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A New Genus of the Tribe Gnoristini from Yunnan, China (Diptera, Mycetophilidae)

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Abstract A new genus *Hemisphaeronotus* belonging to the Gnoristini of the family Mycetophilidae is described based on four new species, *H. rotundatus*, *H. bilobatus*, *H. flavidus* and *H. fuscicaudatus*, which were collected in Yunnan, China. The new genus is somewhat similar to the genera *Boletina*, *Gnoriste*, etc. in wing venation, but it is easily distinguished from them by the strongly humpbacked mesoscutum that expands anteriorly as an eave overlapping the head, the incompletely separated anepisternum and katepisternum of the mesothoracic pleuron, and the mesoscutellum without strong marginal setae. The new species are distinguished from each other based on body size, coloration of the thorax, and in the male by coloration and shape of the epandrium, shape of gonostylus, and the claws of the legs.

Introduction

In the course of faunal surveys of the Diptera of Yunnan, China, the author collected some fungus gnats belonging to a unique group of the tribe Gnoristini of the Mycetophilidae. They have an extremely humpbacked mesoscutum that is almost hemispherical and produced forwards overlapping the small head. A similarly shaped mesoscutum is often found in the Mycetophilinae (e.g. *Epicypta* WINNERTZ, 1863) of the Mycetophilidae, but no genera of the Gnoristini have this type of thorax. The specimens are assigned to four species that are described as new to science, representing a new genus, *Hemisphaeronotus*.

Materials and methods

All the specimens described in this work were collected by sweep net and dried by the author during surveys carried out as a co-operative work with staffs of The Kunming Zoological Institute, Kunming, Yunnan, China. The specimens were then each mounted on a micropin with glue. The holotypes of the new species will eventually be housed in the collection of the Kunming Zoological Institute.

An entire male paratype from the type species of the new genus, and apical abdominal segments of each of the holotypes of the three other species and of a female paratype of the type species were macerated in hot (95℃) potassium hydroxide solution for 10–15 minutes, then washed with water, treated in 10% acetic acid for several minutes, washed again in water, and finally preserved in 80% glycerol. The wings were detached from the body, dipped and cleaned in warm water mixed with a few drops of a neutral detergent, mounted on a microscopic slide with glycerol, and then photographed. The wings were finally dried again and attached to the specimens

External morphological characters were observed under a stereoscopic binocular microscope at a maximum magnification of 180×, and the detailed structure of the macerated material were examined under a compound microscope at a maximum magnification of 400×.

Taxonomy

Hemisphaeronotus gen. nov.

Type species. Hemisphaeronotus rotundatus SAIGUSA, sp. nov.

Etymology and gender. The generic name is based on the hemispherically humpbacked mesoscutum; hemisphaera (hemisphere) + notus (back). Gender masculine.

Diagnosis. Medium- to large-sized, elongate, long-legged mycetophilids with strongly humpbacked mesoscutum overlapping head, incompletely divided mesepimeron, only short setose mesoscutellum lacking marginal setae, wing characters as in genus *Boletina* Staeger, 1840, male epandrium completely fused with gonocoxites bearing trifurcate gonostylus, and female cercus lobate and one-segmented.

Description. Head (Fig. 1) moderately large, hemispherical, in dried specimens tightly attached to more or less concaved cervical and prothoracic regions under anterior 1/3 of mesoscutum, therefore head directed ventrally and morphological posterior margin of head almost dorsal. Compound eyes oval, with inner margin almost straight, not emarginated above antennal bases, densely covered with inter-ommatidial setae 3 times as long as diameter of ommatidium; vertical diameter of eye 1.4 times as long as transverse diameter. Ocelli 3 in number, arranged almost transversely, but middle ocellus slightly shifted anteriorly from lateral pair, middle ocellus half as large as lateral pair in diameter, lateral pair situated midway between middle ocellus and inner eye margin. Frons 1.3 times as wide as long, more or less narrowed anteriorly; face twice as wide as long; clypeus as long as face, twice as long as wide; frons, face and clypeus without setae. Vertex short, greater part of vertex and occiput representing bottom surface of hemispherical head concealed in lateral aspect, short setose only on upper lateral areas of vertex. Antenna moderately long for Gnoristini, longer in male than in female; scape as long as thick and short setose, pedicel spherical, half as long as scape, and short setose on ventral surface; flagellum consisting of 14 flagellomeres, each flagellomere pale pilose and bearing several short black setulae more abundant on basal flagellomeres; 1st flagellomere several times as long as thick; distal flagellomere almost as long as penultimate. Mouthparts short; labrum triangular, almost as long as face; labella small, very short setose; maxillary palpus greatly shortened, 2/3 as long as height

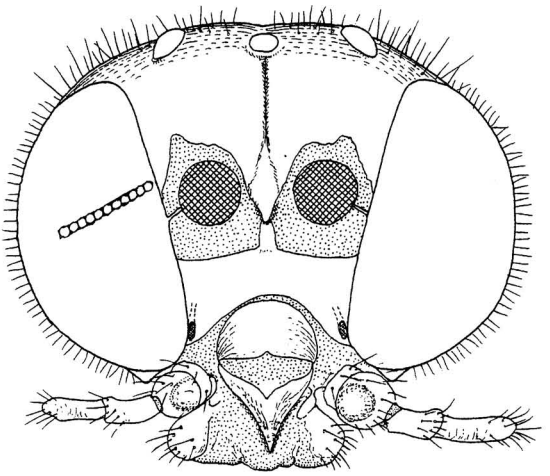


Fig. 1. Male head of *Hemisphaeronotus rotundatus*, sp. nov., anterior aspect.

of compound eye, 1st and 2nd palpomeres united into short segment with some setulae, 3rd spherical and with large sensory area occupying most of mesal surface and bearing some 10 setulae, 4th cylindrical, as long as 3rd, 5th longer than 4th and with several setulae towards tip.

Thorax (Fig. 2): Mesoscutum large, hemispherical and strongly humpbacked, expanded anteriorly like an eave that overlaps head; parapsidal suture nearly transverse, directed medially at right angle to lateral margin of mesonotum. Acrostichals absent, dorsocentrals uniserial to irregularly biserial; sublateral portions of mesoscutum setose, prealar (notopleural) to supra-alar areas close to lateral margins of mesoscutum densely clothed with long stiff setae arranged in uniserial or irregularly biserial rows. Scutellum moderately large, oval and about 1.5 times as wide as long, bearing only short setulae on lateral areas of anterior half, setulae may be reduced to 1–2 in number and confined to lateral corners of scutellum. Mediotergite large and elongate, bare and not swollen posteriorly. Prothoracic and cervical areas situated on sunken ventral surface of mesoscutum; anterior pronotum with median area invisible in dried condition, with lateral part flattened bearing several setae; proepisternum bare, proepimeron narrowly tapered to sharply pointed ventral extremity that is articulated with anterior margin of mesokatepisternum; precoxal sclerotization of prothorax bare, isolated as sclerite on membranous area; prosternum bare.

