

Gasterapophus (Opiliones: Laniatores: Epedanidae), a new genus from Hainan Island, South China Sea

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Abstract. *Gasterapophus*, new genus (Opiliones: Laniatores: Epedanidae) and two species are newly described from Hainan Island, China, *G. singulus*, new species and *G. binatus*, new species. The genital characters dictate that the new genus should be placed in Epedanidae. The new genus is characterised by: (a) penis simple, ventral plate conspicuously extended, stylar lobe entirely surrounding the stylus, basal sac partly sinking into the truncus; (b) stigmatic area of male with large apophysis; (c) ocularium, scutum and free tergites unarmed; (d) coxa IV widened.

Key words. Arachnida, taxonomy, harvestmen, genitalia

INTRODUCTION

The family Epedanidae Sørensen, 1886 is endemic to Asia, with the greatest abundance in Southeast Asia, e.g., Philippines, Indonesia, Thailand, and Malaysia (Kury, 2007). Most genera and species were found and named by Roewer (1923, 1938) and much work has been done on this family in recent years (Suzuki, 1969, 1976, 1977, 1982, 1985a; Zhu & Lian, 2006; Kury, 2008; Lian et al., 2008; Zhang & Zhang, 2010; Lian et al., 2011; Zhang & Zhang, 2012). Thus far, this family includes 70 genera and 174 species (Kury, 2013).

Typical members of epedanids, which includes four valid subfamilies (Acrobuninae Roewer, 1912; Sarasinicinae Roewer, 1923; Epedaninae Sørensen, 1886 and Dibuninae Roewer, 1912), are characterised by “the greatly elongate pedipalps, high erect spine on eye tubercle, fused scutal areas I–II etc.” (Lian et al., 2008: 58), while some epedanids have contrary external morphology, e.g., relatively short and thick pedipalps, unarmed eye tubercle and scutum, disjunct scutal I and II etc. However, “based mainly on the presence of a well-developed immovable sac (...follis) and the absence of complex introverting structures in the penis” (Lian et al., 2008: 58), Kury (1993, 2003, 2009) placed these quite different epedanids in Epedanidae incertae sedis.

Dibuninae is one of the dominant group of opiliones of the Philippines (Kury, 2007), and only includes one genus *Dibunus* Loman, 1906 presently. *Dibunus* was traditionally

distinguished from other genera by the eyes placed in two widely separated mounds (Kury, 2009).

Acrobuninae contains six genera, i.e., *Acrobunus* Thorell, 1891, *Anacrobunus* Roewer, 1927, *Harpagonellus* Roewer, 1927, *Heterobiantes* Roewer, 1912, *Metacrobunus* Roewer, 1915 and *Paracrobunus* Suzuki, 1977. Members of this subfamily have dense scopulae in tarsi III–IV and eyes placed laterally at the base of a well-marked common ocularium (Kury, 2007) and they are mainly distributed in the south Asian tropics including Sumatra (Berg Singalang), Borneo (Mt. Dulit), Riouw-Archipel (Doerian), Mentawai-Inseln (Sipora, Sereinu), China (Hong Kong), Singapore, Malakka (Johore, Gunung Pulai), Sarawak (Mt. Poi) and the Philippines (Palawan Island).

Sarasinicinae is distinguished from Acrobuninae and Epedaninae by the tarsi III–IV without scopulae and distitarsus I with three tarsomeres (Kury, 2007). Roewer (1938) reviewed this subfamily which encompassed 21 genera at the time. Suzuki (1973, 1985b) successively synonymised *Nobeoka* Roewer, 1938 and *Strisilvea* Roewer, 1927 with *Pseudobiantes* Hirst, 1911 which belongs to Sarasinicinae, and he (1976) placed the new genus *Pasohnus* Suzuki, 1976 which was erected by himself in the same subfamily. Kury (1992) transferred *Padangcola* Roewer, 1963 from Tricommatinae Roewer, 1912 to Sarasinicinae because “*Padangcola* does not share any evident synapomorphy with the rest of the Tricommatinae, which are exclusively South-American, ranging from Argentina to Venezuela”. Tsurusaki (1995) found another new genus *Sungsotia* Tsurusaki, 1995 which is included in Sarasinicinae. So far, the Sarasinicinae includes 22 described genera typically occurred in Borneo, Tonking, Taiwan, Ryukyu Island, Malacca, Sumatra, Betelnut Island, Japan and Vietnam.

Although Epedaninae is similar to Sarasinicinae in the absence of scapulae in the tarsi III–IV, it can be differentiated from Sarasinicinae with the presence of two tarsomeres on

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TAXONOMY

Family Epedanidae Sørensen, 1886

Subfamily incertae sedis

Gasterapophus, new genus

Type species. *Gasterapophus binatus*, new species

Diagnosis. This new genus is noticeably distinct from other epedanids by the combination of (1) Stigmatic area of male with large armature; (2) body dorsally unarmed; (3) carapace with three tubercles on each side of front margin; (4) coxa IV widened conspicuously; (5) basichelicerite unarmed, disto-dorsally swollen; (6) segments of pedipalpus short and stout, never elongate; (7) femur of pedipalpus ventrally with four (IIIi) setiferous tubercles, distally on medial side with one setiferous tubercle; (8) penis ventral plate, basal sac and cavity elongated.

Description. Male: dorsal scutum (Figs. 1a, 4a) pyriform in shape; widest portion of body at fifth scutal area. Carapace with three setiferous tubercles on each side of front margin. Surface of the dorsum almost smooth. Low oval ocularium, removed from anterior border of scutum. Dorsal hump on anterior margin. Opisthosomal region of scutum with five areas, the first area without a median longitudinal line. Scutal groove strongly convex; borders of all scutal areas slightly convex. Areas I–V unarmed, nearly smooth except a few much reduced granules; a row of microscopic granules across the posterior margin of the scutum and free tergites. A few scattered granules also on the anal plate.

Venter (Figs. 1b, 3h, 4b): all coxae and genital operculum with small granulations. Coxa I with rather coarse and numerous granulations. Coxa II with a few setiferous tubercles retrolaterally. Coxa III with prolateral and retrolateral rows of small humps. Coxa IV widened, with numerous setiferous tubercles prolaterally. Stigmatic area with at least one apophysis. Tracheal stigma clearly visible. Both tracheal stigmata with a row of tubercles laterally.

Chelicerae (Figs. 1c–e, 4c–e): proximal segment disto-dorsally visibly swollen, without any conspicuous armament. Second segment unarmed, only with hairs which are scattered mainly on the prodorsal surface. Fingers relatively short.

