

One new burrow spider of the genus *Gravelyia* Mirza & Mondal 2018 (Araneae: Nemesiidae) from north-east India

Paris Basumatary & Dulur Brahma*

Department of Zoology, Bodoland University, Assam, 783370, India

E-mail: brahmadulur@gmail.com

*Corresponding author

Abstract — *Gravelyia boro* sp. nov. is described based on both sexes from Assam, India in a genus previously known from two species. The palp of the species belonging to the genus is illustrated for the first time, and a distribution map of *G. boro* sp. nov. is also provided.

Key words — Araneae, Asia, Kokrajhar, mygalomorph, male palp

Introduction

The non-monophyletic mygalomorph family Nemesiidae Simon 1889 (Opatova et al. 2020) comprises 184 species belonging to 22 genera worldwide (World Spider Catalog 2020), of which two genera, *Damarchilus* Siliwal et al. 2015 and *Gravelyia* Mirza & Mondal 2018 occur in India (Caleb & Sankaran 2021). The recently described genus *Gravelyia* currently contains two species viz., the type species *G. excavatus* (Gravely 1921) and *G. striatus* Mirza & Mondal 2018, both species are known only from India. Although *G. excavatus* is known by both sexes the details of male palp is neither illustrated nor described in detail and *G. striatus* is only known from the female.

The genus *Gravelyia* Mirza & Mondal 2018 was erected with *G. excavatus* (Gravely 1921) as its type. *G. excavatus* (Gravely 1921) was originally described from Barkuda Island of Odisha in India, and there are no museum records of male of this species apart from some illustrations by Gravely (1921). The male of this genus bears a distinct single tibial spur on tibiae I alongwith metatarsus I bearing a cluster of cuspules ventro-proximally. The present paper describes *Gravelyia boro* sp. nov. from Assam, India.

Materials and Methods

Live individuals were photographed with Sony DSC – HX90V. Specimens were hand collected and preserved in 80% ethanol. Images were made using a Leica M205A stereo microscope equipped with a Leica DFC500 HD camera using a Leica Application Suite (LAS) version 3.8. The spermathecae were dissected and immersed in lactic acid for 24 hours to clear soft tissue. All measurements are in millimeters (mm). Legs measurements are given as total length (femur, patella, tibia, metatarsus and tarsus). Leg spination

pattern follows Mirza & Mondal (2018). The studied specimens are deposited at museum in North Eastern Regional Centre, Zoological Survey of India (NERC – ZSI), Shillong. Abbreviations used: ALE = anterior lateral eye, AME = anterior median eye, PLE = posterior lateral eye, PME = posterior median eye, PLS = posterior lateral spinnerets, PMS = posterior median spinnerets, mt = metatarsus, p = prolateral, r = retrolateral, ti = tibia, v = ventral.

Taxonomy

Family: Nemesiidae Simon 1892

Gravelyia Mirza & Mondal 2018

Type species: *Damarchus excavatus* Gravely 1921 (♀ lectotype in Zoological Survey of India, Kolkata)

Diagnosis: For detailed diagnosis see Mirza & Mondal 2018.

***Gravelyia boro* sp. nov.**

(Figs. 1–37)