Mesothoracic pleuron deep and much obliquely situated on lateral part of thorax, its vertical length 0.6–0.7 times as long as combined length of mesoscutum and mesoscutellum; no setae on any part of mesothoracic pleuron; pleural suture of mesothorax

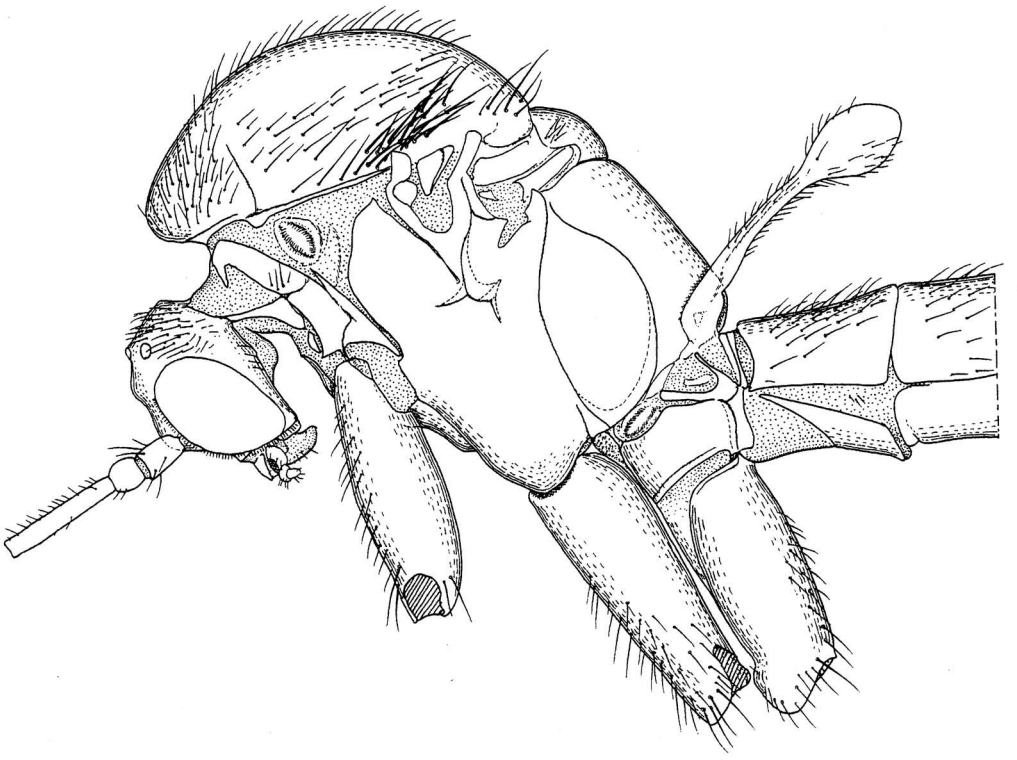


Fig. 2. Male head, thorax and basal abdominal segments of *Hemisphaeronotus rotundatus*, sp. nov., lateral aspect.

appearing along only dorsal half of episternum and close to base of cx_2; anapleural suture disappearing on anterior 2/3 to 3/4 of its ordinary length, therefore suture not reaching anterior margin of episternum; laterotergite large and bare. Metathoracic pleuron small, metakatepisternum twice as long as deep, quadrate and bare; metepimeron small and bare; metanotal seta just dorsal to halter base present or absent.

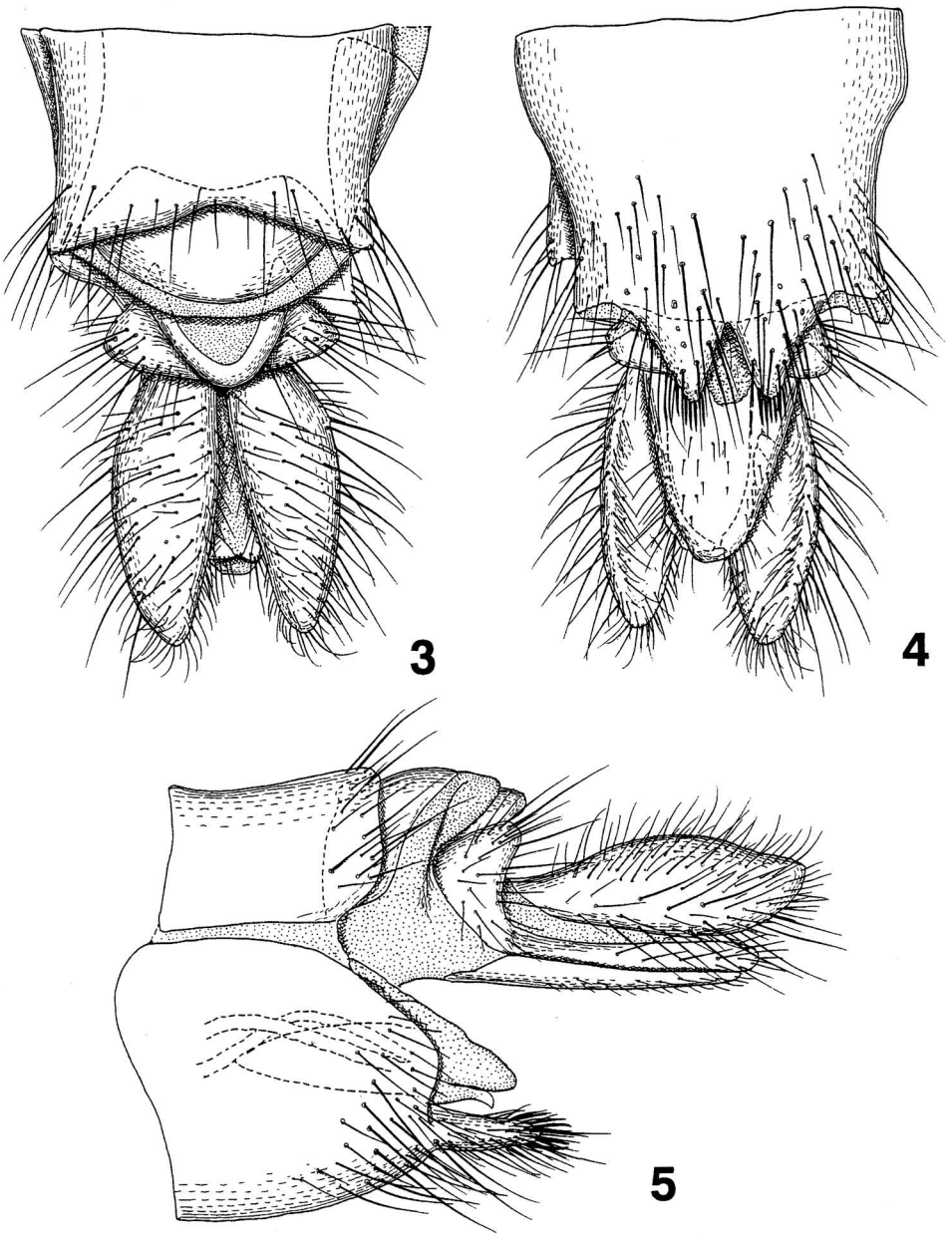
Legs long and slender as in other Gnoristini genera; cx_1 and cx_2 setose on anterior surface, cx_3 setose on outer surface; distal setae strong; femora short setose, with anteroventral row of setae as long as or half as long as f thickness; tibiae with several anterior, dorsal, posterior and ventral short bristles, more or less thickened at apical portion; t_1 with oblong anterodistal patch densely clothed with minute pile; tarsi short haired bearing a few setae; apex of 5th tarsomere produced into dorsal process. Ungues (Figs. 14–16) bearing several ventral teeth, larger apically; in males of some species posterior unguis lamellate, with small apical projection; empodium small.

