

TWO NEW SPECIES OF HEPTAGENIIDAE FROM CHINA (INSECTA, EPHEMEROPTERA)

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Abstract Two new species of Heptageniidae (Insecta, Ephemeroptera) are described from Hong Kong, China: one new species, *Compsoeuria taipokauensis* sp. nov., is based on larval and adult material which were identified as the same species by rearing larvae in the laboratory. This new species represents the first report of the genus *Compsoeuria* from China. Another new species, *Epeorus sagittatus* sp. nov., is identified from larval material.

Key words Ephemeroptera, Heptageniidae, *Compsoeuria*, *Epeorus*, new species, China.

Compsoeuria Eaton is a small genus previously known from Java, Sumatra, Thailand and Malaysia (Ulmer, 1933, 1940; Braasch and Soldán, 1986a, b; Braasch, 1990). Some details of its larval structure were given by Ulmer (1940) but a more complete account was provided by Braasch and Soldán (1986a, b). *Epeorus* Eaton is widespread throughout the Oriental Region into the Palearctic Region (Braasch, 1979, 1980, 1981; Braasch and Soldán, 1984, 1986a, b; Hubbard and Peters, 1978; Imanishi, 1940; Gui and Zhang, 1992; You and Gui, 1995) but only four species were previously known to occur in China (Imanishi, 1940; You and Gui, 1995; Kang and Yang, 1994).

In this paper, we describe one new species of the genus *Compsoeuria*, *C. taipokauensis* sp. nov., based on larval and adult material which were identified as the same species by rearing larvae to adulthood in the laboratory, and one new species, *Epeorus sagittatus* sp. nov., based on larval material collected Hong Kong, China. The new species of *Compsoeuria* represent the first report of this genus from China. The new species *Epeorus sagittatus* is widespread in fast-flowing upland streams in Hong Kong (Dudgeon, 1990, 1996), where it is associated with large stones and boulders in fast currents. Larval ecology has been described by Dudgeon (1996). All type specimens are housed in the Insect Collection of the Department of Entomology, South China Agricultural University, Guangzhou, China.

***Compsoeuria taipokauensis* sp. nov.** (Figs.1-16)

Male adult. Body length 6.0-6.3 mm. Forewing length 6.5-7.2 mm, hindwing length 2.0-2.2 mm. Cercus length 15.0-18.0 mm.

Head light yellowish brown. Compound eyes grey-blue and contiguous on vertex. Ocellus off-white with black basal ring, frontal ocellus small, posterior ocelli larger. Antennal scape and pedicle pale, flagella light brown. Pronotum dark brown medially and deeply V-shaped concavity posteromedially; meso- and metanota yellowish brown with anterior and posterior margins darker. Wings (Fig.13) hyaline; venation yellowish brown. Mesosternum with medial depression of furcasternum parallel-sided. Forefemur yellowish brown, foretibia brown, foretarsus light brown; length of foreleg (Fig.12) segments (mm): femur 2.3 mm; tibia 2.4 mm; tarsal segments (mm) 0.45, 1.18, 1.20, 0.95 and 0.30; mid- and hindfemur light yellow-white; tibia brown and tarsus light brown. Abdominal terga 1-8 dark purple-brown with anterior off-white, and with 3 longitudinal pale stripes medially, terga 9-10 light yellowish brown. Abdominal sterna cream. Genitalia yellowish brown with a pair of divergent, remarkable titillators with points as in Figs.14-16. Cercus yellowish brown.

Female adult. Unknown.

Larva. Body length 5.3-6.0 mm. Cercus length 7.0-10.0 mm.

Head. Head capsule (Fig.1) light yellowish brown with diffuse paler spots and smudges marginally, epicranial suture pale. Antenna light brown. Labrum (Fig.2) 0.38-0.41 × width of head capsule.

