

## Three new jumping spiders from northeastern India (Araneae: Salticidae: Hasariini: *Habrocestum*)

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**Abstract.** Three new species of jumping spider from northeastern India are described, all in the genus *Habrocestum* Simon 1876: *H. emanasakgrensis* Kadam & Tripathi 2023 (♂ only), *H. imilchang* Kadam & Tripathi 2023 (♂ only), and *H. togansangmai* Kadam & Tripathi 2023 (♂ only). Current distribution records for all three species are mapped.

**Keywords.** Indo-Burma, Meghalaya, Pa Togan Sangma, taxonomy

### Introduction

As noted by Richman (1981), the genus *Habrocestum* Simon 1876 is poorly defined. Richman revised the North American members of this genus, but these were later transferred to the euophryine genera *Naphrys* or *Chinattus* (Edwards 2003). Only the female of the type species, *H. pullatum* Simon 1876, is known, and that primarily from later drawings by Prószyński (1987). Thus our placement of three new species into this genus, based only on the males, is based solely on the similarity of these spiders to other salticids that have been associated with *Habrocestum*.

Presently *Habrocestum* includes 52 species with a largely Afroeurasian distribution (WSC 2023). The occurrence of this genus in India was first reported by Sankaran et al. (2019) and a total of four nominal species have been reported so far from the Western Ghats of India (Sankaran et al. 2019; Asima et al. 2022; Sudhin et al. 2022; Caleb & Sankaran 2023). In this paper, we describe three new *Habrocestum* species that were recently collected in the Meghalaya State of India.

### Materials and methods

All measurements are in millimeters (mm). Length of palp and leg segments are given as: total (femur, patella, tibia, metatarsus (except for palp), tarsus). Length of the chelicerae was measured dorsally from its point of attachment to the clypeus to base of the fangs. Photos of live spiders were taken using Canon 750D DSLR, Canon EFS 18-55mm Macro 0.25m/0.8ft lens and micrographic images were taken with a Leica DMC4500 digital camera attached to a Leica M205A stereomicroscope with the software package Leica Application Suite (LAS, version 3.8) for stacking images taken at different focal planes. Terminology of male genitalia mostly

follows Sankaran et al. (2019). The specimens examined are deposited at National Centre for Biological Sciences Research Collections (NRC), Bengaluru, India.

*Abbreviations used in the text.* Morphology: ALE—anterior lateral eyes; AME—anterior medial eyes; do—dorsal; pl—prolateral; pld—prolateral dorsal; PLE—posterior lateral eyes; plv—prolateral ventral; PME—posterior medial eyes; rl—retrolateral; rld—retrolateral dorsal; rlv—retrolateral ventral; RTA—retrotibial apophysis; I–IV—1st to 4th leg. Institution: NCBS—National Centre for Biological Sciences Research Collections (NRC), Bengaluru, India.

## Taxonomy

### Salticidae Blackwall 1841

### *Habrocestum* Simon 1876

Type species: *Habrocestum pullatum* Simon 1876, by monotypy

### *Habrocestum emanasakgrensis* Kadam & Tripathi 2023, sp. nov.

Figures 1, 4F, 5 (♂ only)

*Etymology.* The species group name is an adjective and refers to the type locality of this new species.

