

Key to the species of the genus *Subancistrocerus* de Saussure, 1855 (Hymenoptera, Vespidae, Eumeninae) from China with description of a new species

Jiang-Li Tan^{1,2}, Meng Wang^{1,2}, Hongli Xu^{1,2}, Yan Tang^{1,2}, Ying Liu^{1,2}

1 Shaanxi Key Laboratory for Animal Conservation, Ministry of Education, College of Life Sciences, Northwest University, Xi'an, China **2** Key Laboratory of Resource Biology and Biotechnology in Western China, Ministry of Education, College of Life Sciences, Northwest University, Xi'an, China

Corresponding author: Jiang-Li Tan (tanjl@nwu.edu.cn)

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Abstract

A newly discovered species, *Subancistrocerus chypeatus* **sp. nov.**, from China (Zhejiang) is described and illustrated. In addition, *Subancistrocerus kankauensis* (Schulthess-Rechberg) is redescribed and photographed after studying the type series. A key to the genus *Subancistrocerus* de Saussure, 1855 from China is presented. The distribution of this genus is briefly discussed.

Keywords

China, key, new species, redescription

Introduction

The small genus *Subancistrocerus* de Saussure, 1855, belonging to the subfamily Eumeninae (Hymenoptera: Vespidae), consists of 33 extant species and subspecies up to date, but mainly found in Oriental Region with 27 species and subspecies (Giordani Soika 1994; Gusenleitner 2000; Carpenter et al. 2010; Kumar 2013; Li and Chen 2014). Among them, most species are scattered in the Pacific Island countries such as Philippines, Indonesia, Malaysia, Palau etc. This genus can be easily recognized by the

characteristics as follows: small sized body, a pair of indistinct cephalic fovea, anterior face of pronotum with two separated foveae medially, a pair of prescutellar longitudinal grooves, tegula broad, smooth and shiny, tergum 1 (T1) wider than long in dorsal view with two transverse carinae close each other at crest of declivity. Giordani Soika (1994) included a key to the species of *Subancistrocerus* from the Oriental region and the juncture area with the Australian region in his revision together with a few line-drawings. However, the taxonomic research on the genus is quite complicated because of lacking figures and the limited illustrated characters. Schulthess-Rechberg (1934) reported the first species of *Subancistrocerus* named *S. kankauensis* from China (Taiwan) in the key with a limited description mostly about color pattern and without any figures. Although few species were reported mainly separated on basis of comparison with *S. kankauensis* (Giordani Soika 1994; Gusenleitner 2000; Li and Chen 2014), the illustration on *S. kankauensis* is still poor up to date. Yeh and Lu (2007) recorded the second species also from China (Taiwan) with a color photo of the habitus of *S. sichelii*. Kumar (2013) provided few pictures when reporting three species from India. Subsequently, Li and Chen (2014) recorded five species in China, however, only with pictures and descriptions on the two new species. Herein, we redescribe *S. kankauensis* (Schulthess-Rechberg, 1934) after checking the types preserved in SDEI (Müncheberg, Germany), and report a new species discovered from Zhejiang, China. A key to the species of this genus from China is provided. The distribution pattern of the genus is briefly discussed.

Materials and methods

Observations, descriptions and photographic images were made with an Opto-Edu A230903 stereomicroscope and a fluorescent lamp or with the Keyence VHX-5000 digital microscope and processed with Adobe Photoshop CS5, mostly to adjust the size and background. For the identification of the genus, Tan et al. (2018) and Giordani Soika (1994) were used. The research specimens are deposited in the collections of the College of Life Sciences, Northwest University, Xi'an, Shaanxi, China (NWUX) and the Senckenberg Deutsches Entomologisches Institut, Müncheberg (SDEI).

A key to the species of the genus *Subancistrocerus* de Saussure from China

- 1 Forewing without a brown cloudy patch along the costal margin; tergum 1 longer, at most 1.4× wider than long in dorsal view; black, with white or pale-yellow patches and bands. Male: Basal tarsomere of the mid-leg straight, cylindrical and long, almost 7× longer than wide. [widely spread in Oriental and present in Afrotropical region; China (Sichuan, Yunnan, Taiwan)] *S. sichelii* (de Saussure)
- Forewing with a brown cloudy patch along the costal margin; black with predominantly brownish yellow patches and bands; tergum 1, about 1.5× wider

