternal setae present. Setae *st1* situated at level of anterior margin of coxae II, *st2* at level of posterior margin of coxae II, *st3* at level of posterior margin of coxae III, *st4* at level of midcoxae IV, and *st5* close at level of posterior margin of coxae IV. One pair of lyriform fissures situated close to *st1*, other one pair close to *st4* and one pair of pores close to *st2*. Genital shield circular, without sculptural pattern and with one pair of long (*ca* 35–37) and smooth eugenital setae. Male genital shield *ca* 90–92 long and *ca* 89–91 wide and situated between coxae IV (Figure 3G). Position and shape of ventral setae and ornamentation of ventral shield as in female. Male femora II and III with large and robust ventral setae, genua II–III and tarsi II with small and robust ventral setae (Figures 3H–I).

Nymphs and larvae are unknown.

Etymology. The name of the new species refers to the country, where the specimens were collected.

Remarks. Two *Gibbauropoda* species are known in Vietnam (Hirschmann 1981; Kontschán & Starý 2011). The new species has a triangular prolongation on the strongly sclerotized area of the marginal part of the dorsal trench, and one pair of setae in the central part of the trench. These characters are missing in the two known Vietnamese species and are unknown in other species living outside of Vietnam.

General remarks

Based on known species, this genus appears to be endemic to Southeast Asia, East Asia, and Australasia. Since this genus is not reported from many countries in these regions, it is expected that these species will be found in other countries as well. The biology of this genus is scarcely investigated. The habitats of the New Guinean species are absolutely unknown (Hirschmann 1976; Hiramatsu & Hirschman 1978), while the Japanese, Korean, and Vietnamese species have been collected from soil and leaf litter (Hiramatsu 1976; Kontschán & Starý 2011; Kontschán et al. 2012). These species seem to be forest-inhabiting species that were collected in evergreen tropical forests and submontane foggy forests.

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