Wing (Figs. 10–13) elongate, wing membrane densely covered with microtrichia, lacking macrotrichia. Sc, R, R_1, R_{4+5}, r-m crossvein bearing long setae on dorsal surface, R, R_1, apical part of R_{4+5} with longish setae on ventral surface in some species; M_1, M_2, M_4 and apical part of CuA and CuP with short setae on dorsal surface. C slightly extended beyond tip of R_{4+5}, Sc ending at or slightly proximad of Rs base, sc-r and R_4 absent, r-m crossvein twice as long as Rs and slightly longer than common stem of M_1 and M_2; fork of M_4 and CuA between level of r-m crossvein and fork of M_1 and M_2; cu-pseudovein (traditional CuP, see SAIGUSA, 2006) distinct, CuP (traditional A1) strong, both extending near level of fork of M_4 and CuA. Wing weakly infuscate on apical 1/4, with weak cloud from Rs to fork of M_1 and M_2. Halter brown or yellow, with yellow shaft.

Abdomen elongate and moderately long setose; 1st abdominal sternum entire, undivided into main anterior part and small posterior part, lacking setae; other abdominal sternum complete, without longitudinal fold lines. In male, 7th and 8th abdominal segments usually almost concealed in 6th segment; 7th segment 0.5–0.7 times as long as 6th, 7th tergum very short, represented by transverse linear sclerite lacking setae, 7th sternum setose; 8th segment shorter than 7th, 8th tergum similar to 7th tergum, 8th sternum bare or with a few setulae along posterior margin.

Male genitalia large, wider than apical abdominal segments; epandrium fused with dorsal margins of gonocoxite leaving no border between them, more or less produced posteriorly like an eave and bearing some stiff setulae on distal margin; gonostylus trilobate, dorsal lobe style-like, middle main lobe large and usually spatulate, densely clothed with minute spinules on flexed surface apically, ventral lobe small and setose; gonocoxite with ventrodistal part produced in lamellate projection more or less triangular in shape; cercus small, membranous, concealed below eave-like expansion of epandrium and only short setose; pair of hypoproct lobes similar to cercus in shape and more sparsely setose; phallic organ small, compact, outwardly short produced into a stout projection with a minute tooth-like tip apically, and pair of short internal apophyses.

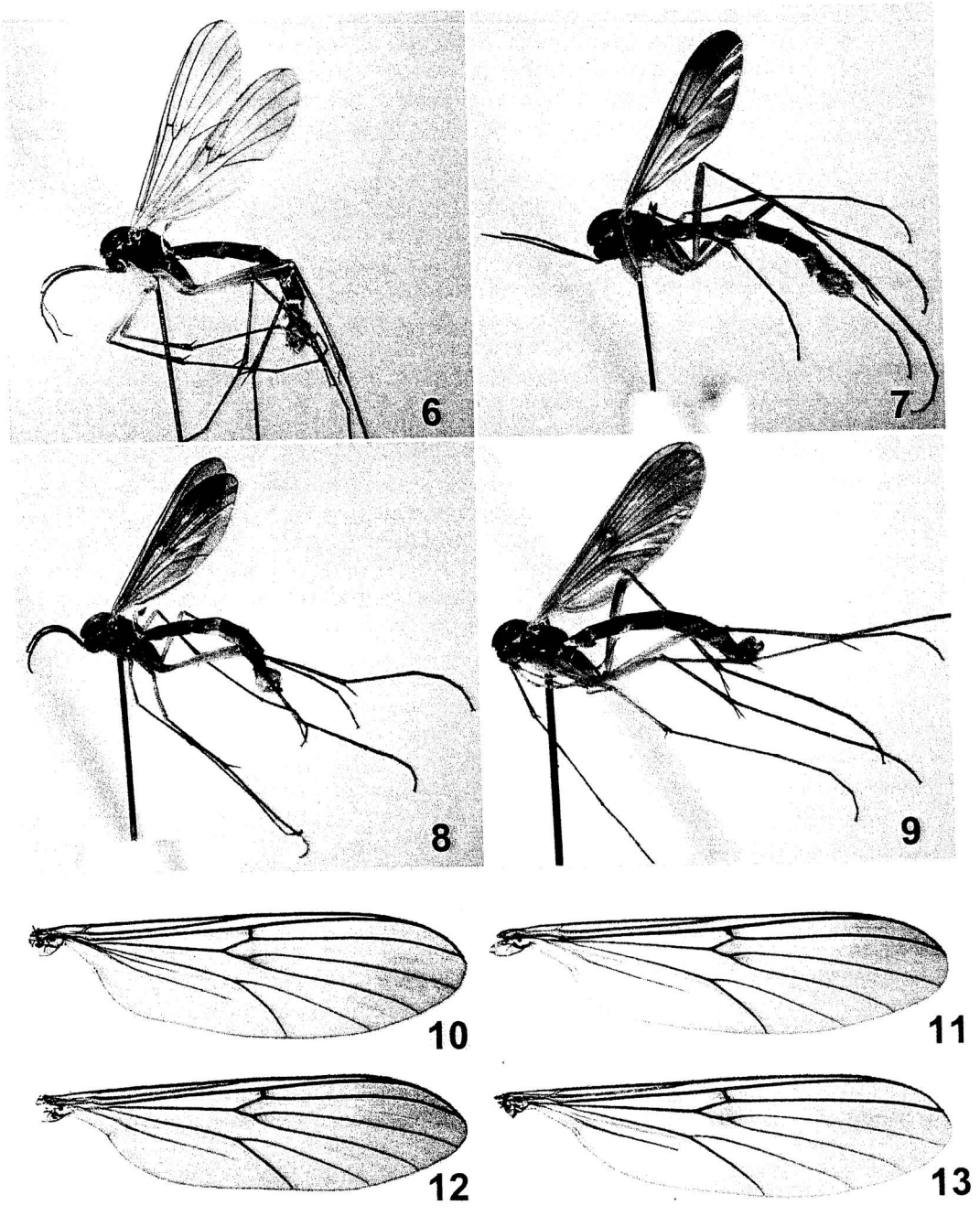
Female terminalia (only type species examined; Figs. 3–5) short; 7th abdominal segment 2/3 as long as 6th segment, 8th to 10th terga very short, 8th sternum with a pair of small lamellate lobes bearing short setae; 9th tergum nearly half as long as 8th, lacking setae, 9th sternum a long triangular plate applied just beneath hypoproct (10th venter); 10th tergum (epiproct) consisting of lateral setiferous lobe and transversely narrow median part raised dorsally and roundly produced posteriorly; 10th sternum (hypoproct) divided into pair of elongate sclerites arising from epiproct without distinct border and extending posteriorly below cerci and bearing some setae; cercus unsegmented, comprising longish, broadly lamellate, oval lobe, short setose and bearing some longish setae



Figs. 3–5. Female terminalia of *Hemisphaeronotus rotundatus*, sp. nov. — 3, Dorsal aspect; 4, ventral aspect; 5, lateral aspect.

along outer margin.