- than long. Male: Basal tarsomere of the mid-leg of relatively short, arched and depressed, at most 5.0× longer than wide.....**2**
- 2 Tergum 2 densely punctate with large and coarse punctations; at least basally and laterally punctures almost as wide as those of the pronotum or meso-scutum. Male: The large antennal concavity begins in antennal article A10 or A11.....**3**
- Tergum 2 finely punctate with small and sparse punctures, much smaller than those on the pronotum or meso-scutum. Male: The large antennal concavity begins in A8. [distributed in Oriental region; China (Sichuan, Chongqing, Yunnan)]***S. camicrus* (Cameron)**
- 3 Apical band of T3 as wide as T1. Clypeus of female entirely yellow except margin, without black spots; apical margin weakly emarginate (nearly truncate). Male: Apical margin of clypeus truncate; only antennal articles A11 and A12 largely and very deeply concave. [China (Jiangxi, Taiwan)]
.....***S. kankauensis* (Schulthess-Rechberg)**
- Apical yellow band of T3 much narrower than T1 or absent. Clypeus of female with a black spot medially, apical margin emarginate. Male: Apical margin of clypeus emarginated; antennal article begins in antennal article A10 or A11.....**4**
- 4 Female: Clypeus medially with wider and rounder longitudinal depression. Male: Antennal articles A10 to A12 concave, A13 gradually sharper apically, slightly curved finger shaped, about 2.1× as long as wide, with its apex reaching base of A10. Fore femur normal basally; basal tarsomere of midleg much shorter than following segments together, about 2.7× as long as wide. [China (Yunnan)]***S. jinghongensis* Li & Chen**
- Female: Clypeus medially with narrower longitudinal depression. Male: Antennal articles A11– A12 deeply concave; A13 roughly oval shaped, 1.7× as long as wide, with its apex reaching base of A11. Fore femur depressed basally; basal tarsomere of midleg about 5× as long as wide**5**
- 5 Apical yellow band of T1 gradually narrowed towards lateral sides; apical yellow band of T3 absent; pronotal spots relatively large, triangular and contiguous; clypeus of female wider than long, mainly yellow, with two roughly longitudinal carinae sub-medially, and with an irregular black spot medially; Male: Clypeus as wide as long; all tibiae black, at most with a whitish yellow elliptic spot. [China (Yunnan)]***S. compressus* Li & Chen**
- Apical yellow band of T1 parallel-sided, also laterally; a narrow apical yellow band of T3 present; pronotal spots irregular, small and separated; clypeus of female as wide as long, black and densely punctate laterally, with two sinuate carinae sub-medially, area between carinae yellow, smooth and shiny with a transversely black and weakly reticulate-punctate spot medially. Male: Clypeus about 1.1× longer than wide; all tibiae yellow, at most with a black spot. [China (Zhejiang)]***S. clypeatus* sp. nov.**

Table 1. List of *Subancistrocerus* spp. recorded from different countries.

Region	Country	Species name
Oriental	Philippines	<i>S. abdominalis</i> Giordani Soika, 1994; <i>S. angulatus</i> Giordani Soika, 1994; <i>S. bambogensis</i> Giordani Soika, 1981; <i>S. domesticus</i> (Williams, 1928); <i>S. similis negrosensis</i> Giordani Soika, 1994; <i>S. similis similis</i> Giordani Soika, 1994; <i>S. spinithorax</i> Giordani Soika, 1994
	Indonesia	<i>S. angulicollis</i> Giordani Soika, 1994; <i>S. clavicornis</i> (Smith, 1859); <i>S. imbecillus</i> (de Saussure, 1852); <i>S. obiensis</i> Giordani Soika, 1994; <i>S. thalassarctos</i> (Dalla Torre, 1889)
	Malaysia	<i>S. camicrus</i> (Cameron, 1904); <i>S. giordanii</i> Castro, 1993; <i>S. sichelii</i> (de Saussure, 1855)
	Borneo	<i>S. spinicollis</i> Giordani Soika, 1994
	Fed. States Micronesia	<i>S. yapensis</i> (Yasumatsu, 1945)
	China	<i>S. camicrus</i> (Cameron, 1904); <i>S. compressus</i> Li & Chen, 2014; <i>S. jinghongensis</i> Li & Chen, 2014; <i>S. kankauensis</i> (Schulthess-Rechberg, 1934); <i>S. sichelii</i> (de Saussure, 1855); <i>S. clypeatus</i> Tan, sp. nov.
	India	<i>S. camicrus</i> (Cameron, 1904); <i>S. reflexus</i> Giordani Soika, 1994; <i>S. sichelii</i> (de Saussure, 1855); <i>S. venkataramani</i> Kumar, 2013
	Chagos Archipelago	<i>S. sichelii</i> (de Saussure, 1855)
	Nepal	<i>S. camicrus</i> (Cameron, 1904); <i>S. sichelii</i> (de Saussure, 1855);
	Thailand	<i>S. camicrus</i> (Cameron, 1904); <i>S. reflexus</i> Giordani Soika, 1994; <i>S. sichelii</i> (de Saussure, 1855)
	Myanmar	<i>S. camicrus</i> (Cameron, 1904); <i>S. sichelii</i> (de Saussure, 1855)
	Laos	<i>S. camicrus</i> (Cameron, 1904); <i>S. indochinensis</i> Gusenleitner, 2000
	Bangladesh; Cambodia; Vietnam; Singapore; Sri Lanka	<i>S. sichelii</i> (de Saussure, 1855)
	Palau	<i>S. esakii</i> (Bequaert & Yasumatsu, 1939); <i>S. palauensis</i> (Bequaert & Yasumatsu, 1939)
Australian	Australia	<i>S. albocinctus</i> Giordani Soika, 1993; <i>S. monsticornis</i> (Giordani Soika, 1941)
	Papua New Guinea	<i>S. clavicornis</i> (Smith, 1859)
	Solomon Islands	<i>S. solomonis gizensis</i> Giordani Soika, 1981; <i>S. solomonis solomonis</i> Giordani Soika, 1981
Ethiopian	Kenya	<i>S. budongo</i> (Meade-Waldo, 1915); <i>S. burenis</i> (Giordani Soika, 1935)
	Mauritius; Seychelles	<i>S. sichelii</i> (de Saussure, 1855)
	Democratic Republic of Congo	<i>S. budongo</i> (Meade-Waldo, 1915); <i>S. massaicus massaicus</i> (Cameron, 1910)
	Uganda; Zimbabwe	<i>S. budongo</i> (Meade-Waldo, 1915)
	Burundi; Malawi; South Africa; Tanzania	<i>S. massaicus massaicus</i> (Cameron, 1910)
	Gabon	<i>S. massaicus occidentalis</i> Giordani Soika, 1989; <i>S. budongo</i> (Meade-Waldo, 1915)
	Burkina Faso; Ivory Coast; Senegal	<i>S. redemptus</i> Giordani Soika, 1965