Pedipalpus (Figs. 2f, g, 5g, h): coxa dorsally with one stout setiferous tubercle, ventrally with one acute setiferous tubercle. Trochanter ventrally with one long and one short setiferous tubercle. Femur ventrally with four setiferous tubercles, distally on medial side with one setiferous tubercle. Patella with one setiferous tubercle disto-medially. Tibia with three medial (IIIi) and three ectal (III) setiferous tubercles, the disto-ectal tubercle also with one accessory small tubercle. Tarsus with two medial and ectal enlarged setiferous tubercles. Tarsal claw longer than half of tarsus, strongly curved.

the distitarsus I. Roewer (1938) reviewed that this subfamily was composed of 23 genera. Roewer (1943) and Hillyard (1985) added one new genus, i.e., *Epedanidus* Roewer, 1943 and *Pseudomarthana* Hillyard, 1985, respectively. Suzuki (1969, 1977, 1985a) also added four new genera to this subfamily, i.e., *Pseudoepedanus* Suzuki, 1969, *Balabanus* Suzuki, 1977, *Alloepedanus* Suzuki, 1985 and *Paratakaioia* Suzuki, 1985. Kury transferred two genera to Epedaninae, i.e., *Aboriscus* Roewer, 1940 and *Dino* Loman, 1893; and removed four genera from Epedaninae, i.e., *Caletor* Loman, 1893, *Epedanestus* Roewer, 1938, *Mimepedanus* Roewer, 1923, *Mosfora* Roewer, 1938 (Kury, 1993, 2003, 2008, 2009). Currently 27 genera were listed in this subfamily by Kury and mainly distributed in Indo-Malaysian Region (Kury, 2009).

The remaining eight genera which are not assigned into these four subfamilies belong to Epedanidae incertae sedis. i.e., *Buparellus* Roewer, 1949; *Bupares* Thorell, 1889; *Dhaulagirus* Martens, 1977; *Dumaguetes* Roewer, 1927; *Parabeloniscus* Suzuki, 1967; *Parabupares* Suzuki, 1982; *Sotekia* Suzuki, 1982 and *Tokunosia* Suzuki, 1964. Most of them are found in Southeast Asia, and some in Nepal, Japan and China.

In the present paper, two new species of Epedanidae found among the leaf litter in Hainan Island are described and illustrated. Both new species have similar characters, not only in external morphology but in male genitalia as well. However, they cannot be assigned to any known genus in the Epedanidae. Here we erect a new genus, *Gasterapophus*, to accommodate *G. singulus*, new species and *G. binatus*, new species.

MATERIAL AND METHODS

The material used in this study was collected during 2011 as part of a project to sample terrestrial invertebrates in the national parks of Hainan Island.

Specimens were examined, measured and illustrated under a Leica M165c stereomicroscope with an ocular micrometer and equipped with a drawing tube. The male genitalia were placed firstly in hot lactic acid, followed by distilled water to expand those parts for observation (Schwendinger & Martens, 2002). All specimens were preserved in 75% ethanol. Type specimens are deposited in the Museum of Hebei University, Baoding, China (MHB). Taxonomic methods follow Acosta et al. (2007). The terminologies of the setae on the penis follow Ubick & Briggs (1992). The notation of spines on the pedipalp follow Kury & Maury (1998); large spines are designated as “I” and small ones (less than half the size of the largest on the same row) as “i” (Acosta et al., 2007: 502). All measurements are given in mm.

The following abbreviations are used in the figures: BS–basal sac; C–cavity; DSL–dorsal stylar lobe; G–glans; LS–lateral setae; S–stylus; SC–seminal canal; SL–stylar lobe; VP–ventral plate; VS–ventral setae; VSL–ventral stylar lobe.

Table 1. Pedipalpus and leg measurements of the male holotype and female paratype (in parentheses) of *Gasterapophus binatus*, new species.

	Trochanter	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Pedipalpus	0.28(0.28)	0.68(0.60)	0.38(0.38)	0.43(0.40)		0.43(0.40)	2.20(2.06)
Leg I	0.30(0.28)	0.85(0.80)	0.48(0.40)	0.58(0.55)	0.88(0.78)	0.68(0.63)	3.77(3.44)
Leg II	0.30(0.28)	1.20(1.03)	0.58(0.53)	0.83(0.88)	1.13(0.88)	1.20(1.15)	5.24(4.75)
Leg III	0.30(0.28)	1.00(0.83)	0.48(0.45)	0.78(0.68)	1.03(0.93)	0.83(0.70)	4.42(3.87)
Leg IV	0.65(0.58)	1.10(1.18)	0.73(0.53)	1.55(1.08)	1.25(1.30)	0.88(0.88)	6.16(5.55)

Legs (Figs. 2b–e, 5b–f): relatively short and stout. Trochanters I–IV unarmed above except for a few hair-tipped granules, more granules on the ventral surface. Trochanter IV conspicuously enlarged. Femora III–IV curved, especially femur IV. Femora I–III with fine hair-tipped granules which are arranged more or less in longitudinal series. Patella IV enlarged. Tibiae III–IV with conspicuously enlarged teeth ventro-distally. Base of metatarsus IV strongly curved. The remaining leg-segments unarmed, smooth, but with hairs. Tarsi III–IV with bare double claws, without scopulae. Tarsal formula: 4/7/5/6. Distitarsus I two-jointed and II three-jointed.

Penis (Fig. 7): slender. Ventral plate well defined, spoon-shaped. Cavity within the ventral plate, elongate. Glans entirely exposed in the cavity, nearly cylindrical, short. Base of glans connect to the basal sac and apex of glans with an opening. The opening of glans consists of ventral stylar lobe and dorsal stylar lobe. Stylus smooth, columnar and arising straight from glans, stylar lobe entirely surrounding the stylus. Basal sac irregular cylindrical, almost as long as cavity, partially sunken into truncus. Seminal canal visible.

Female (Figs. 3a–e, 6a–e): similar to the male but smaller and with abdomen more rounded posteriorly. Stigmatic area without any conspicuous apophysis.

Ovipositor (Figs. 3f, g, 6f, g): ventral surface with four setae and dorsal surface with six setae.

Sexual dimorphism. The most conspicuous sexual dimorphism is the presence of at least one large, robust apophysis on stigmatic area of male. The second most conspicuous dimorphic structure is found on the legs, especially tibiae III and IV, ventro-distally with enlarged teeth in males. Sternite and legs unarmed in female.

Habitat. Collected by leaf litter sieving in the tropical montane rainforest.

Etymology. The name derives from “gaster” (Greek) meaning belly and “apophysis” from the Greek meaning apophysis or outgrowth; referring to the apophysis of the male stigmatic area. Masculine.

Notes. Detailed illustrations of both the unexpanded and expanded penis from different views are very important to

Laniatores taxonomy (Martens, 1988). However, the fact is that the expanded conditions of penis are non-arbitrary. Although we succeed in expanding only a few specimens of Epedanidae with the method of Schwendinger & Martens (2002), we failed to expand every male specimen of this new genus with all methods available, e.g., Briggs (1974), Ubick & Briggs (1989) and Schwendinger & Martens (2002).

Gasterapophus binatus, new species

(Figs. 1–3, 7a–d, Table 1)

Material examined. Holotype male, China: Hainan Province, Mt. Jianfengling, 860m, 18°44'N, 108°51'E, 26 May 2011, coll. C. Zhang (MHBUS-Opi-HNQ0409). Paratypes: 3 males (MHBUS-Opi-HNQ0410–12), 5 females (MHBUS-Opi-HNQ0413–17), same data as holotype; 1 male (MHBUS-Opi-HNQ0220), 4 females (MHBUS-Opi-HNQ0221–24), Hainan Province, Mt. Diaoluo, 18°43'N, 109°52'E, 930m alt., 20 May 2011, coll. C. Zhang.