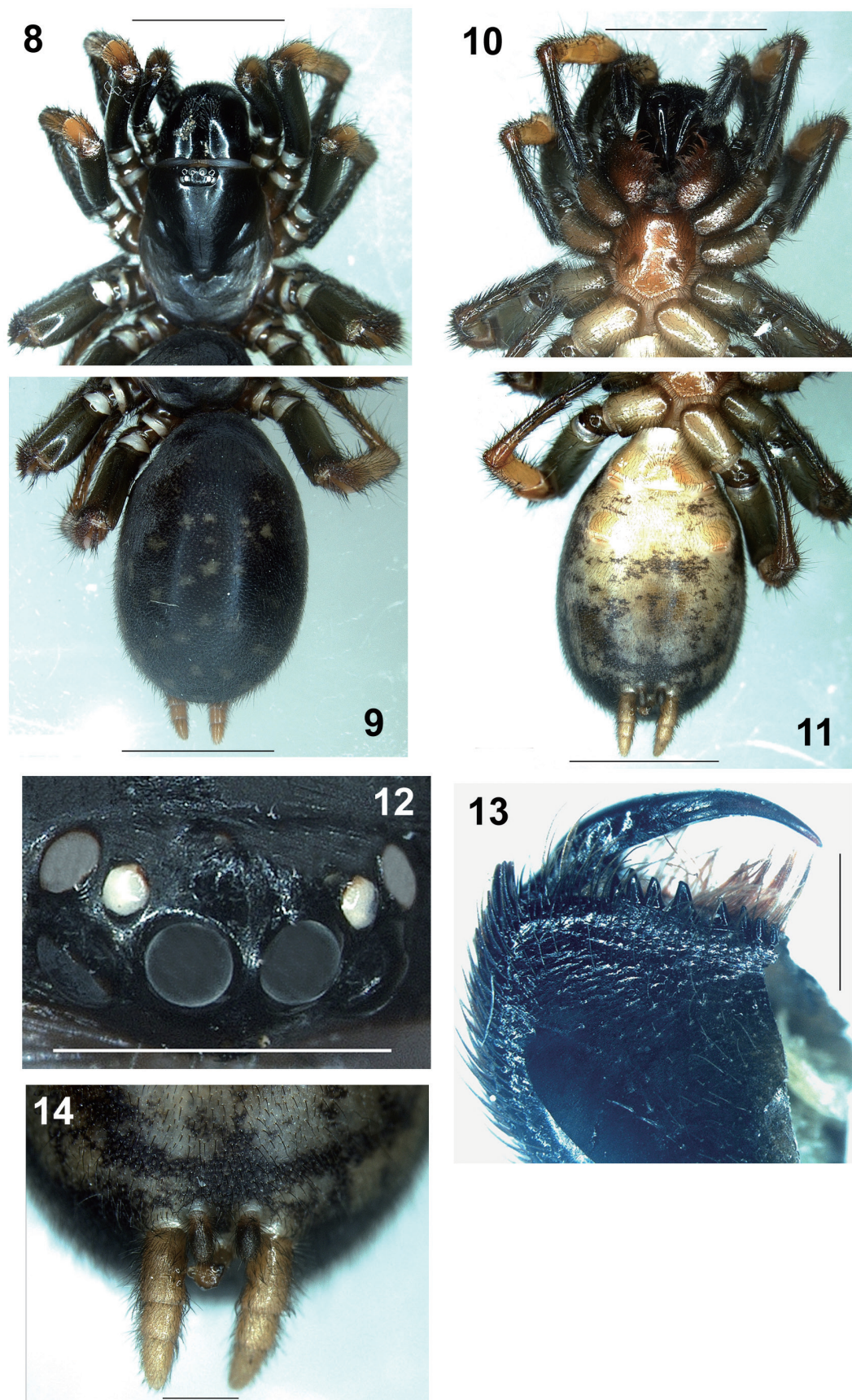
Type series. Holotype: ♀ (IV/ARA/ERS-21): India, Assam, Jharbari Forest Range, Chirang Reserve Forest (N 26°37'23.11", E90°14'48.67"), 81 m, 28.III. 2019 (P. Basumatary). Paratypes: 2♂ (IV/ARA/ERS-28–29) and 1♀ (IV/ARA/ERS-30) same data as in the holotype.

Etymology. The specific name is derived from the Boro tribe, one of the largest ethnolinguistic group in the Assam state of India, and predominantly inhabits the type locality of the new species. The name is used as a noun in apposition.