Affinity. The genus *Hemisphaeronotus* is assigned to the tribe Gnoristini by reason of the wing membrane only covered with irregularly distributed microtrichia not arranged in rows, three ocelli, vein R_1 several times as long as more or less oblique r-m crossvein. The new genus is easily distinguished from all known genera of the Gnoristini by the hemispherical mesoscutum, of which the eave-like anterior part conceals the head



Figs 6–13. Male of *Hemisphaeronotus* spp. — 6–9, Habitus; 10–13, wing. — 6, 10, *H. rotundatus* sp. nov., holotype; 7, 11, *H. bilobatus* sp. nov., holotype; 8, 12, *H. flavidus*, sp. nov., holotype; 9, 13, *H. fuscicaudatus* sp. nov., holotype.

in dorsal aspect. Detailed comments on the morphological characters will be stated in the discussion section. The new genus consists of the following four new species from

Yunnan, China described in this paper.

Hemisphaeronotus rotundatus SAIGUSA, sp. nov.
Hemisphaeronotus bilobatus SAIGUSA, sp. nov.
Hemisphaeronotus flavidus SAIGUSA, sp. nov.
Hemisphaeronotus fuscicaudatus SAIGUSA, sp. nov.

Key to the males of species of the genus *Hemisphaeronotus*

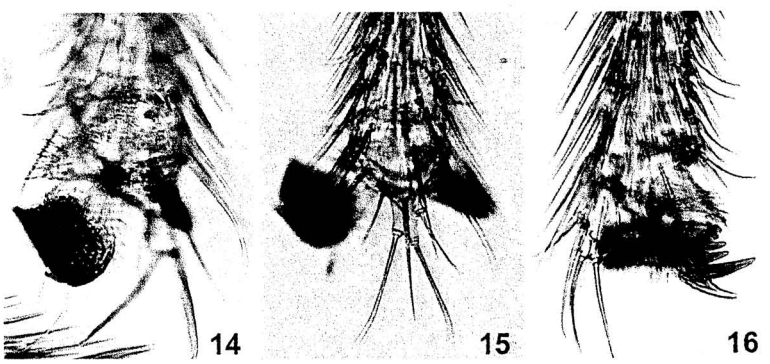
1. Large-sized species; length of body more than 8 mm; head and thorax uniformly blackish brown to black; epandrium yellow; posterior unguis lamellate. 2
– Small-sized species; length of body less than 6 mm; head blackish brown to black, mesonotum yellow to light brown, much paler than head; epandrium yellow or light brown; posterior unguis similar to anterior one or lamellate. 3
2. Posterior margin of epandrium weakly and roundly produced; gonostylus gently curved ventrally in lateral aspect. ..... *H. rotundatus*, sp. nov.
– Posterior margin of epandrium divided into two short lobes; gonostylus symmetrically spatulate in lateral aspect. ..... *H. bilobatus*, sp. nov.
3. Mesoscutum and epandrium extensively yellow; anterior unguis with several ventral teeth, posterior one lamellate; epandrium with truncate distal margin; gonostylus strongly widened distally in lateral aspect. ..... *H. flavidus*, sp. nov.
– Mesoscutum and epandrium pale brown; anterior and posterior ungues similar to each other in shape, with ventral teeth; epandrium with distinctly bilobed distal margin; gonostylus only slightly dilated to apex in lateral aspect. ..... *H. fuscicaudatus*, sp. nov.

Hemisphaeronotus rotundatus sp. nov.
(Figs. 1, 2, 3–5, 6, 10, 14–16, 17–20, 25)

Diagnostic characters. Large-sized species with entirely blackish brown head and thorax, and male epandrium roundly produced distally.

Male (Fig. 6). Head (Fig. 1) matt black, face, clypeus and labrum subshining dark brown; occipital setulae black. Antenna yellow on scape, pedicel and 3 basal flagellomeres, 3rd darkened apically, remaining flagellomeres dark brown to blackish brown; 1st flagellomere 4.3–5.0 times as long as apically thick, 2nd flagellomere 0.8–0.9 times as long as 1st, 4 times as long as thick.

Thorax (Fig. 2). Mesonotum black, paled to dark brown laterally, more or less

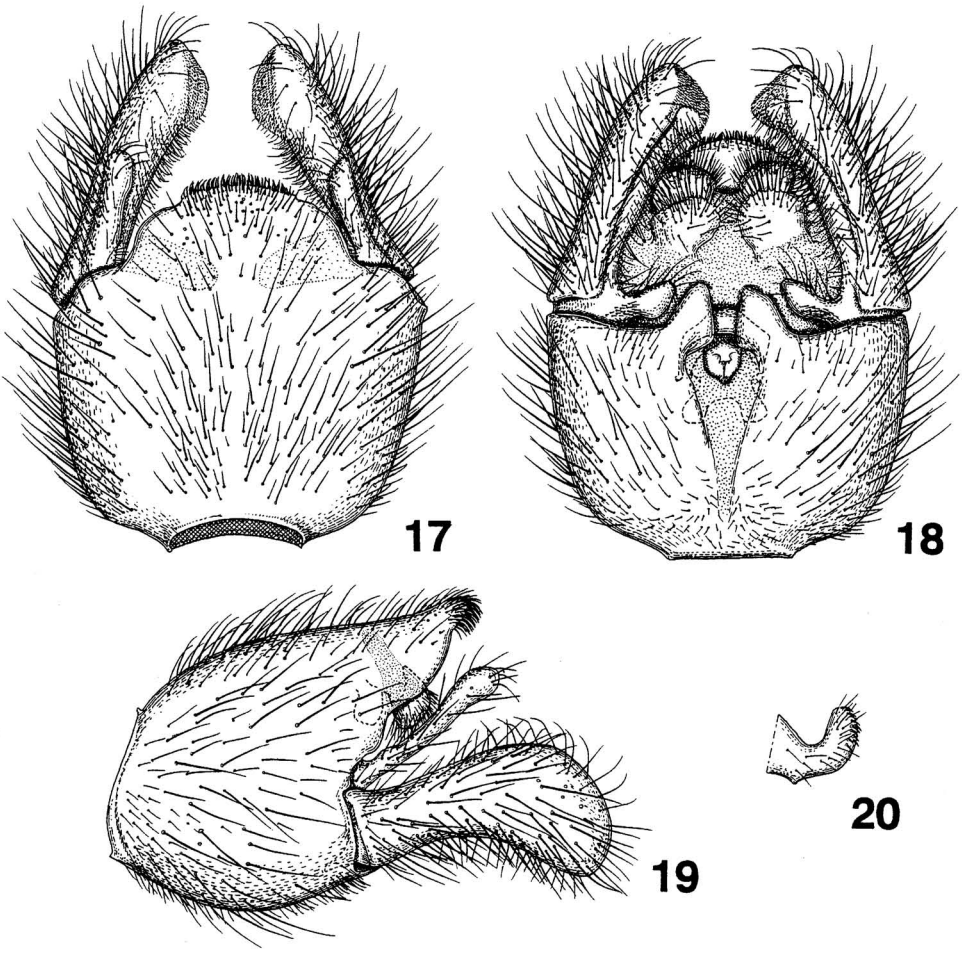


Figs. 14–16. Terminal tarsomere and ungues of male paratype of *Hemisphaeronotus rotundatus* sp. nov. — 14, Right fore leg; 15, right midleg; 16, left hind leg.