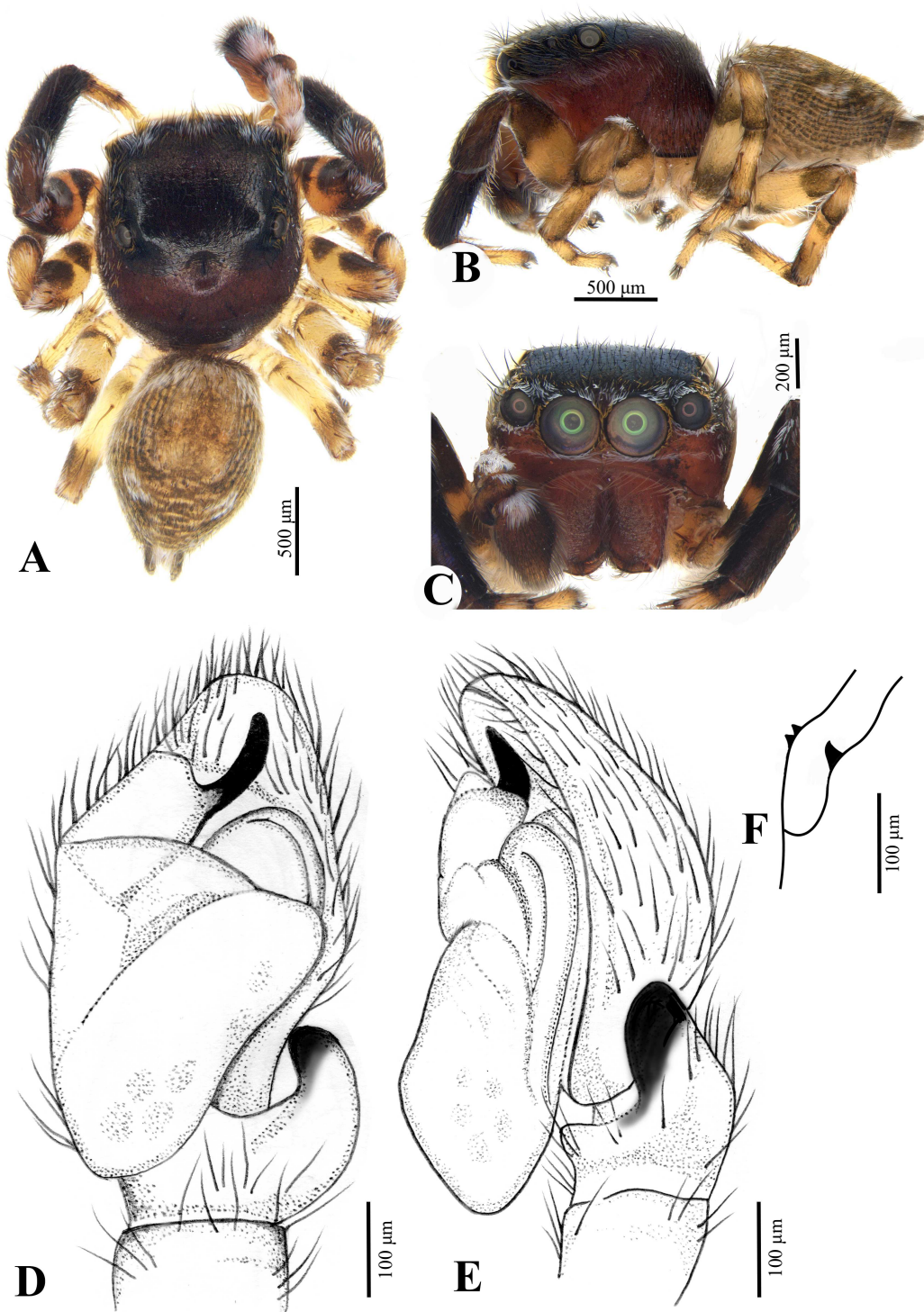
*Type material.* Holotype: ♂ (NRC-AA-7687) from INDIA: Meghalaya: South Garo Hills: Eman-Asakgre (25°20'17"N, 90°30'41"E; 215 m alt.), 12 April 2022, Gautam K. leg., from ground, by hand. Deposited in the National Centre for Biological Sciences Research Collections (NRC), Bengaluru, India.

*Diagnosis.* Males of *H. emanasakgrensis* are closely related to the males of *H. africanum* Wesolowska & Haddad 2009, with cymbium and tegulum of similar shape, and with a triangular fleshy bulbus and a short embolus, but can be separated from that species by the thick RTA with a prolateral curvature (vs. comparatively thin and straight in *H. africanum*), straight embolus (vs. curved in a prolateral direction in *H. africanum*) and wide proximal tegular lobe (vs. narrow in *H. africanum*) (compare Figure 1D–E with Wesolowska & Haddad 2009, figs. 62–65).