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Mandible (Fig.3) with outer incisors slightly longer than inner incisors, both incisors serrate; a tuft of 3-5 long pinnate setae near the inner incisors' base; apical margin between incisors and molar areas smooth; lateral margins setaceous. Maxilla (Fig.4): galealacinia with approximately 19 pectinate spines on crown, ventral setae scattered subtriangularly; segments 2 and 3 of palp fused and light brown, approximately $1.2 \times$ length of segment 1. Labium (Fig.11) with broad U-shaped separation of glossa; glossa oval, stalked; paraglossa laterally elongated; apical segment of palp slightly pointed, subequal in length to basal segment.

Thorax. Thoracic nota cream with diffuse light brown markings; pronotum produced laterally and subequal to head in width or slightly broader than head, posterior margin with shallow median emargination (Fig.6). Leg (Fig.7): femur cream with light brown markings; long elliptical setae on dorsal surfaces and long, robust setae fringed with fine hairs along dorsal margins; tibia cream shading to light brown submedially and with a row of long, fine setae along dorsal margins; tarsus light yellow brown with sparse

setae. Claw with 4 subapical denticles.

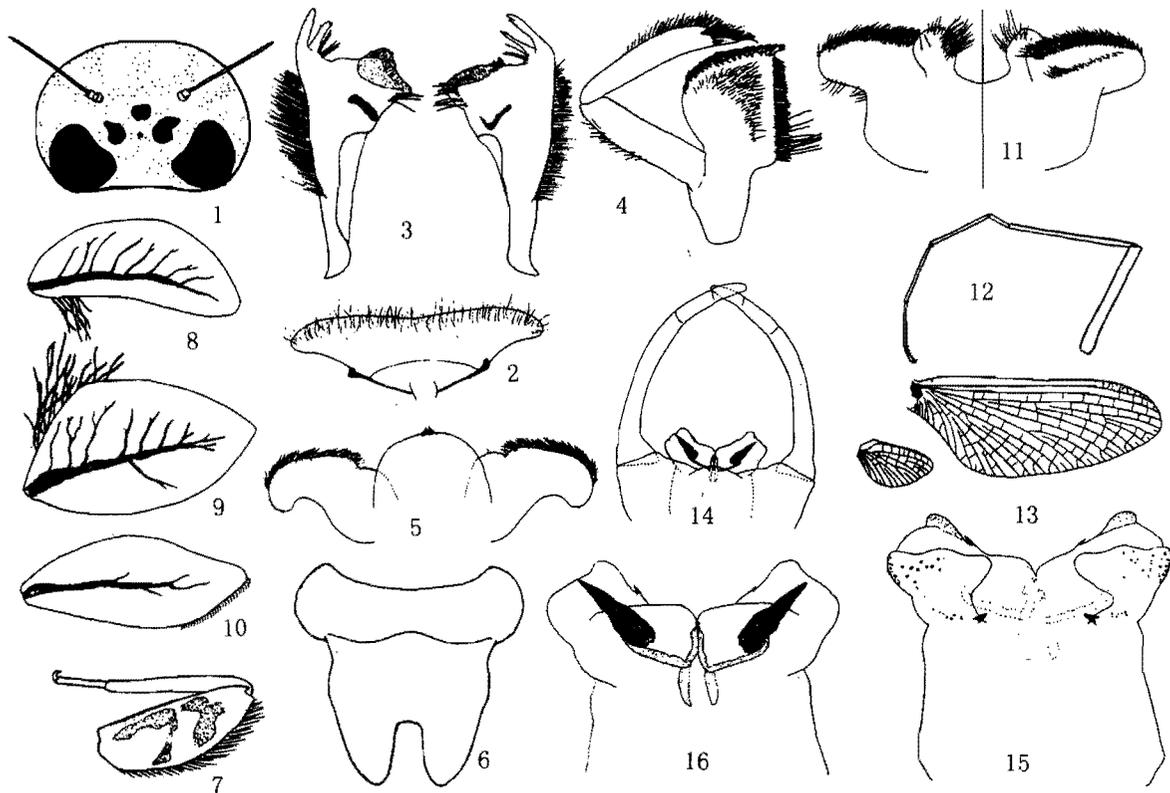
Abdomen. Abdominal terga 1-4 dark brown; terga 5-6 light brown; terga 7-9 light yellow or light yellow brown; tergum 10 dark brown with a longitudinal stripe medially; abdominal segments 3-8 with posterolateral spines. Gills 2-6 (Figs.8-10) with broad lamellae, narrower on gills 1 and 7; fibrilliform portion present on gills 1-6, absent on gill 7. Caudal filament cream with light brown articulations, and whorls of spines on articulations; intersegmental setae absent.