densely covered with thin whitish pollinosity when viewed from in front, black setose; sublateral area of mesoscutum anterior to parapsidal suture clothed with many longish setae; dorsocentrals irregularly biserial; notopleural area bearing stiff black setae arranged in two irregular rows; scutellum and mediotergite dark brown, similarly pollinose as scutum; scutellum bearing several short fine setulae at sublateral areas. Pronotum yellow, lateral regions of antepronotum darkened and bearing several black setae, prothoracic spiracle and a triangular membranous area below it dark brown. Pleura dark to blackish brown, very thinly whitish pollinose.

Legs yellow, coxae thinly whitish pollinose; cx_1 darkened at extreme base, cx_3 blackish brown on basal 2/3 to 3/4; trochanters blackish brown; spurs black; femora with an av row of setae slightly longer than 2/3 of f thickness; tibial spur formula 1.7; 2.6, 2.9; 2.9, 3.4 in one paratype. Anterior unguis with 4 teeth, of which apical one is largest, nearly 2 times as long as basal teeth and slightly longer than apical hook; posterior unguis lamellate, slightly deeper than long, with minute apical hook (Figs. 14–16).

Wing (Fig. 10) faintly yellowish grey, slightly infuscated brownish on apical 1/4; small area of R_3 to fork of M_1 and M_2 with faint brownish cloud; veins light brownish



Figs. 17–20. Male genitalia of *Hemisphaeronotus rotundatus* sp. nov., holotype. — 17, Dorsal aspect; 18, ventral aspect; 19, lateral aspect; 20, basal process of gonostylus, posteroventral aspect.

yellow; Sc ending in C slightly proximad of Rs; r-m crossvein 2.8–3.4 times as long as Rs, 1.1–1.3 times as long as base of fork of M_1 and M_2; Sc above with setulae on apical 2/3.

Abdomen with 1st segment black, 2nd to 6th with a median and lateral longitudinal dark brown stripes; three stripes expanded and connected with each other on anterior 1/2 of 2nd tergum and 5th tergum; stripes of 6th tergum may be strongly reduced; degree of development of stripes considerably varied among individuals. Male genitalia (Figs. 17–20): Distal margin of epandrium weakly rounded (Fig. 25); gonostylus in lateral aspect asymmetrical, widened beyond middle and curved ventrally.

Length: Body 8.1–9.2 mm; wing 7.5–8.0 mm.

Female. Similar to male. Antenna with 1st to 4th flagellomeres yellow, remaining flagellomeres brown, but paler on more proximal ones. Wing weakly darkened distally. Abdomen (Figs. 3–5) extensively blackish brown, 2nd and 3rd terga with pair of sublateral yellow patches on posterior area, apical area of abdomen posterior to submarginal area of 6th segment yellow.

Length: Body 8.3–9.8 mm; wing 9.2–9.3 mm.

Holotype. Male, Tuomunan (3030–3500 m), 42 km N of Qiaotou, Zongdian, Yunnan, China, June 11, 1996, T. SAIGUSA leg.

Paratypes. 1 male and 2 females, same data as holotype; 1 male, same locality and collector as holotype, June 9, 1966.

Affinity. This species is very similar to the next species but they can be distinguished in the male by the shape of the posterior margin of the epandrium.

Hemisphaeronotus bilobatus sp. nov.
(Figs. 7, 11, 21–24, 26)

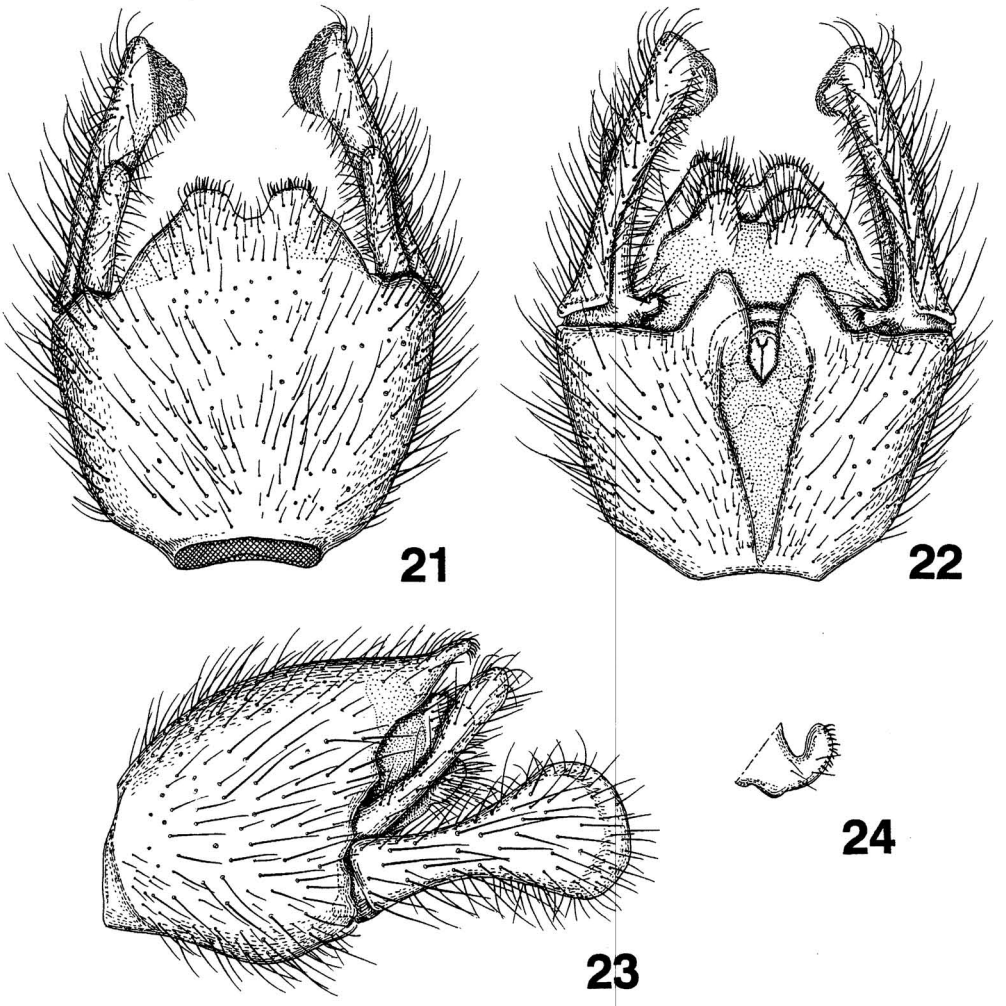
Similar to *H. rotundatus* SAIGUSA, but darker in wing and abdomen, and male epandrium bilobate distally.