***Subancistrocerus kankauensis* (Schulthess-Rechberg, 1934)**

Figs 1–3

Odynerus kankauensis Schulthess-Rechberg, 1934: 69.

Nortonia kankauensis: Iwata 1939: 71–72 (ethology).

Ancistrocerus kankauensis: Giordani Soika 1941: 241 (in subgenus *Subancistrocerus*).

Subancistrocerus kankauensis: Giordani Soika 1981: 170, figs 1, 2; 1994: 14 (key), 44, figs 7, 16.

Material examined. “Syntypus”, 3@, Kankau (Koshun), Formosa (CHINA: Taiwan), 22.IV.1912, VI.1912, IX.1912, H. Sauter”, “DEI-GISHym, 16380”, “*Odynerus kankauensis* Schulthess, 1934, Schulthess det.”; “2\$, Taihorin (CHINA: Taiwan), 11.VI.1912, H. Sauter”, “*Odynerus kankauensis* Schulthess, 1934, Schulthess det.”

Diagnosis. ♀, Length of body (up to apex of T2) 6.5 mm with forewing 5.5 mm long. Body black with yellow to brownish yellow parts as follows (Fig. 1A): mandible except a basal black triangle and its brown translucent apex, clypeus with a brown translucent apical margin and black lateral outlines, an inter-antennal spot, scape ventrally, a small spot on the apical ocular sinus, a spot behind the eye on upper surface of temple, a pair of irregular quadrilateral patches joined on pronotum dorsally, tegula except center and outline brown translucent, parategula, contiguous metanotal spots, propodeal valvula and apical lamella of sub marginal carina of propodeum, apical outside half portion of fore femora, apex of mid- and hind femora, tarsi and dorsal tibiae and of all legs, mid and hind basitarsomere, apical bands of terga 1–3, sternite 2 and S3 medially. Brown to darkish brown as follows: pedicel and flagellar segments ventrally, legs except yellow patches mentioned previously, fourth to remaining metasomal segments. Wings hyaline with veins and pterostigma dark brown, and with a brown cloudy patch along the costal margin; body with white to yellowish brown pubescence.

Redescription. Head. Frons deeply punctate and reticulate; temple relatively small and sparsely punctate. Clypeus as long as wide, with apical margin very weakly emarginate or nearly truncate between both very indistinct projecting teeth, which is 1/3 of the maximum width of the clypeus, moderately convex, with medial depression bounded laterally by two indistinct arched carinae. The basal half of the clypeus weakly punctate, while with apical half largely smooth (Fig. 2A, B). Antenna short and clavate (Fig. 1B), length of the first flagellar segment F1: width = 5.5: 4.1, F2 as wide as long, length of F3: width = 4.3: 4.8.

Mesosoma (Fig. 2C, D). Mesosoma 1.6× as long as wide and 1.5× as its high. Humeral corner of pronotum rounded; pronotum, mesoscutum, mesoscutellum densely punctate, punctures obviously larger and deeper than those on head; punctures on the yellow spots of metanotum sparser than of other parts. Lower part of the mesepisternum with punctures slightly smaller and less dense than those of the upper part. Dorsal face of the propodeum not well separated from lateral and posterior faces, coarsely reticulate, metapleuron impunctate and somewhat coriaceous with transverse wrinkles.