Distribution. China (Hong Kong).

Etymology. Named after the type, and to date, the only locality for this species.

Material examined (in alcohol, adults reared from larvae). Holotype: male adult, Tai Po Kau Forest Stream ($22^{\circ}25'40''\text{N}$, $114^{\circ}10'45''\text{E}$), Hong Kong, China, 2 Feb. 1999, coll. TONG Xiao-Li. Paratypes (in alcohol): 2 males and 5 larvae, locality and date as holotype. 1 male and 1 larva, 25 Feb. 1999, locality as holotype, coll. TONG Xiao-Li.

Remarks. The adult can be easily distinguished from the other species of *Compsoeuria* by the charac-



Figs.1-16. Larva and adult of *Compsoeuria taipokauensis* sp. nov. 1. Dorsal view of head. 2. Labrum. 3. Mandibles. 4. Maxilla. 5. Hypopharynx. 6. Thoracic nota of larva. 7. Foreleg of larva. 8. Gill 1. 9. Gill 5. 10. Gill 7. 11. Labium. 12. Foreleg of male adult. 13. Forewing and hindwing of male adult. 14. Genitalia, ventral view. 15. Penes, dorsal view. 16. Penes, ventral view.

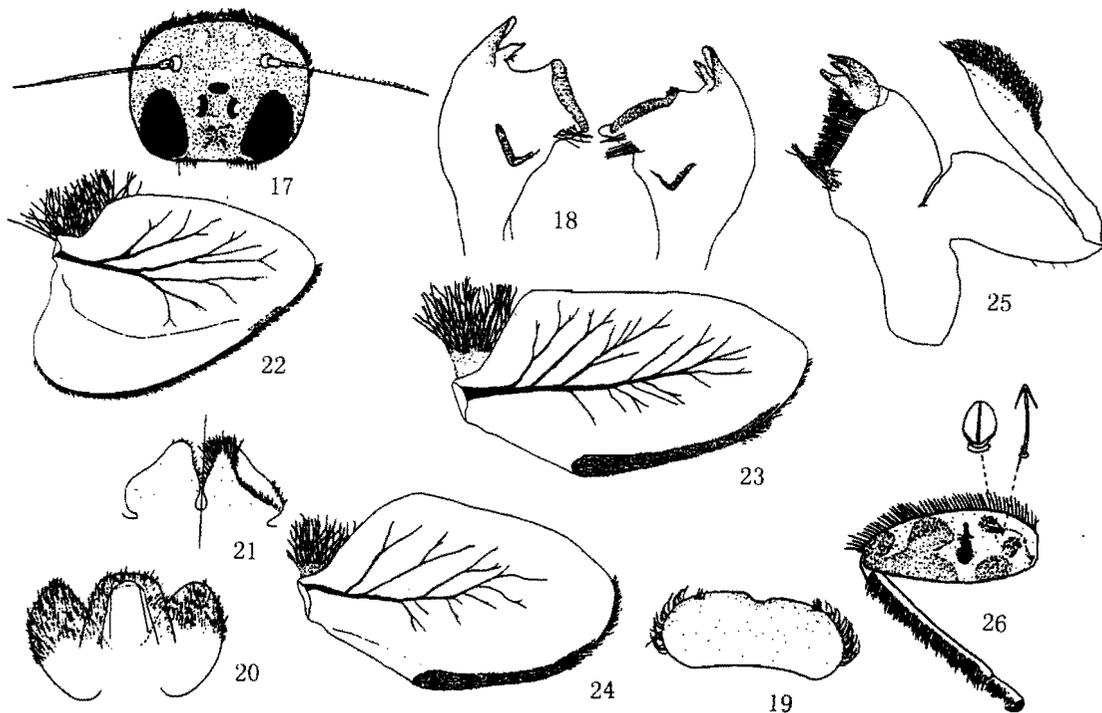
teristic male genitalia with a pair of divergent sclerotized titillators as in Figs.14-16. Larvae of few other species of the genus have been described, but the new species is distinctive with respect to its combination of characters: 1) labium with broad U-shaped separation of glossae; 2) pronotum produced laterally and its posterior margin with shallow median emargination; 3) femur cream with light brown markings; 4) gills 2-6 with broad lamellae, narrower on gills 1 and 7.