Holotype male (Fig. 7). Extremely similar to *H. rotundatus* in size and coloration, but differing in the following aspects. Pronotum with lateral areas of anteprontum entirely blackish brown. Antenna with scape, pedicel and 1st flagellomere yellowish brown, other remaining antenna dark brown, with yellow tinge on 2nd to 4th flagellomeres. Ground colour, distal infuscation and median cloud of wing darker (Fig. 11); r-m crossvein twice as long as Rs and slightly shorter than stem of M_1 and M_2 fork; Sc above with setulae throughout its length beyond humeral crossvein. Abdomen black, sublateral areas of 4th tergum and posterior 1/2 of 3rd tergum yellow, sublateral markings connected by yellow posterior marginal band; 4th and 5th abdominal terga with narrow yellow posterior margin; 6th tergum with brown median and lateral stripes; 4th and 5th sterna with brown lateral margins; 6th sternum and male genitalia entirely yellow. Male genitalia (Figs. 21–24): Distal part of epandrium narrowed posteriorly and distinctly bilobed (Fig. 26); gonostylus in lateral aspect symmetrical, weakly tapered to its middle, then strongly widened to rounded distal margin.

Length: body 8.5 mm; wing 7.0 mm.

Holotype. Male, 11.5 km SW of Yanjia, 1750–1800 m, Luchun, Yunnan, China, May 30, 1996, T. SAIGUSA leg.

Affinity. This new species is closely related to *H. rotundatus*, but easily distinguished from it by the different shape of the distal margin of the epandrium and gonostylus as stated above.



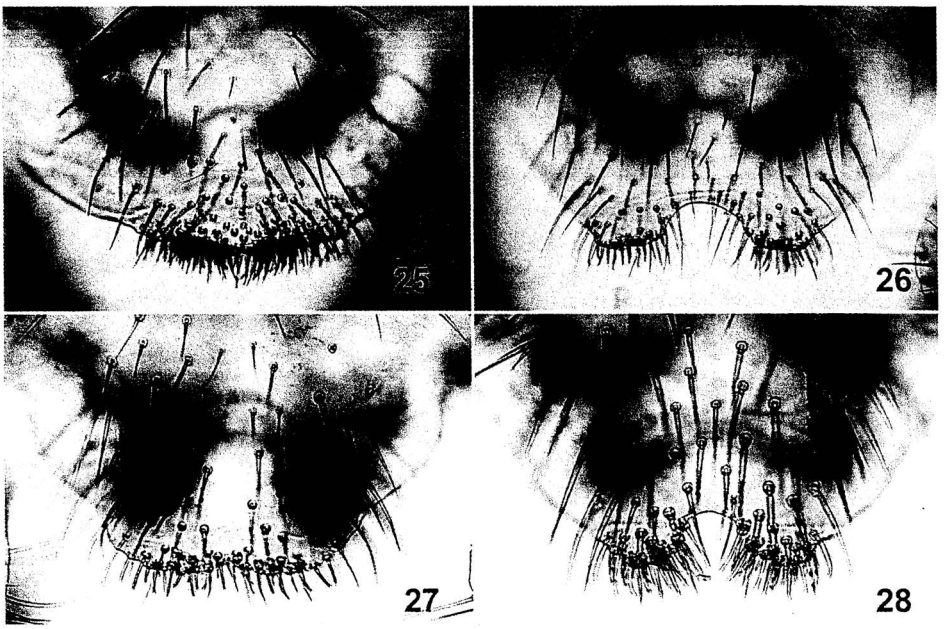
Figs. 21–24. Male genitalia of *Hemisphaeronotus bilobatus* sp. nov., holotype. — 21, Dorsal aspect; 22, ventral aspect; 23, lateral aspect; 24, basal process of gonostylus, posteroventral aspect.

Hemisphaeronotus flavidus SAIGUSA, sp. nov.
(Figs. 8, 12, 27, 29–32)

Small yellowish species with a single row of dorsocentral setae, asymmetrical ungues, extensively darkened hind coxa and male gonostylus symmetrical and gradually widened to rounded distal margin..

Holotype male (Fig. 8). Head matt black to blackish brown, tinged with brown above antennal bases towards eye margin; face, clypeus and labrum subshining brown; occipital setulae black. Antenna yellow on scape, pedicel, two basal flagellomeres, basal 1/2 of 3rd flagellomere, brown on remaining flagellum; 1st flagellomere 3.1 times as long as thick, 2nd 0.83 times as long as 1st and 2.9 times as long as thick. Labella and palpus yellow.

Mesoscutum yellow, more or less densely covered with thin white coating when



Figs. 25–28. Apical portion of epandrium of *Hemisphaeronotus* spp., dorsal aspect. — 25, *H. rotundatus* sp. nov., paratype; 26, *H. bilobatus* sp. nov., holotype; 27, *H. flavidus*, sp. nov., holotype; 28, *H. fuscicaudatus* sp. nov., holotype.

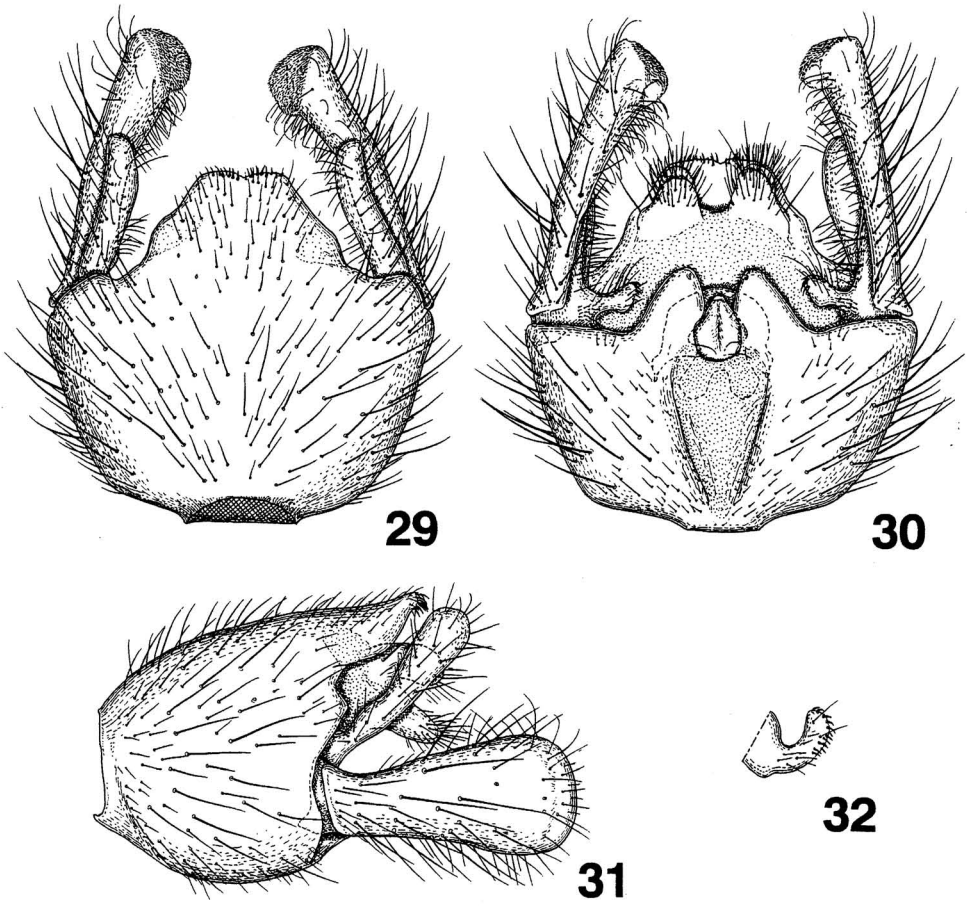
viewed from in front, black setose, its sublateral areas clothed with fine long hairs, dorsocentrals short and uniserial; notopleural area bearing stiff black bristles irregularly arranged in two rows; scutellum, mediotergite and laterotergite light yellowish brown, similarly pollinose as scutum; scutellum 3/5 as long as wide, transversely oval, with several short setulae at lateral corners. Pronotum yellow, lateral areas of antepronotum and propleuron brown, former with dorsally directed bristle and several short setulae; mesothoracic pleuron light yellowish brown, anepisternum and ventral 1/4 of pleuron lighter, basalare and epimeron brown; pleural suture and anterior border of laterotergite blackish; metapleuron dark brown.