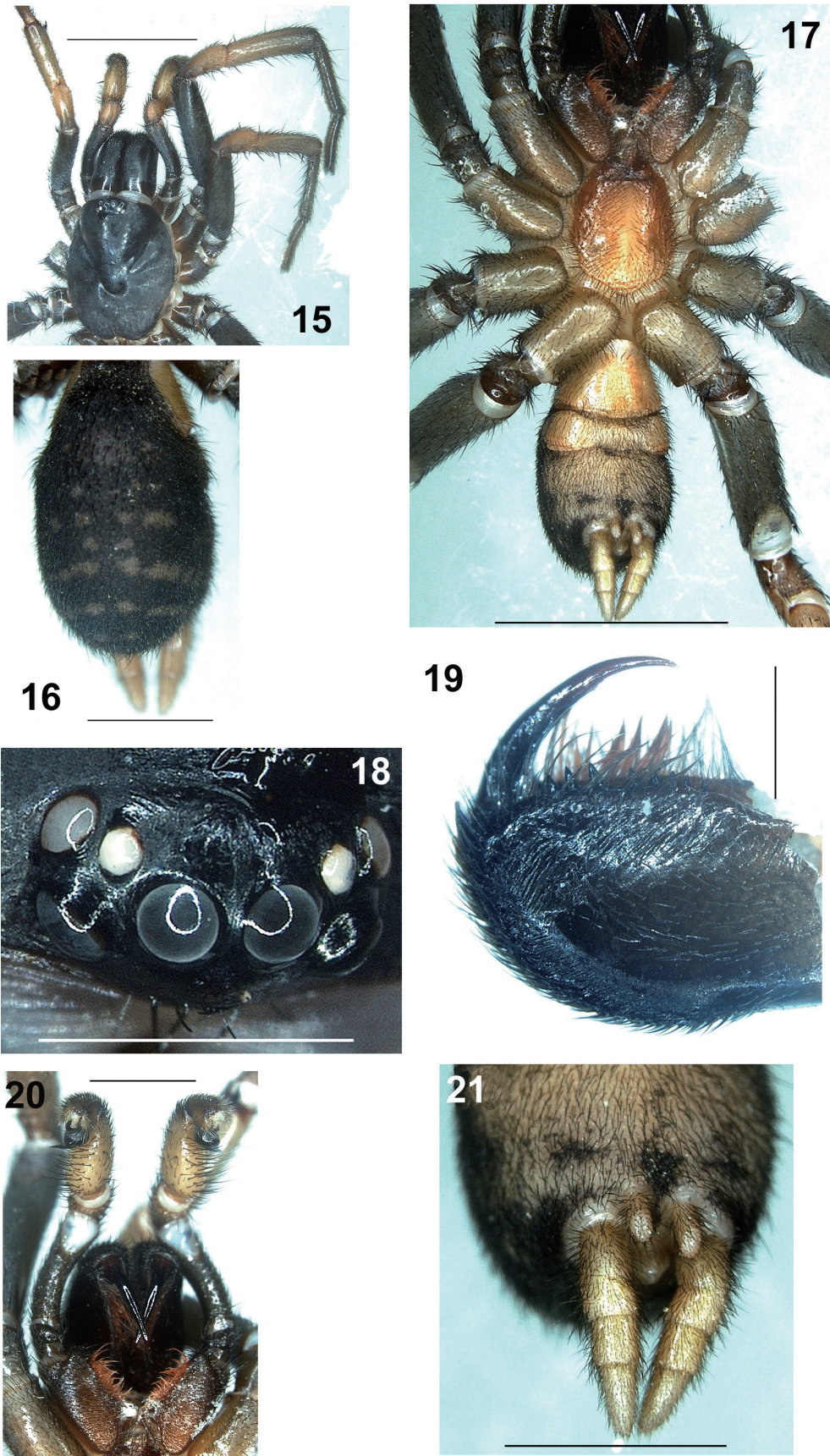
Diagnosis. *Gravelyia boro* sp. nov. is distinguishable from *G. excavatus* and *G. striatus* by the abdominal pattern, *G. boro* sp. nov. has sparse pale brownish dorsal spots (Figs. 2, 9), while *G. excavatus* and *G. striatus* have wide, short chevron stripes, almost covering the abdomen (cf. in figs. 1A & 2A, Mirza & Mondal 2018). Female of *G. boro* sp.