*Description.* Male (holotype, Figure 1A–C, F, colouration in alcohol): carapace, clypeus and chelicerae burnt orange; labium, endites, sternum, legs dark brown; eye field black; opisthosoma creamy-brown, with numerous brown transverse stripes. Fovea narrow, longitudinal, straight, reddish-brown. Cheliceral promargin with two closely spaced tiny teeth; retromargin with a single long tooth (Figure 1F). Opisthosoma oval, laterally with longitudinal imprinted lines which are denser posteriorly. Body length. 3.24. Carapace 1.66 long, 1.44 wide. Abdomen 1.58 long, 1.09 wide. Ocular area 1.01 long, 1.25 wide. Eye sizes and interdistances: AME 0.36, ALE 0.21, PME 0.07, PLE 0.17; AME–AME 0.02, AME–ALE 0.01, PME–PME 1.12, ALE–ALE 0.82, PME–PLE 0.16, PLE–PLE 0.97, ALE–PME 0.22, ALE–PLE 0.45. Length of Cchelicerae 0.55. Clypeus height at AMEs 0.08. Sternum 0.68 long, 0.49 wide. Length of pedipalp and legs: pedipalp 1.40 [0.46, 0.20, 0.19, 0.55], I 3.11 [1.13, 0.37, 0.62, 0.62, 0.37], II 2.41 [0.77, 0.39, 0.49, 0.44, 0.32], III 2.87 [0.93, 0.37, 0.58, 0.64, 0.35], IV 2.91 [0.90, 0.49, 0.62, 0.50, 0.40]. Leg formula: 1432. Spination of pedipalp: femur pld 2 do 2, patella pl 1 do 2, tibia pld 1 do 1, tarsus/cymbium pl 1 do 2 rl 1; legs: femur I do 2, II–IV pld 2 do 3; patellae I 0, II–III pld 1, IV rl 1; tibiae I–II plv 3 rlv 3, III