Legs yellow; coxae thinly whitish pollinose, cx_1 and cx_2 slightly darkened at extreme base, cx_3 dark brown except for yellowish brown apical 1/5; middle and hind trochanters dark brown; anteroventral setae of f_2 2/3 as long as f_2 thickness; anteroventral setae of f_3 shorter than 1/2 f_3 thickness except for some long setae towards apex; tibial spurs blackish, their formula 1.5; 2.6, 3.3; 3.0, 4.3. Ungues asymmetrical, almost same as those of *H. rotundatus*.

Wing (Fig. 12) yellowish grey, only slightly darkened towards tip; area from Rs to fork of M_1 and M_2 slightly darkened; veins yellowish brown; Sc ending in C between levels of Rs and posterior end of r-m crossvein; r-m crossvein 4.6 times as long as Rs, 1.9 time as long as base of fork of M_1 and M_2; Sc above with some setulae on apical part. Halter yellow, base of knob darker.

Abdomen light grayish yellow, 1st tergum, narrow lateral margins of 2nd to 6th terga dark brown, posterior margin of latter terga yellowish; 4th and 5th terga darker in ground colour. Male genitalia (Figs. 29–32): Distal part of epandrium narrowed posteriorly and ending in more or less truncate distal margin (Fig. 27); gonostylus in lateral aspect symmetrical and broad, gradually widened to rounded distal margin.

Length: body 5.6 mm; wing 5.8 mm.



Figs. 29–32. Male genitalia of *Hemisphaeronotus flavidus* sp. nov., holotype. — 29, Dorsal aspect; 30, ventral aspect; 31, lateral aspect; 32, basal process of gonostylus, postero-ventral aspect.

Holotype. Male, Fenshuiling Nat. Resv., 2000–2450 m, Jingping, Yunnan, China, March 7, 1995, T. SAIGUSA leg.

Affinity. This species is similar to the preceding two species based on features of the ungues, but the body is smaller and the thorax extensively yellowish.

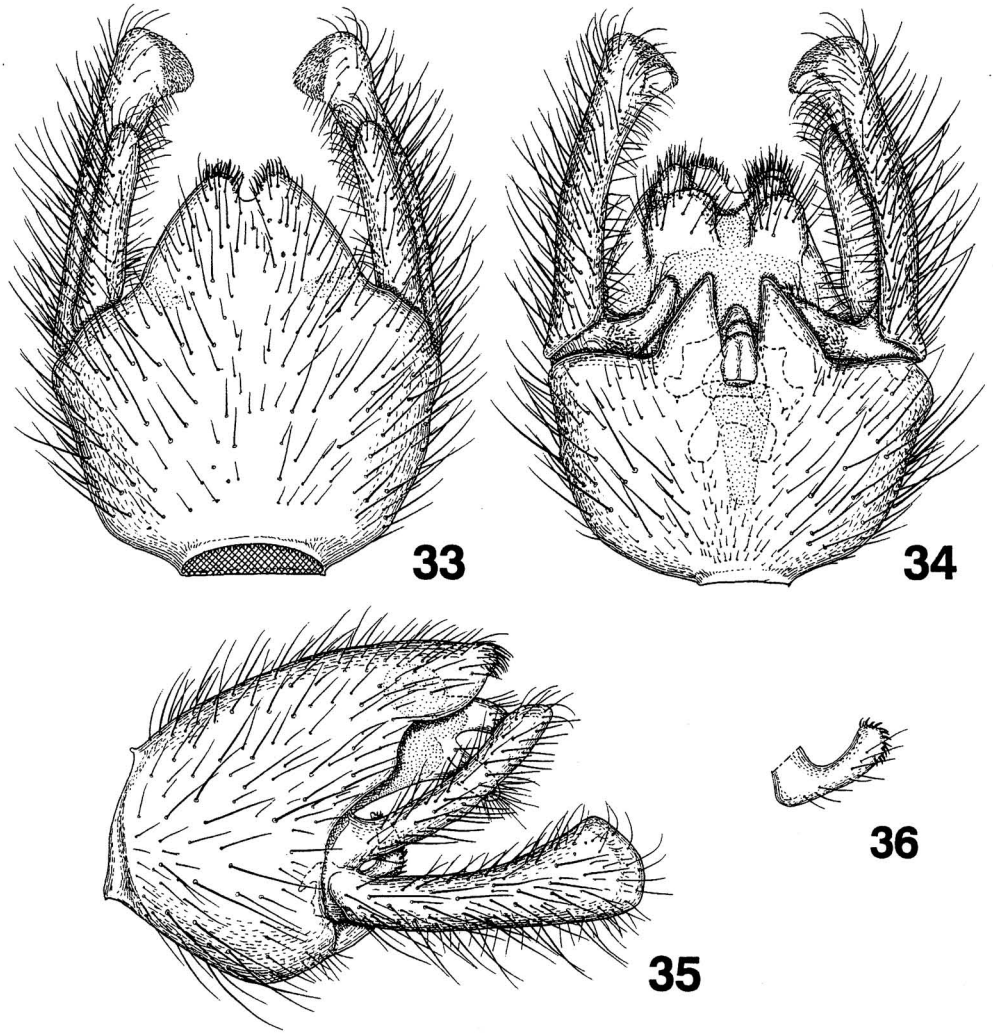
Hemisphaeronotus fuscicaudatus SAIGUSA, sp. nov.
(Figs. 9, 13, 28, 33–36)

Small species with black head and light brown thorax and abdomen, the latter with yellowish posterior band on abdominal terga, and epandrium brown with narrowly bilobed yellow distal margin.