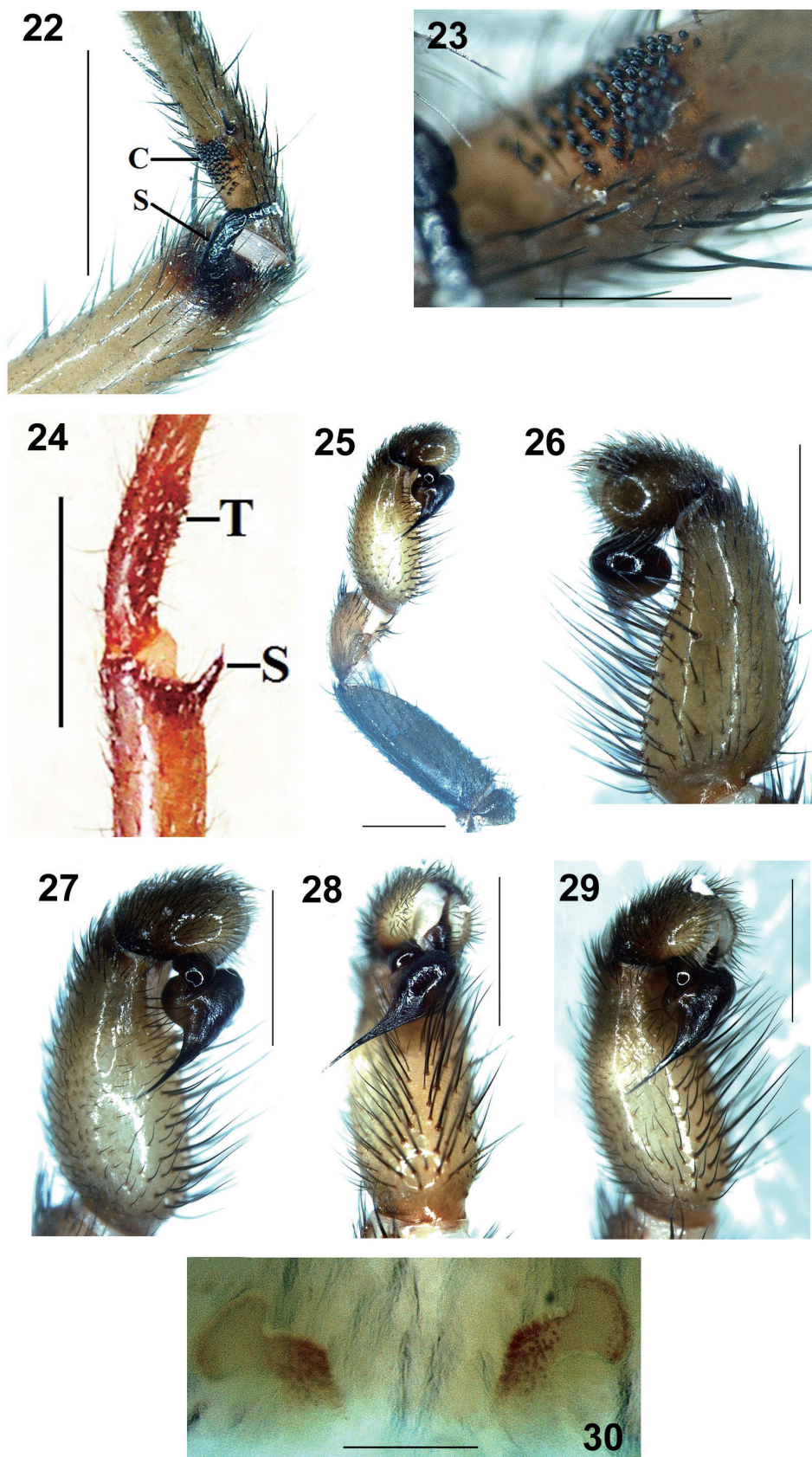
Figs. 1–7. *Gravellyia boro* sp. nov.: 1 – live habitus in burrow; 2, 4, 6 – female, live habitus, dorsal, lateral and anterior views; 3, 5, 7 – male, live habitus, dorsal, lateral and anterior views.