pl 1 pld 1 plv 2 rl 1 rld 1 rlv 2, IV pl 1 plv 1 rl 1 rlv 1; metatarsi I–II plv 2 rlv 2, III pl 1 pld 2 plv 2 rl 2 rld 2 rlv 2, IV pl 1 plv 2 rl 1 rlv 2; tarsi I–IV 0. Pedipalp (Figure 4D–E): RTA thick, robust, strongly curved, thumb-like (Figure 1E). Tegulum moderately swollen, with a slightly long lateral proximal lobe (Figure 1D). Embolus short, thick, with blunt tip directed at 12-o’ clock ventrally (Figure 1D).

*Female.* Unknown.

*Distribution.* Known only from the South Garo Hills district of Meghalaya (Figures 4F, 5).



**Figure 1.** *Habrocestum emanasakgrensis*, holotype male (NRC-AA-7687). **A**, Habitus, dorsal. **B**, Same, lateral. **C**, Same, frontal. **D-E**, Ventral (D) and retrolateral (E) views of left pedipalp. **F**, Left chelicera, retrolateral view.

***Habrocestum imilchang* Kadam & Tripathi 2023, sp. nov.**

Figure 2, 4F, 5 (♂ only)

*Etymology.* The species group name is a noun and refers to the name of a waterfall from near the collection site of the type.

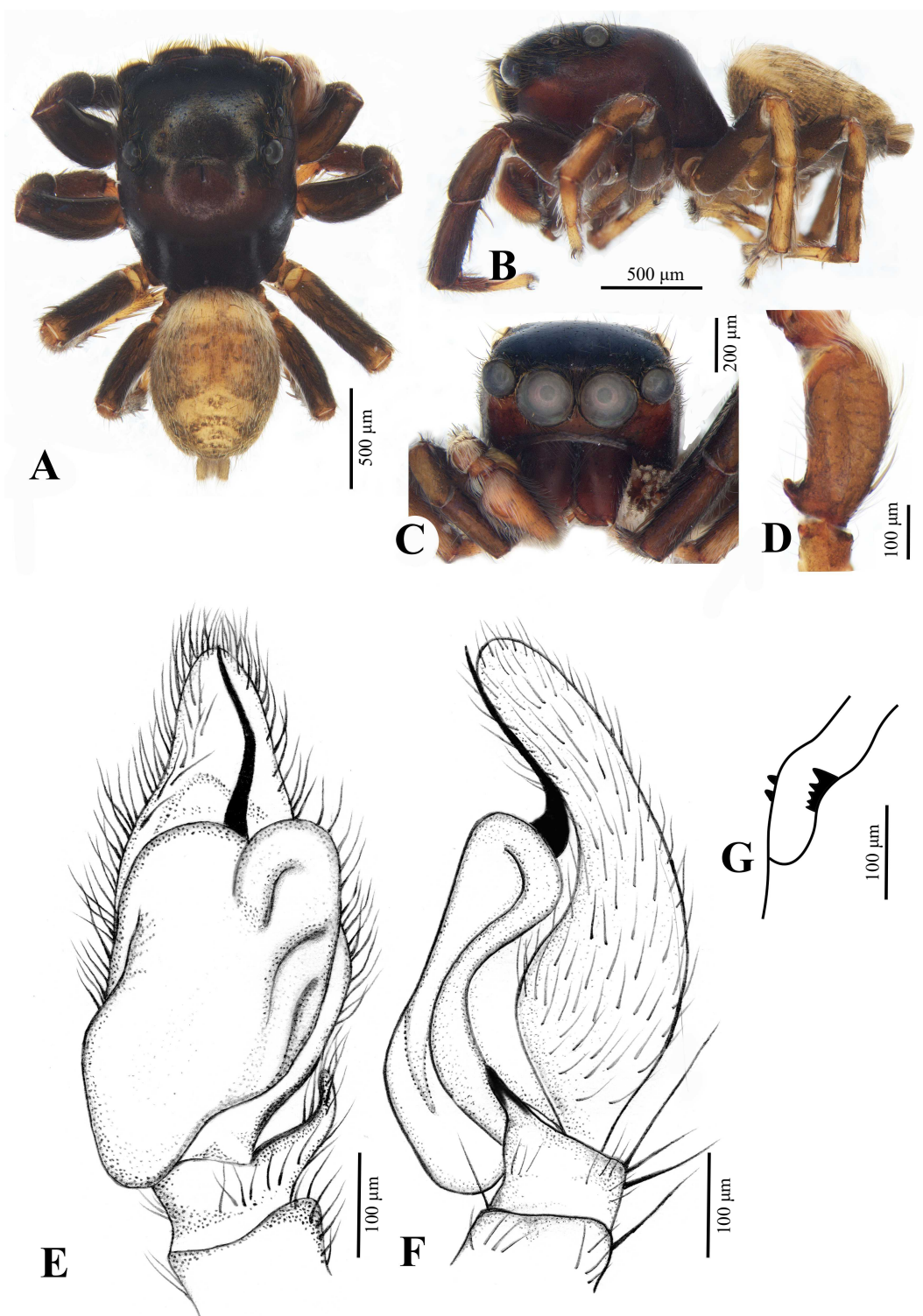
*Type material.* Holotype: ♂ (NRC-AA-7688) from INDIA: Meghalaya: South Garo Hills: Eman-Asakgre (25° 19.517'N, 90° 30.985'E; 120 m alt.), 12 April 2022, Gautam K. leg., from ground, by hand. Deposited in the National Centre for Biological Sciences Research Collections (NRC), Bengaluru, India.