Metasoma (Fig. 2E–G). First tergum (T1) 1.56× wider than long. Surface between both transverse carinae of T1 smooth and shiny; horizontal surface of T1 behind the second carina to apical margin 2.1× as wide as long. Apical yellow band of T1 gradually narrowed towards lateral side. Terga 1–3 and S2–3 coarsely punctate with backwards open punctures, and with very narrow transparent lamellate apical margin, respectively; diameter of punctures less than distance between punctures. S3 with an arched carina laterally; fourth to remaining metasomal segments smooth basally and sparsely and finely punctate towards apical part.



Figure 1. Syntypes of *Subancistrocerus kankauensis* (Schulthess-Rechberg, 1934), habitus lateral view **A** female and its head frontal aspect **B** male.

Male. Similar to female except as follows (Fig. 3): clypeus yellow, smooth except very sparsely punctate basal half, medially convex with long pubescence, with ventral 1/3 portion strongly depressed, and with apical margin truncate and as wide as half of maximum width of clypeus (Fig. 3B); fore femora yellow. Antenna clavate with an apical cavity on the articles 11–12 (A11–A12) and last arti-

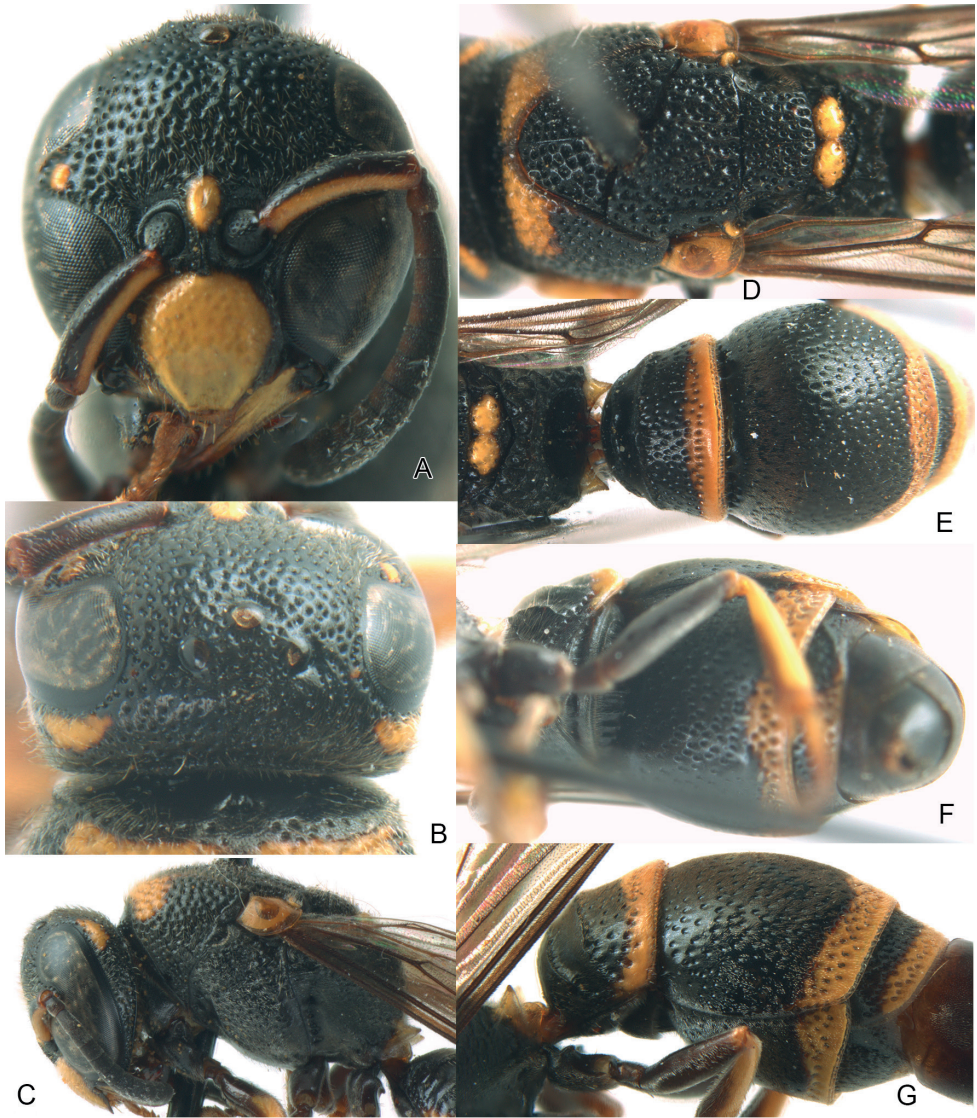


Figure 2. Syntypes of *Subancistrocerus kankauensis* (Schulthess-Rechberg, 1934), female **A** head, frontal aspect **B** ibid, dorsal aspect **C** head and mesosoma, lateral aspect **D** mesosoma, dorsal aspect **E** metasoma, dorsal aspect **F** ibid, ventral aspect **G** ibid, lateral aspect.