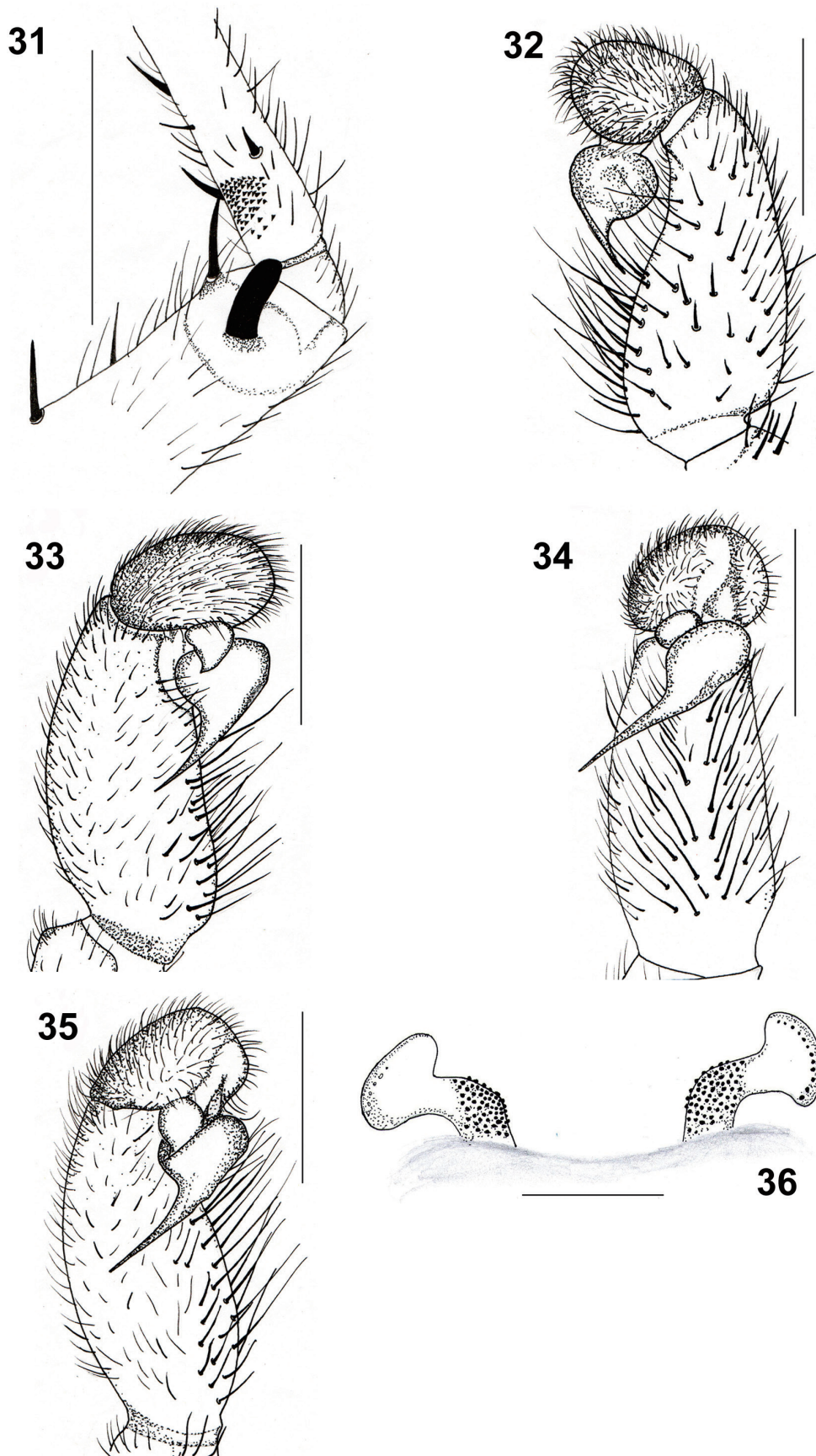
Figs. 8–14. Female of *Gravellyia boro* sp. nov.: 8 – carapace, dorsal view; 9 – abdomen, dorsal view; 10 – carapace, ventral view; 11 – abdomen, ventral view; 12 – eyes, anterior view; 13 – chelicerae, prolateral view; 14 – spinnerets. Scale bars: 5 mm (8–11); 2 mm (12); 1 mm (13–14).