Diagnosis. Recognised by male stigmatic area medially with a pair of apophyses along the posterior margin, apical part of penile ventral plate attenuated and somewhat triangular, penis with ten lateral setae.

Description. Male: habitus as in Figs. 1a–b, 2a. Carapace with one enlarged and two small setiferous tubercles on each side of front margin. Stigmatic area strongly extended and covering almost the whole of abdomen. Compressed free sternites IV–VII not easily visible. Posterior region of stigmatic area medially with a pair of large apophyses which are slightly curved forward. Both tracheal stigmata with a row of enlarged tubercles laterally. Inner edges of cheliceral fingers toothed as illustrated (Fig. 1e): articulated finger with two teeth; fixed finger with four teeth. Tarsus of pedipalpus with four medial (iili) and three ectal (Ili) setiferous tubercles (Figs. 2f, g). Femur IV with conspicuously enlarged granules (Fig. 2e). Tibia IV ventrally with many teeth which are arranged more or less in two longitudinal series, ventral side with three medial and two ectal conspicuously enlarged teeth distally (Figs. 2c, d). The remaining segments of leg unarmed, smooth, but with setae. Penis (Figs. 7a–d), apical part of ventral plate and ventral stylar lobe somewhat triangular; dorsal stylar lobe U-shaped; setae arranged as follow: six ventral setae, 10 lateral setae.

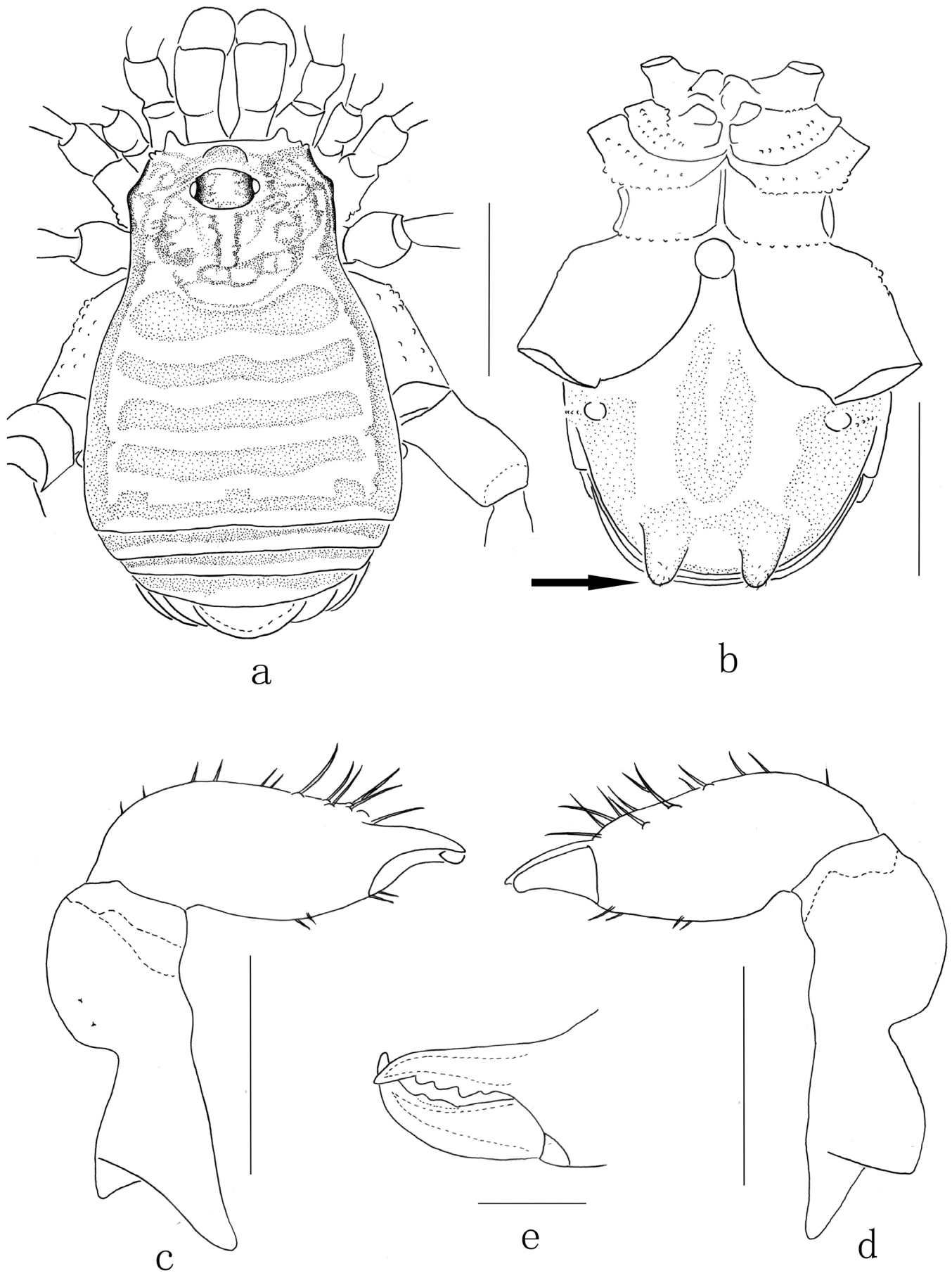


Fig. 1. *Gasterapophus binatus*, new species. Holotype male. a, b, body; a, dorsal view; b, ventral view (arrow indicates apophysis); c, d, left chelicerae; c, medial view; d, ectal view; e, cheliceral fingers, frontal view. Scale bars: a, b = 1 mm; c, d = 0.5 mm; e = 0.2 mm.