*Diagnosis.* Males of *Habrocestum imilchang* are most similar to the males of *H. albopunctatum* Wesolowska & van Harten 2002, as both share a thin, long and slightly bent embolus, but can be distinguished from the latter species by the smooth and rounded anterior lobe of the tegulum (vs. cone shaped in *H. albopunctatum*), and a cheliceral retromargin with a serrated tooth (vs. bifurcated tooth in *H. albopunctatum*) (compare Figure 2E–F with Wesolowska & van Harten 2002, figs. 5–10).

*Description.* *Male* (holotype, Figure 2A–C, G, colouration in alcohol): carapace, clypeus and chelicerae brown; labium, endites, sternum, legs dark brown; eye field black; opisthosoma pale, with numerous brown transverse stripes. Carapace with scattered fine black hairs. Fovea narrow, longitudinal, straight, black. Cheliceral promargin with two tiny teeth, a bit spaced; retromargin with a serrated tooth (Figure 2G). Opisthosoma oval, hirsute. Body length. 4.13. Carapace 2.28 long, 1.75 wide. Abdomen 1.86 long, 1.27 wide. Ocular area 1.01 long, 1.58 wide. Eye sizes and interdistances: AME 0.50, ALE 0.30, PME 0.09, PLE 0.27; AME–AME 0.02, AME–ALE 0.01, PME–PME 1.46, ALE–ALE 1.07, PME–PLE 0.23, PLE–PLE 1.24, ALE–PME 0.34, ALE–PLE 0.64. Length of chelicerae 0.71. Clypeus height at AMEs 0.06. Sternum 0.80 long, 0.55 wide. Length of pedipalp and legs: pedipalp 1.87 [0.86, 0.15, 0.22, 0.64], I 4.05 [1.29, 0.62, 0.98, 0.73, 0.43], II 3.27 [1.12, 0.45, 0.73, 0.59, 0.38], III 3.65 [1.16, 0.55, 0.78, 0.76, 0.40], IV 3.93 [1.26, 0.44, 0.80, 0.96, 0.47]. Leg formula: 1432. Spination of pedipalp: femur pld 2 do 2, patella pl 2 do 1, tibia pld 1 do 2 rl 1, tarsus/cymbium pl 2 do 2 rl 1 rld 1; legs: femur I pld 1 do 3, II–IV pld 1 do 3 rld 1; patellae I–II 0, III–IV pld 1 rld 1; tibia I plv 3 rlv 3, II plv 2 rlv 2, III pl 2 pld 1 plv 2 rl 1 rld 1 rlv 1, IV pl 2 pld 1 plv 2 rld 1 rlv 1; metatarsus I–II plv 2 rlv 2, II pl 1 plv 2 rlv 2, III pl 2 pld 2 plv 2 rl 2 rld 2 rlv 2, IV pl 2 pld 1 plv 1 rl 2 rld 1 rlv 2; tarsi I–IV 0. Pedipalp (Figure 2D–F): Palpal femur proximally with a small femoral apophysis (Figure 2D). RTA short, narrow, tube-like, slightly bent at middle, tip directed toward a 10 o'clock position retrolateral view (Figure 2F). Tegulum with a slightly long proximal lobe, protruding posterolaterally (Figure 2E). Embolus broad at base, long, with narrow apex, arising from under tegular ledge, directed at 12-o'clock ventrally (Figure 2E).