Figs. 15–21. Male of *Gravellyia boro* sp. nov.: 15 – carapace, dorsal view; 16 – abdomen, dorsal view; 17 – habitus, ventral view; 18 – eyes, anterior view; 19 – chelicerae, prolateral view; 20 – male maxillae, labium and palp, ventral view; 21 – spinnerets. Scale bars: 5 mm (15–17); 2 mm (18, 20); 1 mm (19, 21).



Figs. 22–30. *Gravelyia boro* sp. nov.: 22 – male tibia and metatarsus I, prolateral view (S – spur, C – cusps); 23 – ditto, cluster of cusps, prolateral view; 24 – male tibia and metatarsus I, prolateral view, (S – spur, T – tubercle); 25 – whole male palp, retrolateral view; 26 – right male palp, dorsal view; 27 – ditto, ventral view; 28 – ditto, prolateral view; 29 – ditto, retrolateral view; 30 – vulva, dorsal view. Scale bars: 2 mm (22, 24, 25); 1 mm (26–29); 0.5 mm (23); 0.2 mm (30).



Figs. 31–36. *Gravellyia boro* sp. nov.: 31 – male tarsus and metatarsus I, prolateral view; 32 – right male palp, dorsal view; 33 – ditto, ventral view; 34 – ditto, prolateral view; 35 – ditto, retrolateral view; 36 – vulva, dorsal view. Scale bars: 2 mm (31); 1 mm (32–35); 0.2 mm (36).