cle A13 flat, shaped as a corresponding cover reaching basis of A11, 1.5× as long as wide, rounded at apex, subparallel-sided bilaterally (Fig. 3D); A3–A9 laterally each with an indistinct or distinct tyloid (a carina-like prominence) without concavities ventrally. A3, A4 and A5 is 1.7×, 1.1× and 1.0× as long as wide. Basitarsomere of mid leg curved, 4.7× as long as wide, 1.2× longer than the combine of tarsomeres 2–5 and pretarsus (Fig. 1B).

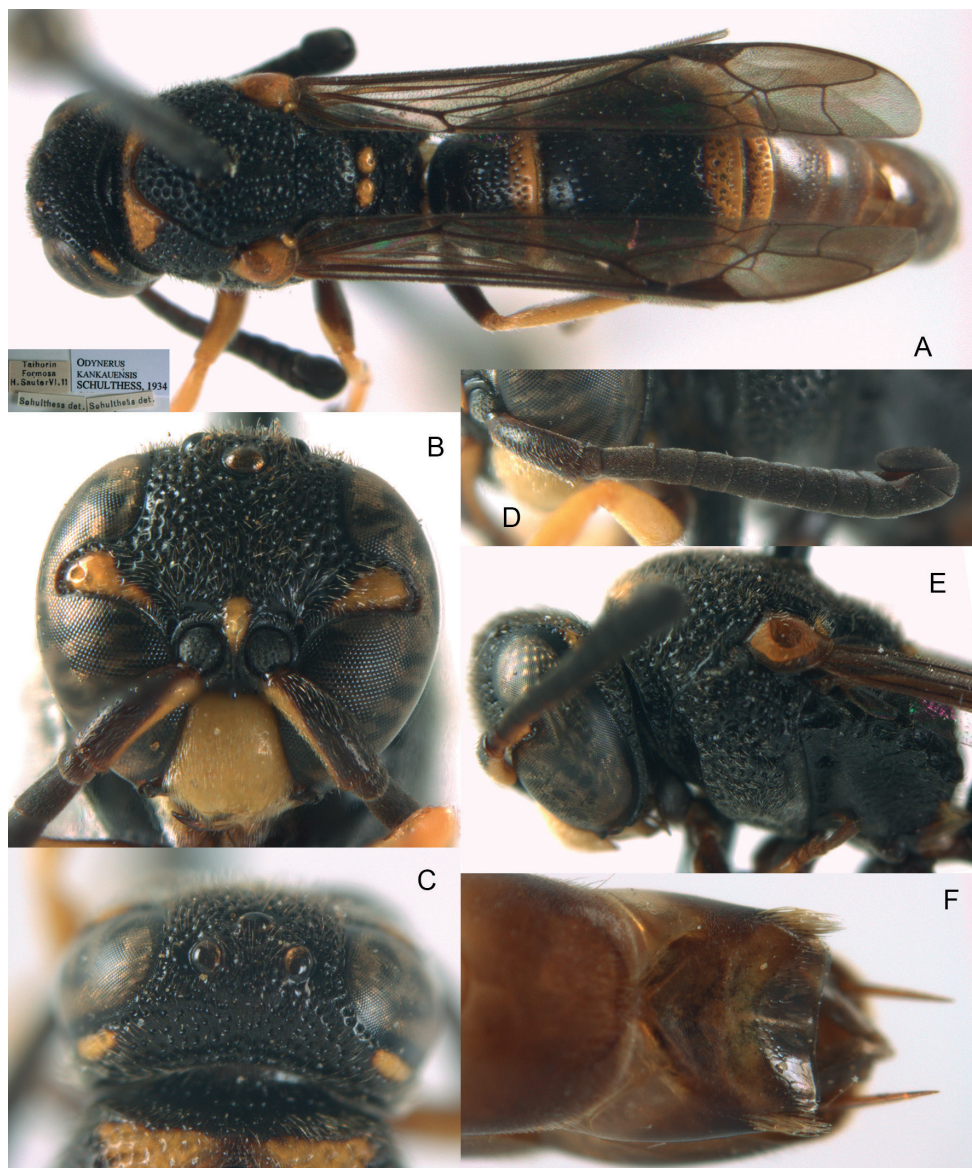


Figure 3. Syntypes of *Subancistrocerus kankauensis* (Schulthess-Rechberg, 1934), male **A** habitus, dorsal aspect **B** head, frontal aspect **C** ibid, dorsal aspect **D** antenna **E** head and mesosoma, lateral aspect **F** apex of metasoma, ventral aspect.

Subancistrocerus clypeatus Tan, sp. nov.