Holotype male (Fig. 9). Head matt black, with slight brown tinge near anterodorsal corner of compound eye; face, clypeus and labrum subshining brown; vertical setulae black. Antenna brown, scape, pedicel and 2 basal flagellomeres yellow; 1st flagellomere

(somewhat shriveled) 4.2 times as long as thick, 2nd flagellomere 0.67 times as long as 1st, 2.7 times as long as thick. Labella and palpus yellow.

Mesoscutum light brown with slight orange tinge, with thin whitish pollinosity appearing when viewed from in front, black setose; sublateral areas of mesoscutum clothed with fine longish setulae; dorsocentrals moderately long and uniserial, notopleural area bearing stiff black bristles irregularly biserial in front and uniserial towards supra-alar area; scutellum and mediotergite light brown with similar pollinosity as scutum, scutellum oval, 1.6 times as wide as long, with 10–15 short setulae on lateral areas of anterior half. Pronotum yellow, lateral areas of antepronotum darkened near anepisternum, and bearing 1 bristle and 2–3 minute setulae. Propleuron dark brown; mesothoracic pleuron and laterotergite light brown, ventral 1/3 of laterotergite tinged with yellow; pleural suture and anterior margin of laterotergite blackish; metapleuron



Figs. 33–36. Male genitalia of *Hemisphaeronotus fuscicaudatus* sp. nov., holotype. — 33, Dorsal aspect; 34, ventral aspect; 35, lateral aspect; 36, basal process of gonostylus, posteroventral aspect.

dark brown.

Legs yellow; coxae thinly whitish pollinose, cx_3 dark brown on basal 2/3; middle and hind trochanters dark brown; anteroventral setae of f_2 as long as its thickness; anteroventral setae of f_3 2/3–3/4 as long as its thickness; tibial spurs black; their formula 1.2; 1.9, 2.4; 3.7, 4.9; anterior and posterior ungues similar to each other, each with 3 ventral teeth, of which apical one is much larger than others, and apical hook intermediate between basal tooth and apical teeth in size.

Wing (Fig. 13) yellowish grey, very slightly darkened towards tip, cloud from Rs to stalk of M_1–M_2 light brown; veins yellowish brown; Sc ending in C at level of proximal (posterior) end of r-m crossvein; r-m crossvein 2.9 times as long as Rs, almost as long as stalk of M_1–M_2 fork; Sc above with some setulae on apical part. Halter brown on apical 2/3 of knob, otherwise yellow.

Abdomen brown; 1st tergum with faint yellow patches on lateral part of posterior margin, 2nd to 5th terga with yellow posterior marginal band, 1/6 as long as wide at dorsomedian area, gradually expanded towards lateral margin; 6th tergum yellow with broad brown dorsal stripe; 5th to 8th sterna yellow. Genitalia (Figs. 33–36) yellow, dorsal surface of epandrium+gonocoxites brown except narrow anterior margin and posterior 1/3; distal part of epandrium distinctly narrowed posteriorly and ending in a pair of lobes close to each other (Fig. 28); gonostylus in lateral aspect narrow and asymmetrical, gradually widened distally and weakly curved dorsally.

Length: Body 5.7 mm; wing 5.3 mm.

Holotype. Male, Fenshuiling Nat. Resv., 2400–2500 m, Jingping, Yunnan, China, 26 May, 1996, T. SAIGUSA leg.

Affinity. This new species is easily distinguished from the three other species by the symmetrical ungues and brown abdomen with 2nd to 6th terga marked with narrow yellow posterior stripe.

Discussion

1. The genus *Hemisphaeronotus* undoubtedly belongs to the tribe Gnoristini in the current classification of the Mycetophilidae based on the following characters: ocelli three in number, wing membrane without macrotrichiae, venation similar to that of *Boletina*, and r-m crossvein apparently short and oblique. VOCKEROTH (1980) pointed out that the validity and limit of the tribes Gnoristini and Leiini are doubtful. SÖLI (1997) and SÖLI *et al.* (2000) also discussed on the validity of the tribes. However, *Hemisphaeronotus* has the typical Gnoristini venation having short and oblique r-m crossvein, and quite different from typical Leiini genera.

2. The monophyly of *Hemisphaeronotus* is strongly supported by the following advanced characters: Maxillary palpus extremely short; head strongly drawn to the ventral surface of anterior portion of thorax; mesoscutum strongly humpbacked and expanded anteriorly as an eave-like expansion overlapping head; ventral part of pleural suture of mesothorax disappearing for a long distance; anapleural suture strongly abbreviated leaving only short posterior part close to pleural suture; female 10th abdominal segment consisting of narrow raised tergum and basally swollen paraprocts; female cercus one-segmented; epandrium completely fused with gonocoxites, distal area of epandrium expanded posteriorly and overlapping cerci.

Some of the above-mentioned character states are also found in some genera of the Gnoristini. However, anteriorly expanded eave-like mesoscutum overlapping the head, and the abbreviated mesothoracic pleural and anapleural sutures seem to be unique to this genus in the Gnoristini.

3. Systematic position of *Hemisphaeronotus*. Although *Hemisphaeronotus* has many apomorphic character states mentioned above, it also has some plesiomorphic character states as to the wing venation and male genitalia. The vein Sc is complete, fairly long and ends in the costa, and the fork of M3+4 and CuA has moderately long stalk. The venation of this genus including these character states is similar to that in the genera *Gnoriste* MEIGEN, 1818, *Boletina*, *Saigusaia* VOCKEROTH, 1980, *Aglaomyia* VOCKEROTH, 1980, some species of the genus *Synapha* MEIGEN, 1818, etc. in the Gnoristini. This type of venation seems to be rather plesiomorphic and does not indicate the monophyly of the above-mentioned genera. These genera are also characterized by the absence of R2+3, an apomorphic state, however the disappearance of this vein occurred many times in different lineages in the Mycetophilidae (s. lat.), and does not always indicate close phylogenetic relationships among the genera having this apomorphy. Except for the fusion between the epandrium and gonocoxites, the male genitalia of *Hemisphaeronotus* are plesiomorphic or unmodified in the epandrium, cercus, and gonostylus. The unmodified states of these structures are also found in *Aglaomyia*, *Synapha* and some species of *Boletina* (e. g. *Boletina trivittata* (MEIGEN, 1818)) and of *Saigusaia* (e.g. *Saigusaia taiwana* (SAIGUSA, 1968)), but this resemblance is probably symplesiomorphic. The unsegmented female cercus is one of the apomorphies of *Hemisphaeronotus*. However, this character state is also found at least in the genera *Coelosia* WINNERTZ, 1863, *Drepanocercus* VOCKEROTH, 1980, and *Acadia* VOCKEROTH, 1980 in Gnoristini. However, no other derived character to support close relationship among these genera including *Hemisphaeronotus* are found, therefore the fusion of cercal segments seems to have evolved in different clades. Thus the sister group of *Hemisphaeronotus* is not clearly detected at the present. This genus is probably derived from an ancestor morphologically similar to *Aglaomyia* and *Synapha* in an early stage of Gnoristini evolution, and strongly specialized in many characters through an isolated lineage.

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