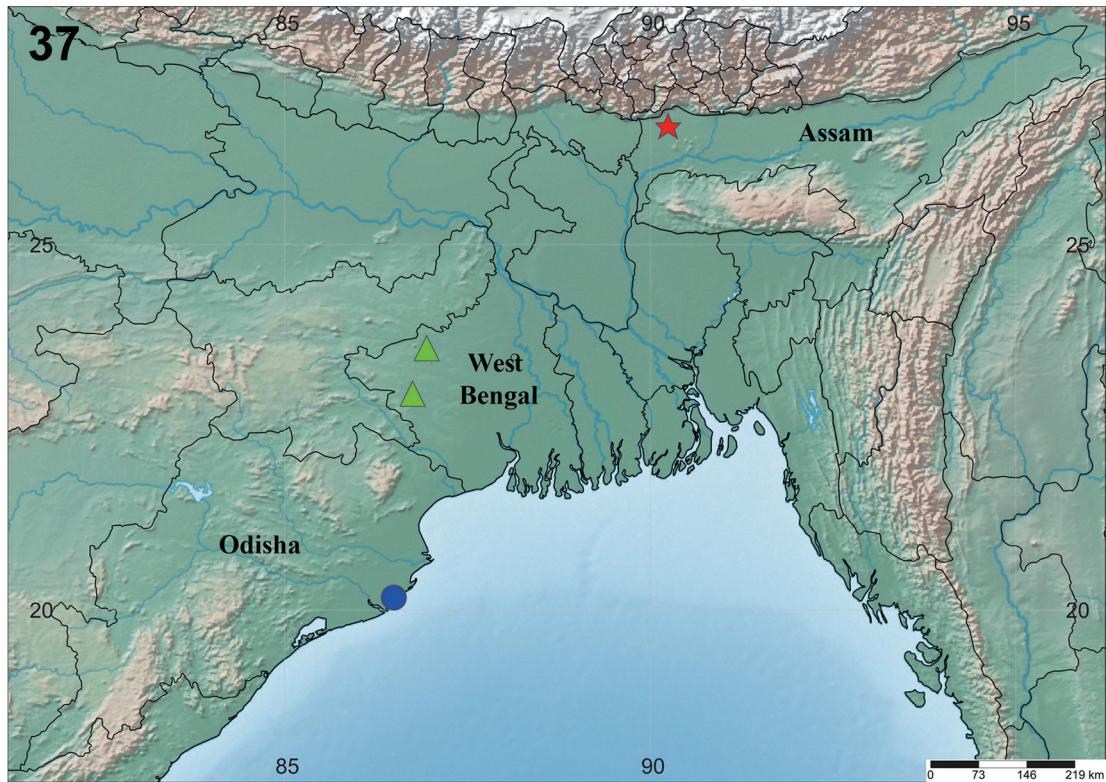


Fig. 37. Distribution records of *Gravelyia boro* sp. nov. (star), *G. striatus* (triangle) and *G. excavatus* (circle).

nov. can be distinguished from those of *G. excavatus* and *G. striatus* by having fungiform receptacles, swollen heads, curved outwards and directed distal (Figs. 30, 36), whereas in *G. excavatus* the receptacles are fully mounds and swollen inwards distally and *G. striatus* having small mounds with bud shaped swellings directed distal upwards in opposite direction (*cf.* in figs. 1D & 2D, Mirza & Mondal 2018). Male of *G. boro* sp. nov. can be differentiated from those of *G. excavatus* by the spur directed outwards distal and flattened anteriorly without any curves, distal end of tibiae I with gentle inward curvature, and metatarsus I with slightly raised tubercle (Fig. 24), whereas in *G. excavatus* the spur is slightly curved and distally bent inwards being stout and bulky anteriorly, tibiae I without inward slope distally and metatarsus I with highly raised tubercle (*cf.* in fig. 1f, Gravely 1921).

Description. Female (holotype). Total length, without chelicera: 15.08. Carapace (Figs. 2, 6, 8): 5.41 long, 4.41 wide. Matte black, raised caput, covered sparsely with blackish setae. Eye sizes and interdistances (Fig. 12): ALE 0.17, AME 0.26, PLE 0.19, PME 0.18, AME-AME 0.09, PME-PLE 0.04, AME-ALE 0.08, PME-PME 0.58, ALE-PLP 0.12. Maxillae (Fig. 10): 1.64 long, 0.95 wide, with 15 cuspules. Reddish brown with tuft of coarse brownish setae on prolateral sides. Labium (Fig. 10): 0.68 long, 0.56

wide. Dark reddish brown, labiosternal junction distinct and well developed. Chelicera (Fig. 13): glossy blackish with 8 promarginal teeth and 16 mesobasal denticles. Rastellum formed by thick setae. Sternum (Fig. 10): 2.65 long, 2.48 wide. Yellowish brown, sub-rectangular, covered sparsely with blackish setae. Sigilla (Fig. 10): anterior and median slight oval, marginal, posterior large, oval-elongated, sub-central. Legs (Figs. 4, 6, 9, 10): I 9.25 (2.97, 1.61, 1.59, 1.75, 1.33); II 8.91 (2.63, 1.49, 1.72, 1.81, 1.26), III 6.55 (1.83, 1.14, 1.2, 1.41, 0.97), IV 11.95 (3.12, 2.01, 2.91, 2.67, 1.24). Leg spination: leg I, mt, v 4; leg II, mt, v 5, ti, v 1; leg III, mt, v 5, p 4, r, 2, ti, v 3; leg IV, mt, v 6, d 2, ti, v 1. Legs covered with numerous blackish setae alongwith blackish spines sparsely; femora, metatarsi and tarsi blackish; patellae and tibiae yellowish brown. Scopulae present on patellae laterally and entire on tarsi and metatarsi I–IV, including patellae and tibiae of palp. Paired claws on all legs with a row of 4–6 teeth. Abdomen (Figs. 2, 4, 9, 11): 9.67 long, 6.3 wide; blackish, pilose; dorsum covered with pale brownish spots distally; venter pale whitish brown at proximal end and pale blackish with sparse blackish patches distad. Spinnerets (Fig. 14): PLS 2.09 long, 0.59 wide, PLS-PLS 0.78; PMS 0.69 long, 0.32 wide, PMS-PMS 0.42. PLS yellowish brown and pilose, with apical segment triangular distally; PMS pilose and blackish brown.