<https://zoobank.org/EDB01089-3157-4AD6-AB60-0563A056D134>

Figs 4–6

Material examined. *Holotype*, 1♀, Shunxi, Qingliangfeng (30.13°N, 119.04°E), Zhejiang, China, 24.viii.2018, coll. Jiangli Tan. *paratype*, 1♂, same data as holotype.

Diagnosis. The species is similar to two Chinese species *S. kankauensis* and *S. compressus* and to a species *S. indochinensis* from Laos mainly basis of the deep concavity of A11–A12 and A13 flat, reaching the basis of A11 and mid-basitarsomere curved, about 5.0× as long as wide, but can be separated from *S. kankauensis* and *S. compressus* by the characters indicated in the key. It also differs from *S. indochinensis* by the following characters: 1) in *S. clypeatus* sp. nov., clypeus of male slightly longer than wide (width: length = 2.0: 2.2) with apical emarginate (width: depth = 1.0: 0.2), but in *S. indochinensis*, clypeus as wide as long (width: length = 2.0: 2.0) with apical margin slightly emarginate (width: depth = 1.4: 0.2). 2) in *S. clypeatus* sp. nov., clypeus of female as wide as long (width: length = 2.0: 2.0) with apical slightly margin emarginate (width: depth = 1.4: 0.2), black laterally, yellow medially with a black transverse spot, while in *S. indochinensis*, the clypeus of female slightly wider than long (2.5: 2.3) with apical margin slightly emarginate (width: depth = 1.4: 0.2), black with a yellow transverse band basally and two yellow spots above the apical margin. 3) apical yellow band of T3 and S3 present in *S. clypeatus* sp. nov., but absent in *S. indochinensis*.

Description. Holotype. ♀, Length of body (up to apex of T2) 6.3 mm with forewing 5.4 mm long.

Body black with yellow to brownish yellow maculation. Basal 2/5 of the mandible yellow except a small black triangle, and its distal 3/5 dark brown. Clypeus black laterally, yellow medially with a black transverse spot, and with its apical margin brown translucent. Other yellow or brownish yellow parts normally smooth or sparsely punctate as follows (Fig. 4A–D): an inter-antennal spot, scape ventrally, spot on ventral side of each flagellum, a small spot on the apical ocular sinus, a spot behind the eye on upper surface of temple, two small separated irregular spots on pronotum dorsally, tegula sub-core periphery, parategula, separated metanotal spots, propodeal valvula and apical lamella of submarginal carina of propodeum, dorso-apical fore femora, dorsal fore tibiae, wide apical bands of terga 1–2 and sternum 2, narrow band of T3, very small trace of S3 medially. Wings hyaline with veins and pterostigma dark brown, and with a brown cloudy patch along the costal margin; body with white to yellowish brown pubescence (Fig. 5A).

Head (Fig. 5B, C, E). Frons deeply punctate and reticulate; temple relatively small and sparsely punctate. Clypeus moderately convex, as wide as long with medial depression in shield shaped that bounded laterally by two indistinct sinuate carinae; apical margin emarginate (width: depth = 1.4: 0.2) between distinct projecting teeth, 0.3× of maximum width of the clypeus, laterally angulate; clypeus densely punctate laterally, weakly punctate to smooth at the medial depression portion, but densely punctate at black part. Antenna short and clavate, length of the first flagellar segment F1: width = 3.3: 2.5, F2 as wide as long, length of F3: width = 6: 7.

Mesosoma (Fig. 5D, F). Mesosoma 1.4× as long as wide and 1.6× as its high. Humeral corner of pronotum rounded; pronotum, mesoscutum, mesoscutellum densely punctate, punctures obviously larger and deeper than those on head. Mesepisternum densely reticulate-rugose, meshes on the upper part larger than on lower part. Propodeum densely reticulate-rugose dorsally and laterally; its posterior surface concaved, more or less shiny with fine, microscopic, diagonally striped (Fig. 4B); metapleuron impunctate and somewhat coriaceous with transverse wrinkles and densely white pubescence.



Figure 4. *Subancistrocerus clypeatus* Tan, sp. nov., holotype, ♀ **A** wing **B** propodeum posterior surface **C** fore tarsi **D** mid- and hind tibiae and pretarsus.

Metasoma (Fig. 5G–I). T1 about 1.8× wider than long. Surface between the two transverse carinae of T1 smooth and shiny; horizontal surface of T1 behind second carina to apical margin 2.5× as wide as long. T1 coarsely punctate behind second transverse carina, with backwards open punctures, and with very narrow transparent lamellate apical margin; diameter of punctures less than distance between punctures; apical yellow band of T1 evenly wide; S1 coriaceous without punctures. T2 punctate with punctures sparser medially than basally and subapically; S2 sparsely punctate with punctures relatively smaller than T2, diameter of punctures more than distance between punctures; T3 and S3 densely punctate similar to T1, lateral arched carina indistinct; T4 and S4 smooth basally and sparsely punctate distally, punctures gradually larger and deeper towards apex. Fifth to the remaining metasomal segments smooth basally and very finely punctate towards apex.