*Female.* Unknown.

*Distribution.* Known only from the South Garo Hills District of Meghalaya (Figure 4F, 5).



**Figure 2.** *Habrocestum imilchang*, holotype male (NRC-AA-7688). **A**, Habitus, dorsal. **B**, Same, lateral. **C**, Same, frontal. **D**, Pedipalp femur showing femoral apophysis, ventral view. **E-F**, Ventral (**E**) and retrolateral (**F**) views of left pedipalp. **G**, Left chelicera, retrolateral view.



***Habrocestum togansangmai* Kadam & Tripathi 2023, sp. nov.**

Figures 3, 4A–E, 5 (♂ only)

**Etymology.** The species group name is a patronym honouring Pa Togan Nengminja Sangma, a brave freedom fighter from the State of Meghalaya, who fought against the British army.

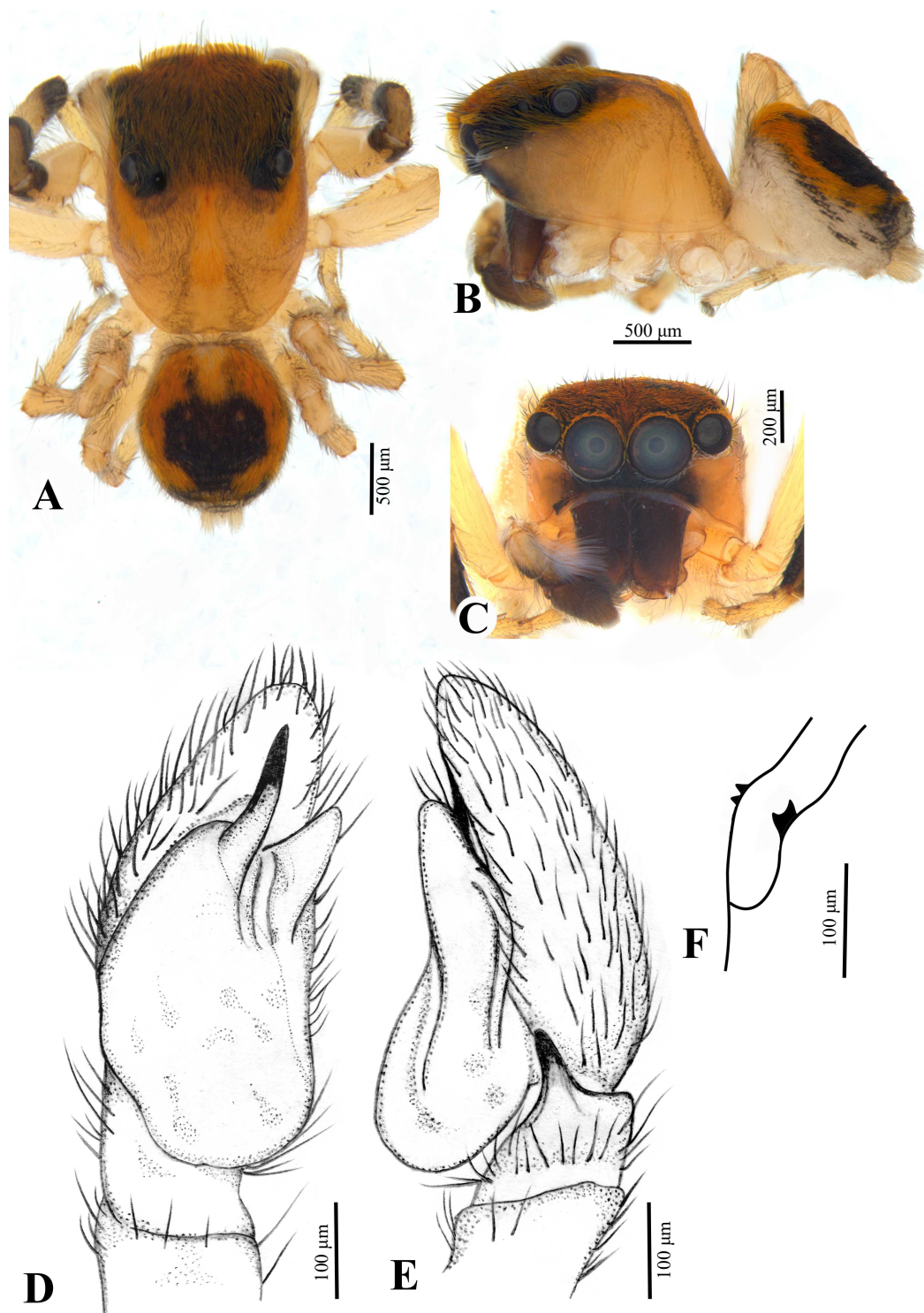
**Type material.** Holotype: ♂ (NRC-AA-7689) from INDIA: Meghalaya: South West Khasi Hills: Nongnah village (25°16'03"N, 91°19'12"E; 992 m alt.), 07 April 2022, Gautam K. leg., from ground, by hand. Deposited in the National Centre for Biological Sciences Research Collections (NRC), Bengaluru, India. ♂, same data as holotype, except South Garo Hills, Siju Bird Sanctuary (25° 20.501'N, 90°40.997'E; 162 m alt.), photographic record by Arpita D., specimen not collected (data used with permission).