Vulva (Figs. 30, 36): receptacles fungiform with swollen heads, curved outwards laterally, 0.25 long; swollen heads spaced by 3 width, stalks spaced by more than 3.7 diameters, and heads 2 times wider than stalk; pores on receptacle dense on the mesal side of the stalk, and evenly spaced on heads.

Male (paratype IV/ARA/ERS – 28). Total length, without chelicera: 13.26. Carapace (Figs. 3, 7, 16): 5.39 long, 4.19 wide. Matte blackish with raised caput and covered with sparse blackish setae. Eye sizes and interdistances (Fig. 18): ALE 0.2, AME 0.26, PLE 0.11, PME 0.13, AME-AME 0.08, PME-PLA 0.04, AME-ALE 0.1, PME-PME 0.58, ALE-PLA 0.12. Maxillae (Figs. 15, 20): 1.68 long, 0.98 wide, with 15 cuspules. Coloration as in female, covered with numerous short blackish setae ventrally and tuft of coarse reddish brown hairs laterally, anterior maxillary lobe protruded. Labium (Fig. 20): 0.71 long, 0.61 wide. Coloration as in female with well-developed labiosternal junction. Chelicerae (Fig. 19): Glossy blackish with 8 promarginal teeth and 16 mesobasal denticles. Rastellum formed by thick setae. Intercheliceral tumescence absent. Sternum (Fig. 15): 3.5 long, 2.25 wide. Sigilla (Fig. 17): as in female. Leg (Figs. 5, 7, 16, 22–24, 31): I 14.98 (4.02, 2.09, 3.54, 3.15, 2.18), II 12.1 (3.17, 1.84, 2.45, 2.75, 1.89), III 9.18 (2.71, 1.38, 1.52, 2.05, 1.52), IV 14.34 (3.09, 1.99, 3.55, 3.89, 1.82). Leg spination: leg I, mt, v 4, ti, v 2; leg II, mt, r 4, p 2, ti, r 2, v 1; leg III, mt, p 6, r 4, ti, r 2; leg IV, mt, p 8, r 3, ti, v 2. Legs covered with numerous blackish setae and sparsely by spines; tibiae I with an outwardly bent blackish stout spur located distally, and inwardly slope at distal end; metatarsus I with cluster of 60–65 blackish cuspules near proximal end; femora blackish; patellae, tibiae, metatarsi and tarsi of all legs yellowish brown. Scopulae as in female. Paired claws on all legs with a row of 5–6 teeth. Abdomen (Figs. 3, 18): 4.83 long, 2.92 wide. Abdomen as in female except for dorsum covered with broad longitudinal pale brownish spots distally; venter pale whitish brown at proximal end and pale blackish with sparse blackish patches distad. Spinnerets (Fig. 21): PLS 1.98 long, 0.5 wide, PLS-PLS 0.44; PMS 0.47 long, 0.25 wide, PMS-PMS 0.22. PLS: apical segment triangular. Palp (Figs. 20, 25–29, 32–35) femora 2.16 long, blackish with short whitish patch disto-ventrally; patella 1.08 long and 0.7 wide, sparse blackish spines apically; tibia 2.0 long and 0.84 wide, relatively 1/3 femora length; cymbium 0.84 long and 0.48 wide, oval shaped, slightly curved inwards and covered with blackish setae; bulb 1.01 long, oval with several low

ridges (Figs. 27–29); embolus slender, twice as long as tegulum, pointed at the tip and gently curved inwards distally.

Distribution. India (Assam) (Fig. 37).

Natural history. *Gravelyia boro* sp. nov. were found underground sandy loam in the burrow ca. 10–15 cm deep. The burrows were seen with open entrance of 0.8–1 cm wide, but entrances of burrows were not found during winter, which might probably be concealed with soil particles for hibernation (Fig. 1). The burrowing site had some vegetation cover with herbs and shrubs.

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