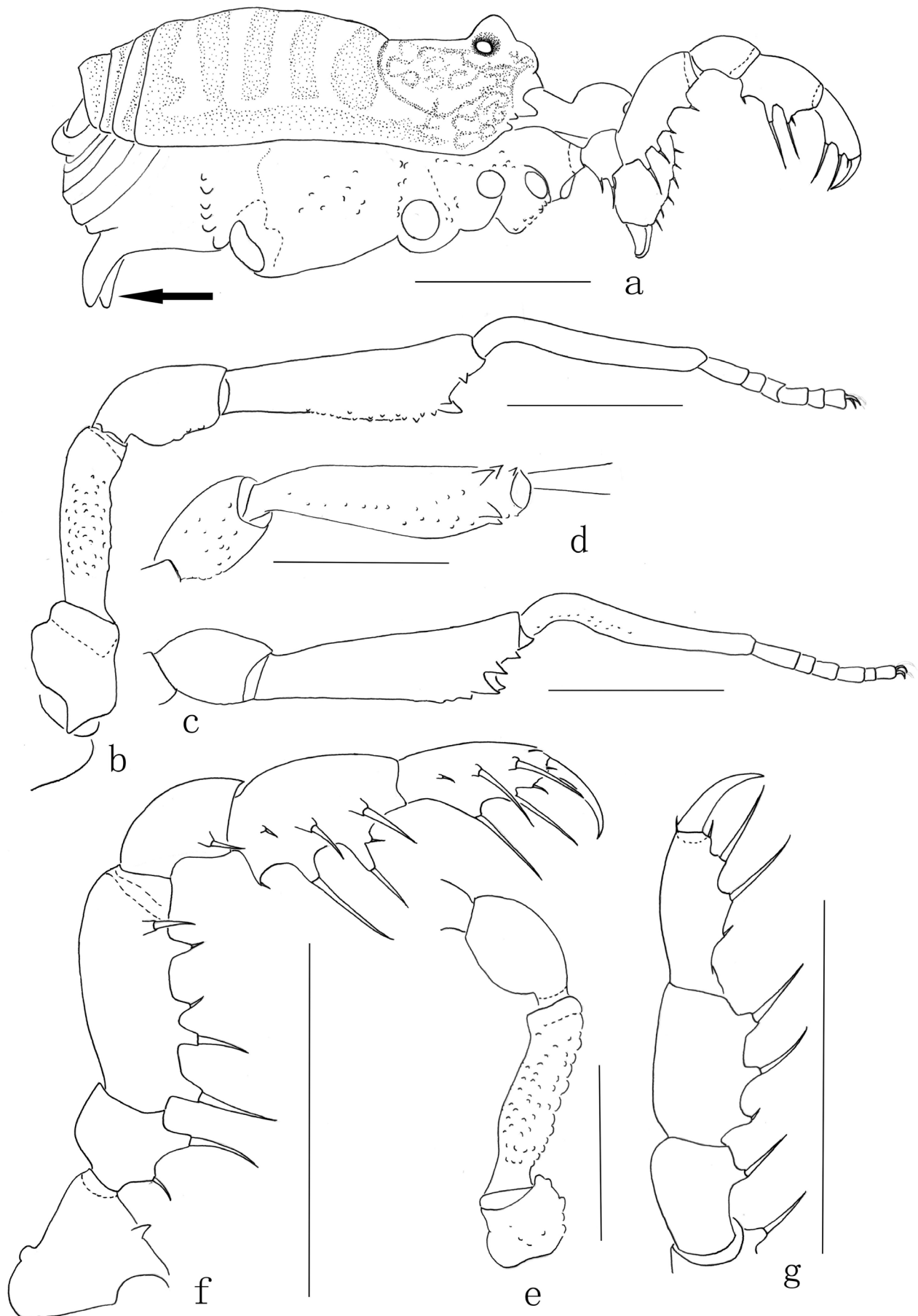


Fig. 2. *Gasterapophus binatus*, new species. Holotype male. a, body, lateral view (arrow indicates apophysis); b, left leg IV, prolateral view; c, patella, tibia, metatarsus and tarsus of right leg IV, retrolateral view; d, patella and tibia of right leg IV, ventral view; e, trochanter, femur and patella of right leg IV, prolateral view; f, left pedipalpus, mesal view; g, patella, tibia and tarsus of left pedipalpus, ectal view. Scale bars = 1 mm.

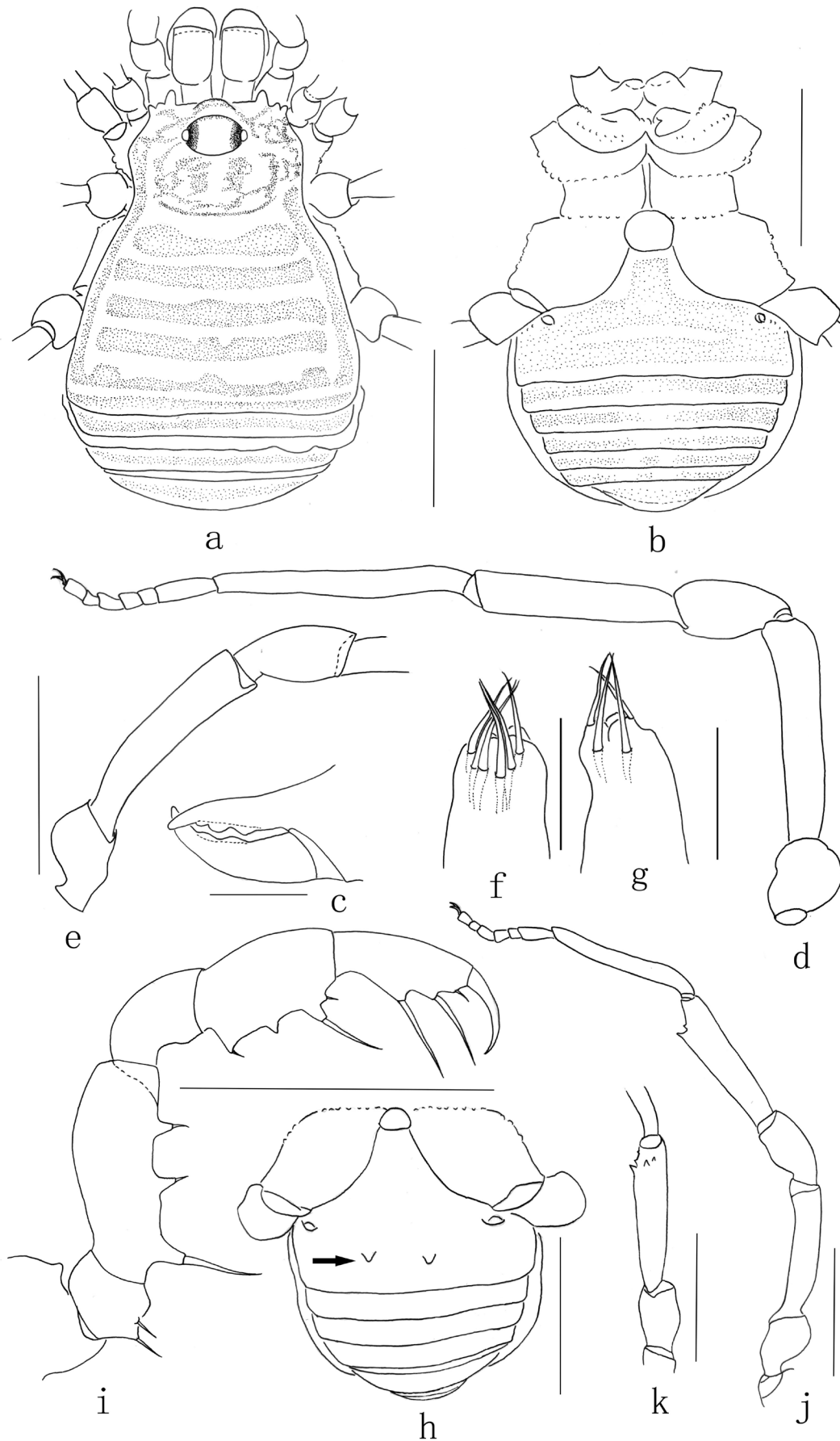


Fig. 3. *Gasterapophus binatus*, new species. Paratype, a–g, female (MHBU-Opi-HNQ0413); i, male (MHBU-Opi-HNQ0410); h, j–k, male (MHBU-Opi-HNQ0220). a, b, body; a, dorsal view; b, ventral view; c, cheliceral fingers, frontal view; d, left leg IV, retrolateral view; e, trochanter, femur and patella of left leg IV, prolateral view; f, g, ovipositor; f, dorsal view; g, ventral view; h, venter of coxa IV, stigmatic area and free sternites (arrow indicates apophysis); i, right pedipalpus, ectal view; j, right leg IV, prolateral view; k, patella and tibia of right leg IV, ventral view. Scale bars: a, b, d, e, h–k = 1 mm; f, g = 0.3 mm; c = 0.2 mm. Arrow indicates apophysis.