Figure 5. *Subancistrocerus clypeatus* Tan, sp. nov., female, holotype **A** forewing **B** head, frontal aspect **C** ibid, dorsal aspect **D** mesosoma, dorsal aspect **E** head, lateral aspect **F** mesosoma lateral aspect **G** metasoma, dorsal aspect **H** ibid, ventral aspect **I** ibid, lateral aspect.

Male (Fig. 6A): Similar to female except as follows: a large spot on ocular sinus; clypeus and mandible both entirely yellow with long pubescence; clypeus slightly longer than wide (length: width = 2.2: 2.0) without carinae, smooth except basal half finely

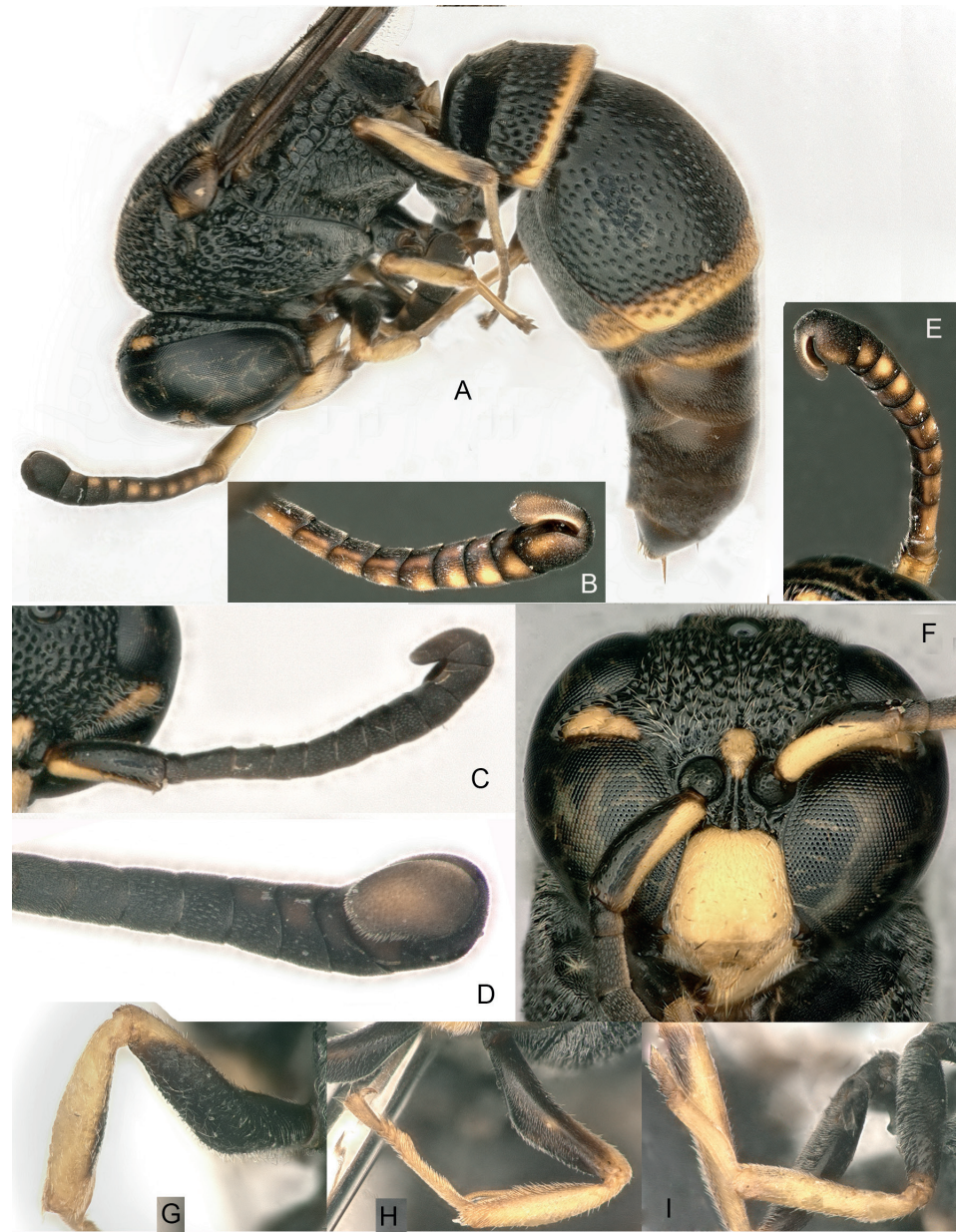


Figure 6. *Subancistrocerus clypeatus* Tan, sp. nov., male, paratype **A** habitus, lateral aspect **B, E** right antenna, ventral aspect, show the tyloids and yellow patches and deep concavity of A11–A12 **C** ibid, dorsal aspect **D** ibid, A4–A13 enlarged head, frontal aspect **F** head, frontal aspect **G** left fore-femora and tibia, frontal aspect **H** foreleg, caudal aspect **I** mid-leg without pretarsus, frontal aspect.