**Diagnosis.** Males of *Habrocestum togansangmai* are closely related to the males of *H. ohiyaensis* Kanesharatnam & Benjamin 2016 as both share an almost straight, thin embolus emerging from below the tegular layer, but can be distinguished from the latter species by a tegulum without a proximal lobe (vs. present in *H. ohiyaensis*), a short, triangular protrusion at distal end of the tegulum (vs. absent in *H. ohiyaensis*), a short and straight RTA (vs. medium sized and hooked-shaped in *H. ohiyaensis*) (compare Figures 3D–E with Kanesharatnam & Benjamin 2016, fig. 9A–F).

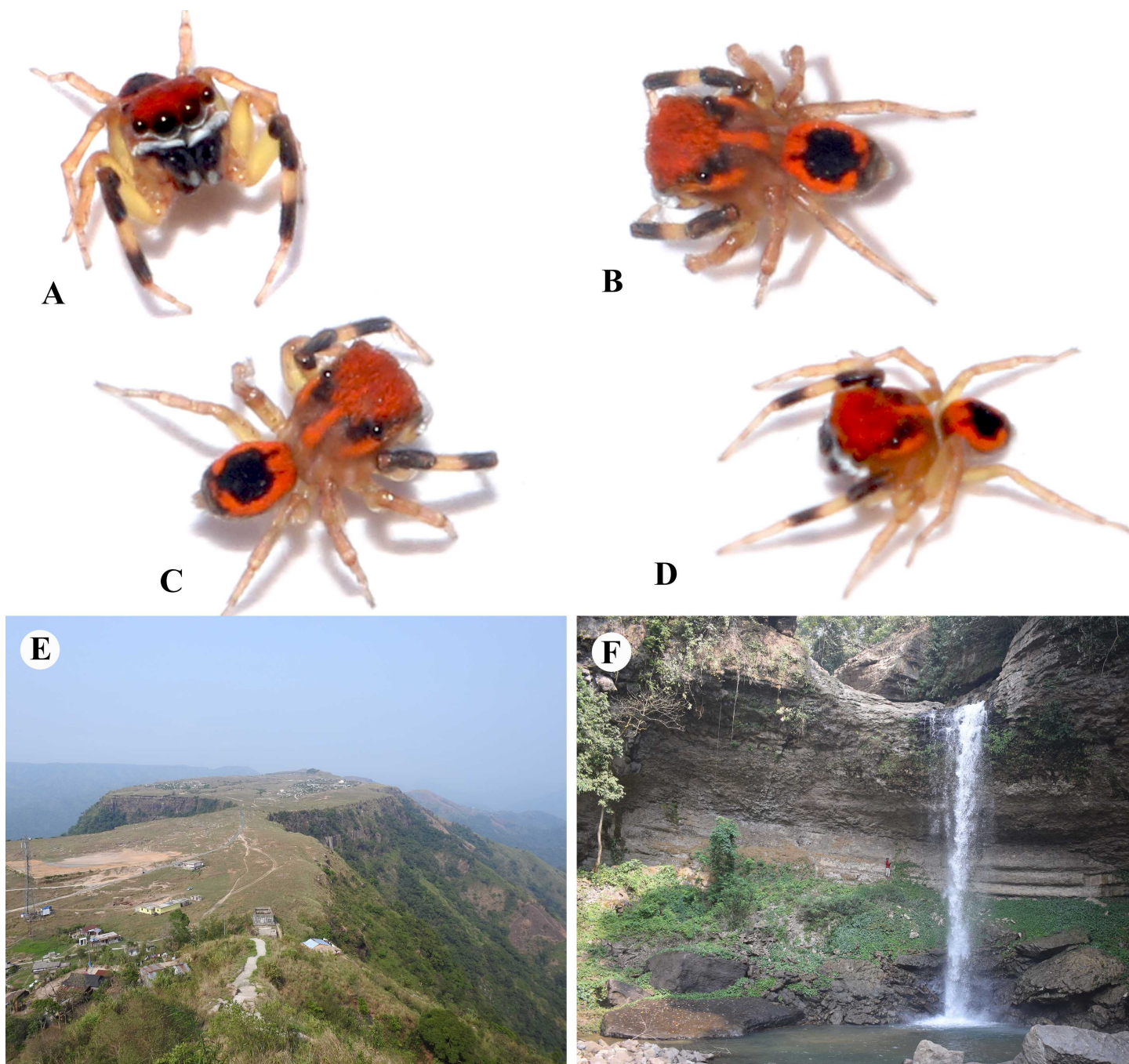
**Description.** Male (holotype, Figure 3A–C, F, colouration in alcohol): carapace, eye field orangish red, clypeus and chelicerae brown; labium, endites, sternum, legs and spinnerets pale yellow, opisthosoma dark orange, distinctly marked with irregular shaped blotches having black hairs. Carapace covered with scattered fine black hairs; ocular region covered with orangish red hairs. Cheliceral promargin with two closely spaced, tiny teeth; retromargin with single bifurcated tooth (Figure 3F). Opisthosoma oval, hirsute. Leg I longest, with distinct black patches at the posterior end of segments. Body length. 2.95. Carapace 1.69 long, 1.26 wide. Opisthosoma 1.22 long, 0.96 wide. Ocular area 0.88 long, 1.06 wide. Eye sizes and interdistances: AME 0.36, ALE 0.23, PME 0.06, PLE 0.20; AME–AME 0.01, AME–ALE contiguous, PME–PME 0.98, ALE–ALE 0.75, PME–PLE 0.12, PLE–PLE 0.84, ALE–PME 0.23, ALE–PLE 0.40. Length of chelicerae 0.58. Clypeus height at AMEs 0.07. Sternum 0.64 long, 0.51 wide. Length of pedipalp and legs: pedipalp 1.39 [0.47, 0.24, 0.13, 0.55], I 3.77 [1.14, 0.59, 0.96, 0.71, 0.37], II 2.52 [0.82, 0.38, 0.54, 0.49, 0.29], III 2.91 [0.91, 0.34, 0.58, 0.73, 0.35], IV 3.08 [1.08, 0.45, 0.54, 0.70, 0.31]. Leg formula: 1432. Spination of pedipalp: femur pld 1 do 2, patella pl 1 do 1, tibia pld 1 do 2 rld 1, tarsus/cymbium pl 1 do 2 rl 1 rld 1; legs: femur I & IV do 3, II pl 1 do 3, III do 3 rld 2; patellae I–II 0, III pl 1 rl 1, IV pl 1; tibia I plv 3 rlv 3, II pl 1 plv 3 rlv 3, III pl 1 pld 1 plv 1 rl 1 rld 1 rlv 1, IV pl 1 pld 1 plv 1 rl 1 rld 1 rlv 2; metatarsus I plv 2 rlv 2, II pl 1 plv 2 rlv 2, III pl 1 pld 2 plv 1 rl 2 rld 2 rlv 2, IV pl 1 pld 2 plv 1 rl 1 rld 2 rlv 2; tarsi I–IV 0. Pedipalp (Figure 3D–E): cymbium hirsute, RTA short, thumb-like, with rounded apex directed at 11-o' clock retrolaterally (Figure 3E). Tegulum moderately swollen, with short, triangular protrusion at distoretrolateral end (Figure 3D). Embolus thin, moderately long, originating distoprolaterally, with pointed apex directed at 1-o' clock ventrally (Figure 3D).