Table 2. Pedipalpus and leg measurements of the male holotype and female paratype (in parentheses) of *Gasterapophus singulus*, new species.

	Trochanter	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
Pedipalpus	0.28(0.23)	0.68(0.55)	0.40(0.35)	0.48(0.43)		0.40(0.38)	2.24(1.94)
Leg I	0.30(0.25)	0.95(0.78)	0.48(0.38)	0.63(0.50)	0.85(0.65)	0.68(0.55)	3.89(3.11)
Leg II	0.30(0.25)	1.38(1.13)	0.63(0.50)	1.05(0.75)	1.03(0.90)	1.23(1.10)	5.62(4.63)
Leg III	0.33(0.33)	1.23(0.90)	0.50(0.43)	0.88(0.65)	1.05(0.85)	0.85(0.70)	4.84(3.86)
Leg IV	0.83(0.40)	1.18(1.13)	0.80(0.58)	1.40(1.00)	1.65(1.28)	0.95(0.83)	6.81(5.22)

Female similar in size and shape to male (Figs. 3a–g). Inner edges of cheliceral fingers toothed as illustrated (Fig. 3c): articulated finger with two teeth; fixed finger with three teeth.

Colouration. Entire body rusty yellow; carapace and ocularium with blackish brown reticulations; lateral margins and opisthosomal areas of scutum, and free tergites banded with blackish brown; venter concolorous with dorsum, slightly lighter; coxae with dark brown reticulations; the first of the free sternites with lateral and central blackish brown patches; chelicerae and pedipalpi concolorous with the dorsum, and also with blackish brown reticulate markings above; legs brown to blackish as well as proximal tarsus, remaining segments of tarsus whitish yellow.

Measurements. Male holotype (female paratype): body 2.85 (2.65) long, 1.83 (1.90) wide at the widest portion, scutum 2.18 (2.10) long. Eye tubercle 0.23 (0.23) long, 0.40 (0.40) wide. Pedipalpus claw 0.28 (0.25) long. Penis 1.28 long. Measurements of left pedipalpus and legs as in Table 1.

Distribution. China: Hainan.

Etymology. The specific name is derived from the Latin word “binare” meaning binate, refers to the numbers of apophyses on male stigmatic area.

Variation. Five male specimens (MHBU-Opi-HNQ0409–0412, 0220) were examined. Body 2.40–2.85 long, 1.54–1.83 wide at the widest portion, scutum 1.92–2.18 long. Ornamentations of the smallest male body (MHBU-Opi-HNQ0220) proportionally reduced, however, the most obvious changes are apophyses on stigmatic area and teeth on tibia IV (Figs. 3h, j, k). The pedipalpi of four male specimens resemble that of the male holotype (MHBU-Opi-HNQ0409). However, the left pedipalpus of another male (MHBU-Opi-HNQ0410) with normal shape as in holotype (Figs. 2f, g), but the right pedipalpus femur with three ventral setiferous tubercles, and other setiferous tubercles in trochanter and patella reduced sometimes (Fig. 3i).

***Gasterapophus singulus*, new species**
(Figs. 4–6, 7e–h, Table 2)

Material examined. Holotype male, China: Hainan Province, Mt. Bawangling, 450m alt., 19°12'N, 109°15'E, 30 May 2011, coll. C. Zhang (MHBU-Opi-HNQ0511). Paratypes:

1 female, same data as holotype (MHBU-Opi-HNQ0512); 1 male (MHBU-Opi-HNQ0100), 2 females (MHBU-Opi-HNQ0101–02), Hainan Province, Mt. Yinggeling, 450m alt., 19°04'N, 109°31'E, 12 May 2011, coll. C. Zhang; 2 males (MHBU-Opi-HNQ0065–66), 1 female (MHBU-Opi-HNQ0067), Hainan Province, Mt. Limu, 760m alt., 19°10'N, 109°44'E, 7 May 2011, coll. C. Zhang.

Diagnosis. Recognised by male stigmatic area medially with one apophysis along the posterior margin, tibia III of leg with two enlarged ventral teeth distally, apical part of penile ventral plate expanded and rounded (shaped somewhat as a spatula), penis with two lateral setae.

Description. Male: habitus as in Figs. 4a, b, 5a. Anterior margin of carapace with three similar setiferous tubercles at lateral angle. Stigmatic area with a median apophysis, triangular from lateral view. Both tracheal stigmata with a row of small tubercles laterally. Inner edges of cheliceral fingers toothed as illustrated (Fig. 4e): articulated finger with two teeth; fixed finger with four teeth. Tarsus of pedipalpus with two medial (II) and three ectal (IIi) setiferous tubercles (Fig. 5g, h). Patella III with one tubercle prolaterally (Fig. 5c). Patella IV enlarged, only with granules ventrally. Tibia III with two enlarged ventral teeth distally (Fig. 5b, c). Tibia IV ventrally with many teeth which are arranged more or less in two longitudinal series, each ventral side with three conspicuously enlarged teeth distally (Fig. 5d–f). Penis (Fig. 7e–h), apical part of ventral plate spatulate; ventral stylar lobe arc-shaped; dorsal stylar lobe U-shaped; setae arranged as follow: six ventral setae, two lateral setae.

Female similar in size and shape to male (Fig. 6a–g). Inner edges of fingers toothed as illustrated (Fig. 6c): articulated finger with two teeth; fixed finger with three teeth.

Colouration. Entire body rusty yellow; carapace and ocularium with pale brown reticulations; opisthosomal areas of scutum each with a transverse row of brownish band except for area I; lateral margins and free tergites banded with blackish brown; venter concolorous with dorsum, slightly lighter; coxae and genital operculum without conspicuous brownish reticulations; free sternites each with brownish bands; chelicerae and pedipalpus yellow with pale brown reticulations above; proximal tarsi I–IV and metatarsi III–IV of legs brown, distal tarsi whitish yellow, remaining segments of legs rusty yellow.

Measurements. Male holotype (female paratype): body 2.58 (2.05) long, 1.88 (1.70) wide at the widest portion, scutum 2.25 (1.80) long. Eye tubercle 0.25 (0.23) long, 0.43 (0.40) wide. Pedipalpus claw 0.28 (0.25) long. Penis 1.13 long. Measurements of left pedipalpus and legs as in Table 2.