and sparsely punctate; medially convex with ventral 1/3 portion strongly depressed; apical margin emarginate (width: depth = 1.0: 0.2), 0.36× of maximum width of clypeus (Fig. 6F); dorsal apex of femora, tibiae except a dark brown patch on its ventral surface

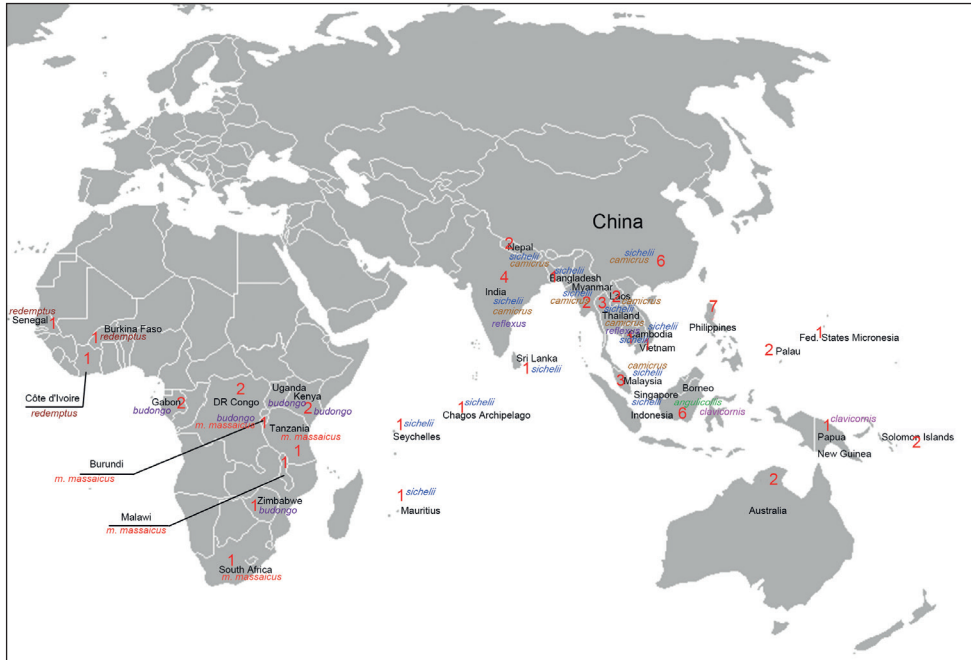


Figure 7. Distribution map of the species diversity on the genus *Subancistrocerus*. Note: the species that spread into at least two countries were inked in color; name of country inked black. Map download: http://ditu.ps123.net/world/314_3.html.

and basitarsomere of all legs yellow. Antennae clavate with an apical cavity on the article 11–12 (A11–A12); terminal article A13 flat, shaped as a corresponding cover reaching the basis of A11, 1.8× as long as wide, rounded apically; A3–A9 laterally each with an indistinct (A3) or a distinct tyloid (a carina-like prominence) without concavities ventrally (Fig. 6B–E). A3, A4 and A5 is 1.7×, 1.2× and 1.0× as long as wide. Basal half of fore femur ventrally compressed (Figs 6G–H); basitarsomere of mid leg curved, 5.0× as long as wide, 1.2× longer than the combine length of tarsomeres 2–5 and pretarsus (Fig. 6I).

Distribution. China (Zhejiang)

Etymology. The new species is named from Latin “clypeus, shield” referring to its shield shaped patch on the middle of female clypeus for the depression bordered by two longitudinal sinuate carinae.

Discussion

Since de Saussure (1855) coined for his division I of the subgenus *Ancistrocerus* Wesmael of the genus *Odynerus* Latreille and raised to the generic rank by Bequaert (1925), this widespread group received little attention. Within the genus, *S. sichelii* (de Saussure) was the most widely spread species followed by *S. camicus* (Cameron), *S. massaicus massaicus* (Cameron 1910) and *S. budongo* (Meade-Waldo) in turn, most of the other species was en-

demic in one country. The distribution can be characterized as Palaetropical, with China as the most speciose country after the Philippines (Fig. 7). Compared with its congeners, *S. clypeatus* Tan, sp. nov. is the most northern (30°N) species known so far. The same place, the first author has published another species viz. *Zethus velamellatus* Tan which is also the most northern Oriental distribution of the genus *Zethus* (Tan et al. 2018). Obviously, it is additional evidence supporting the boundaries of the Palaearctic-Oriental transitional zone as defined for mammals (between 33°N and 28°N; Hoffmann 2001).

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