**Female.** Unknown.

**Distribution.** Known from the South West Khasi Hills and South Garo Hills District of Meghalaya (Figures 4E, 5).

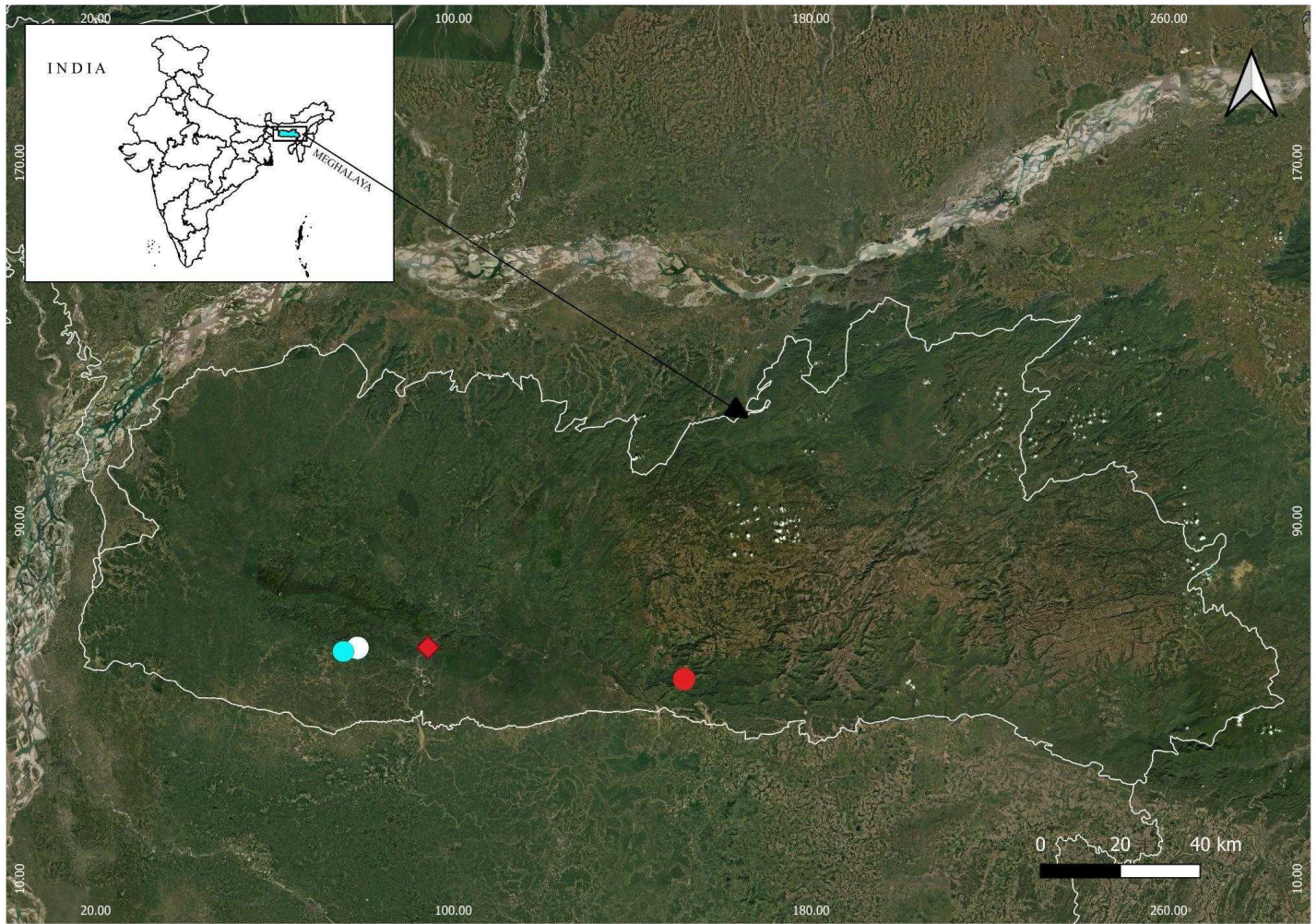


**Figure 3.** *Habrocestum togansangmai*, holotype male (NRC-AA-7689). **A**, Habitus, dorsal. **B**, Same, lateral. **C**, Same, frontal. **D-E**, Ventral (D) and retrolateral (E) views of left pedipalp. **F**, Left chelicera, retrolateral view.



**Figure 4.** A-D, Living holotype male *Habrocestum togansangmai*. E, Collection site for *H. togansangmai* (Meghalaya: South West Khasi Hills). F, Collection site for *H. emanasakgrensis* and *H. imilchang* (Meghalaya: South Garo Hills District). Photo credit: G. Kadam.





**Figure 5.** Map showing the collecting localities of the three new *Habrocestum* species from Meghalaya, India. **Blue circle**, *H. emanasakgrensis*. **White circle**, *H. imilchang*. **Red circle**, *H. togansangmai*, holotype. **Red diamond**, *H. togansangmai*, photographic record.

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