Distribution. China: Hainan.

Etymology. The specific name is derived from the Latin “singulus” meaning individual, refers to the single apophysis on stigmatic area of male.

Variation. Four male specimens (MHBU-Opi-HNQ0511, 0100, 0065–0066) were examined. Body 2.35–2.62 long, 1.69–1.88 wide at the widest portion, scutum 2.00–2.25 long.

One male (MHBU-Opi-HNQ0100) with reinforced teeth on patella III, tibia III and tibia IV (Figs. 6h–l).

DISCUSSION

The male genitalia of *Gasterapophus* offer conspicuous evidence of an epedanid relationship. However, *Gasterapophus* differs from all other known genera because the stigmatic area of males possess a large armature. Therefore, according to the external morphology of *Gasterapophus*, we cannot assign it to any existing subfamily in Epedanidae. We tentatively place the new genus as Epedanidae incertae sedis.

Based on known morphology the current composition of Epedanidae incertae sedis includes eight genera (see

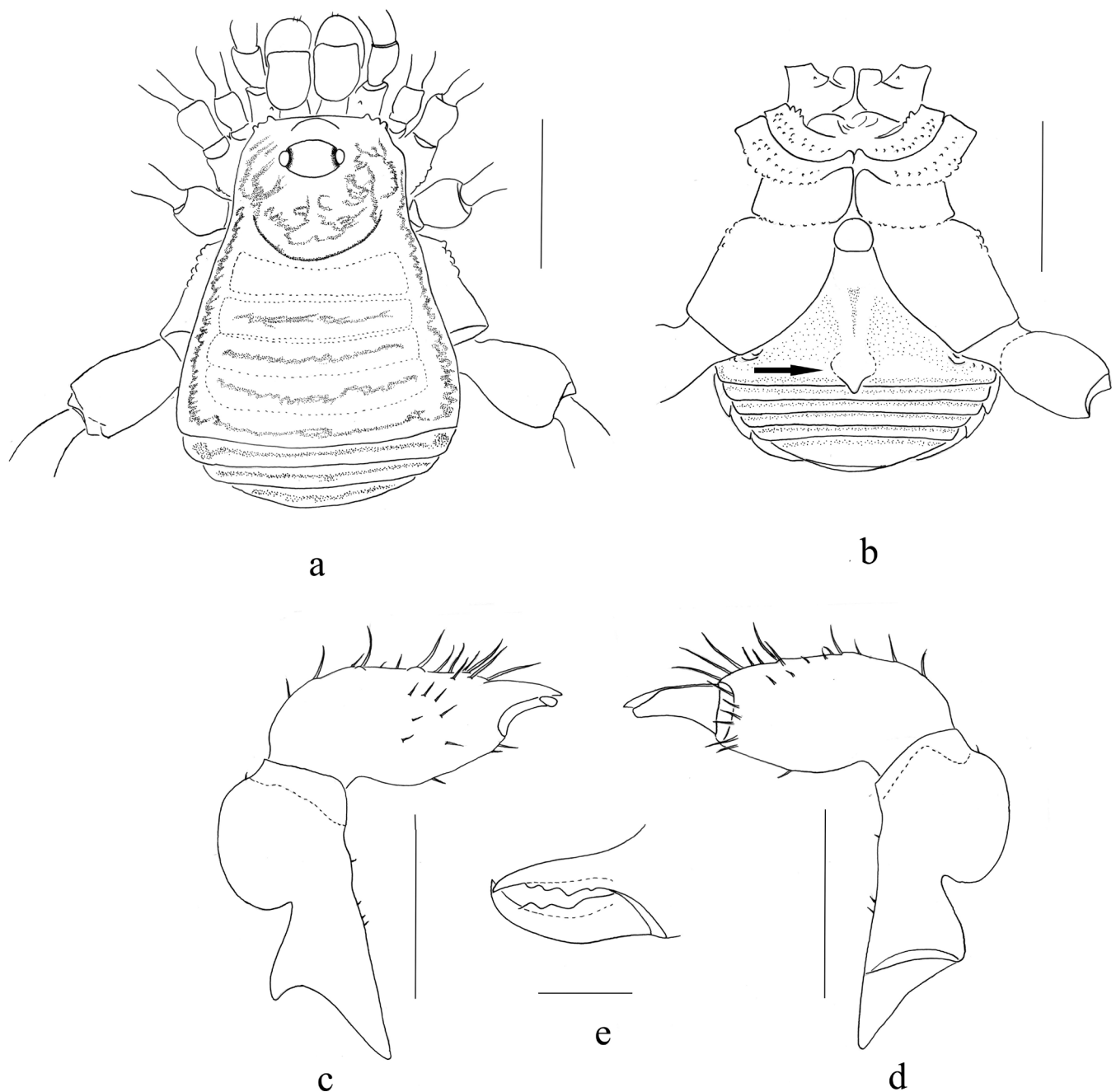


Fig. 4. *Gasterapophus singulus*, new species. Holotype male. a, b, body; a, dorsal view; b, ventral view (arrow indicates apophysis); c, d, left chelicerae; c, medial view; d, ectal view; e, cheliceral fingers, frontal view. Scale bars: a, b = 1 mm; c, d = 0.5 mm; e = 0.2 mm.

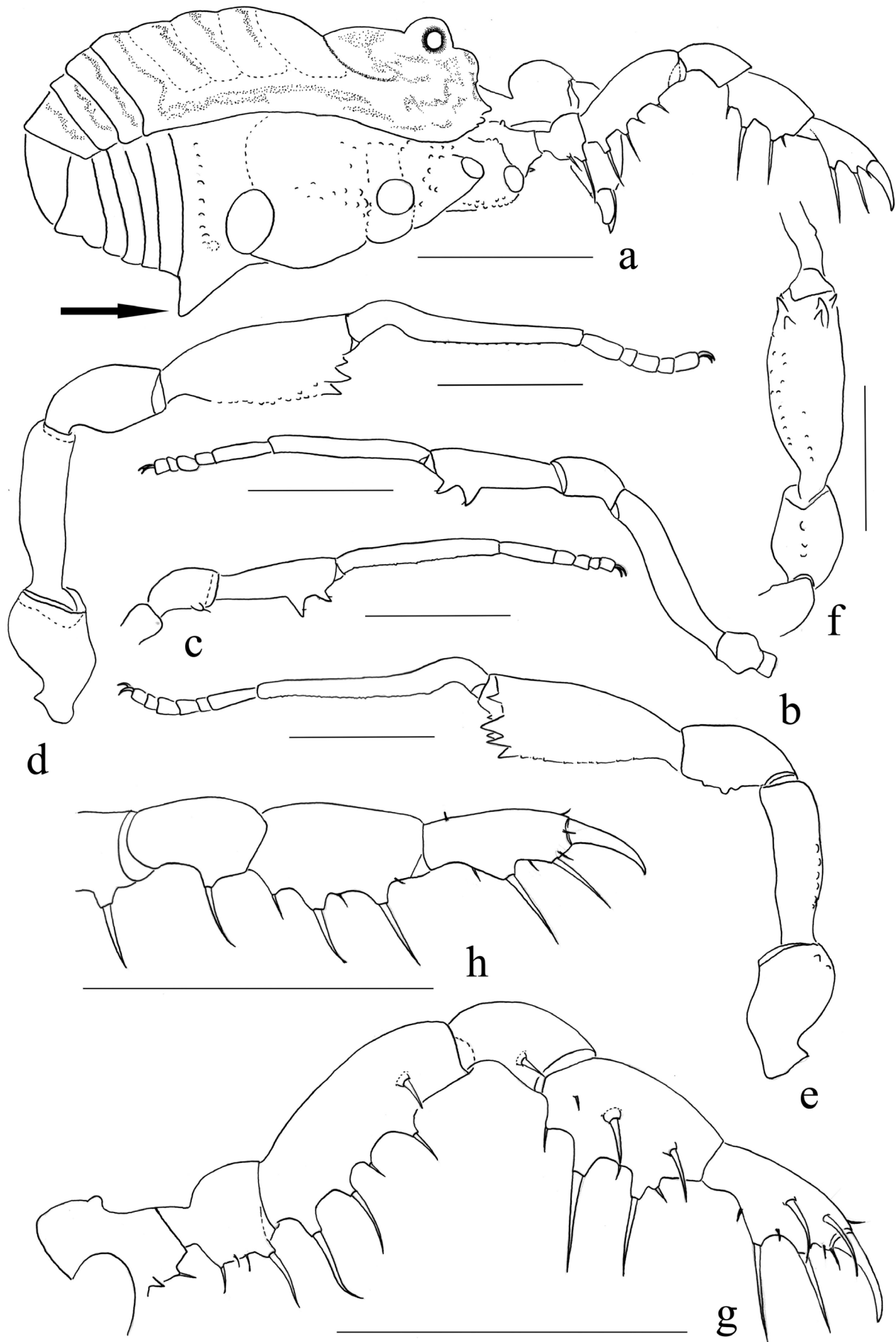


Fig. 5. *Gasterapophus singulus*, new species. Holotype male. a, body, lateral view (arrow indicates apophysis); b, left leg III, retrolateral view; c, patella, tibia, metatarsus and tarsus of left leg III, prolateral view; d–e, left leg IV; d, prolateral view; e, retrolateral view; f, patella and tibia of left leg IV, ventral view; g, left pedipalpus, mesal view; h, patella, tibia and tarsus of left pedipalpus, ectal view. Scale bars = 1 mm.

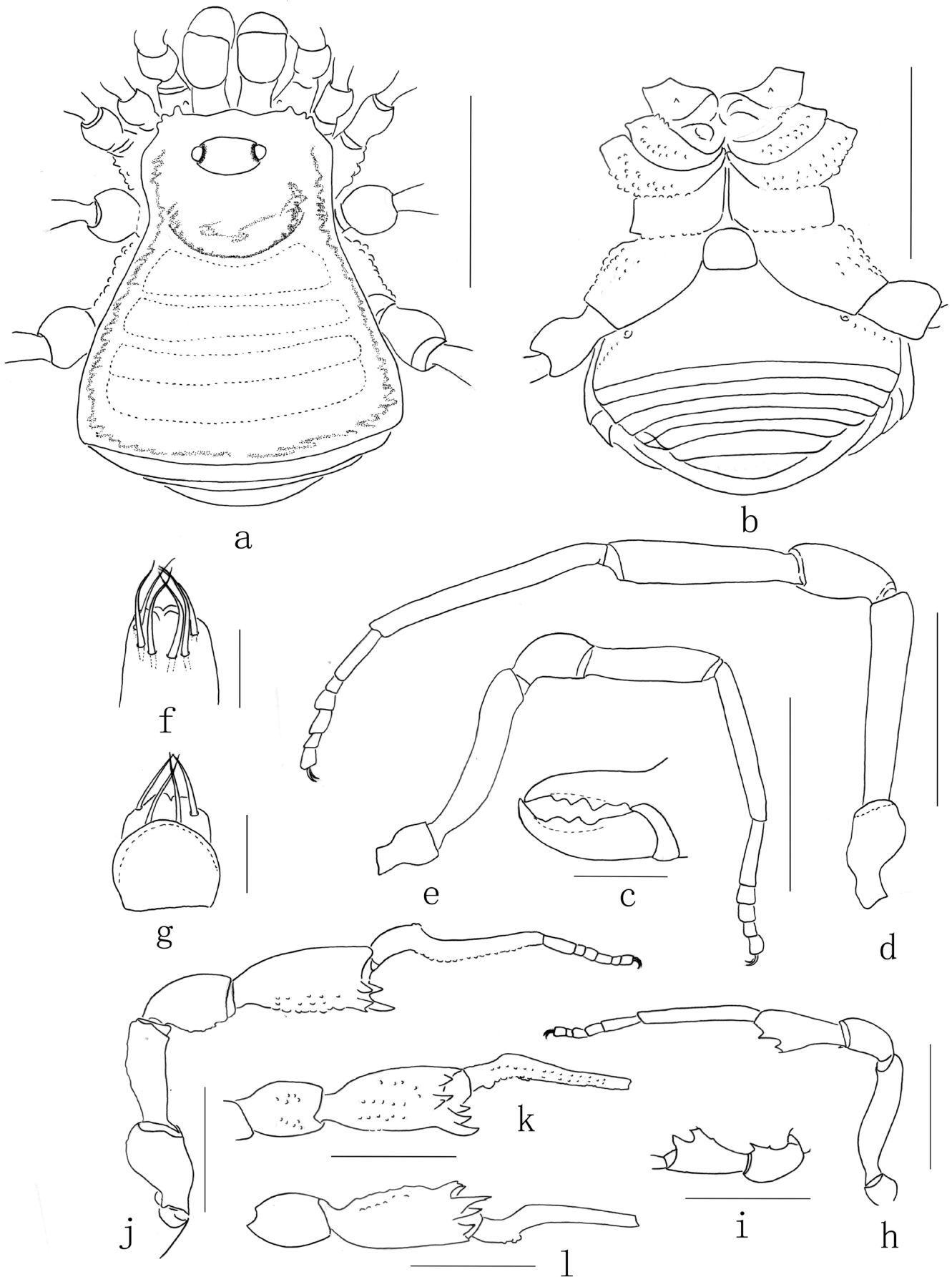


Fig. 6. *Gasterapophus singulus*, new species. Paratype, a–g, female (MHBU-Opi-HNQ0512); h–l, male (MHBU-Opi-HNQ0100). a–b, body; a, dorsal view; b, ventral view; c, cheliceral fingers, frontal view; d, left leg IV, retrolateral view; e, left leg III, prolateral view; f–g, ovipositor; f, dorsal view; g, ventral view; h, left leg III, retrolateral view; i, patella and tibia of left leg III, prolateral view; j, left leg IV, prolateral view; k–l, patella, tibia and metatarsus of left leg IV; k, ventral view; l, retrolateral view. Scale bars: a, b, d, e, h–l = 1 mm; c, f, g = 0.2 mm.

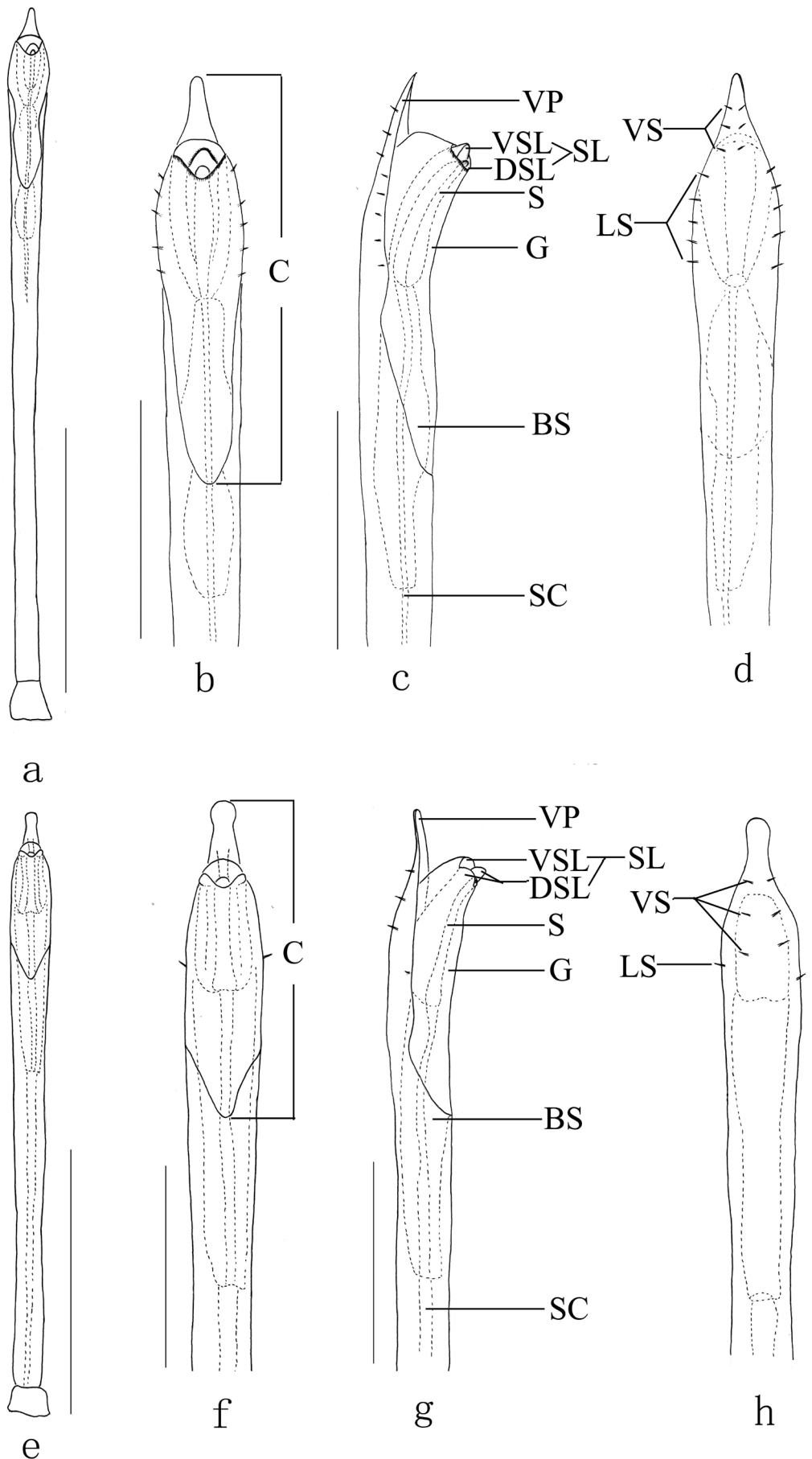


Fig. 7. Penis, a–d, *Gasterapophus binatus*, new species, a, entire penis, dorsal view; b–d, penis tip; b, dorsal view; c, lateral view; d, ventral view; e–h, *Gasterapophus singulus*, new species, e, entire penis, dorsal view; f–h, penis tip; f, dorsal view; g, lateral view; h, ventral view. Scale bars: a, e = 0.5 mm; b–d, f–h = 0.2 mm. BS–basal sac; C–cavity; DSL–dorsal stylar lobe; G–glans; LS–lateral setae; S–stylus; SC–seminal canal; SL–stylar lobe; VP–ventral plate; VS–ventral setae; VSL–ventral stylar lobe.

introduction). Of these genera, only *Parabeloniscus* possesses the pyriform body shape (Suzuki, 1967: 194–195, fig. 1). The remaining seven genera (*Buparellus*, *Bupares*, *Dhaulagiri*, *Dumaguetes*, *Parabupares*, *Sotekia*, and *Tokunosia*) are similar to *Gasterapophus* in their trapezoidal body. However, external morphological characters exist between these species and are distinctive enough to permit identification.

Ocularium of *Gasterapophus* is unarmed, as well as that of *Buparellus*, *Dhaulagiri*, and *Tokunosia*. By contrast, ocularium possesses a low blunt cone in *Sotekia* (Suzuki, 1982: 102, figs. 2A–B); a high erect spine in *Dumaguetes* (Roewer, 1927: 295); a pair of spines in *Bupares* and *Parabupares* (Roewer, 1923: 75; Suzuki, 1982: 100, figs. 1E, F, H).

Among the four genera above (ocularium without armature), both *Gasterapophus* and *Buparellus* have short pedipalps (Figs. 2a, 5a; Roewer, 1949: 53, figs. 100, 101), while both *Dhaulagiri* and *Tokunosia* have elongate pedipalps (Martens, 1977: 299, figs. 10, 14; Suzuki, 1964: 143–144, figs. 1–2). Although the external morphology of *Gasterapophus* is similar to *Buparellus* in some ways, *Gasterapophus* has a visible swelling in the disto-dorsal basichelicerite which is absent in *Buparellus* (Roewer, 1949: 53).

These nine genera of Epedanidae incertae sedis are morphologically very diverse and only a few species have been described and illustrated in detail. At the present time some genera of Epedanidae, e.g., *Buparellus* and *Bupares*, are being shifted out of the Epedanidae (Kury, pers. comm.). Therefore, based only on the information available, we cannot presume the phylogenetic relationship of these genera. However, such an analysis would help to resolve this problem.

ACKNOWLEDGEMENTS

We are grateful to Adriano B. Kury and Nobuo Tsurusaki for sending relevant literature. Thanks are also to two anonymous reviewers for reviewing the manuscript. Jomo MacDemott kindly helped reviewing the English of the manuscript. This work was supported by the National Natural Science Foundation of China (Nos. 31471956, 31071885), and also by the Hebei Province Natural Science Fund of China (No. H201406470).

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