***Epeorus sagittatus* sp. nov.** (Figs.17-26)

Larva. Body length 9.7-14.0 mm, female longer than male. Cercus length 16.8-19.7 mm.

Head. Large and flattened, coloration light-brown to brown with pale markings (Fig.17). Antero-medial margin with 2 pale markings, in front of median ocellus with pale marking. Anterior margin of head

fringed with fine setae. Eye greyish black, behind post ocellus with a pair of brown maculae. Labrum (Fig.19) small, approximately 1/4 as wide as head capsule, and anterior margin with a U-shaped emargination; venter with numerous long, acute setae laterally. Hypopharynx as in Fig.20. Mandible (Fig.18): outer incisors longer, serrate; prosthecae consisting of 1-2 setae fringed with hairs; apical margin between incisors and molar areas without setae. Maxilla (Fig.25): anterolateral corner with 3 large canine teeth; mesal surface with 3 ridges, each ridge fringed with long fine setae; maxillary palp 2-segmented, terminal segment slender and segment 1 expanded basally. Labium (Fig.21) with U-shaped separation of glossa; glossa triangular; dorsum with a row of closely-set fine setae medially, and long fine setae on mesal margin; paraglossa oval.



Figs.17-26. Larva of *Epeorus sagittatus* sp. nov. 17. Dorsal view of head. 18. Mandibles. 19. Labrum. 20. Hypopharynx. 21. Glossae of Labium (left: ventral view; right: dorsal view). 22. Gill 1. 23. Gill 5. 24. Gill 7. 25. Maxilla. 26. Larval foreleg.

Thorax. Thoracic nota yellowish brown with pale markings. Femur (Fig.26) with brown and purple-brown markings on dorsal surface and with row of long, relatively robust, pinnate setae dorsally; dorsal surface of femur scattered with numerous flattened,

rounded setae and also fine, arrow-like setae; tibia and tarsus with row of dense, fine, pinnate setae dorsally; tarsal claw with 5 denticles near the middle.

Abdomen. General coloration light yellowish brown with pale areas. Abdominal terga 3-8 each with

a pair of rounded brown stripes submedially (indistinct on tergum 6); terga 2-10 each with strong, acute spines and long setae along the posterior margin, and with closely set long, fine, brown setae along dorsal midline; posterolateral spines on segments 2-7, anterior spines larger than posterior spines. Paired gills (Figs. 22-24) on segments 1-7 well-tracheated and each with well-developed fibrilliform portion. Abdominal sterna pale. Cercus light brown.

Adult. Unknown.

Distribution. China (Hong Kong).

Etymology. The epithet *sagittatus* is from the Latin meaning arrow-like, and refers the dorsal surface of the femora bearing numerous fine, arrow-like setae.

Material examined. Holotype: 1 larva, upper Ha Wun Yiu (22°26'40"N, 114°09'27"E), Tai Po, Hong Kong, China, 4 Nov. 1997, coll. TONG Xiao-Li. Paratypes: China, Hong Kong: 1 larva, Tai Po Kau Forest Stream, 12 Nov. 1996, TONG Xiao-Li; 2 larvae, Lantau Is., Shek Mun Kap, 17 Dec. 1996, coll. TONG Xiao-Li; 1 larva, Tai Pokau Forest Stream, 27 Aug. 1997, coll. TONG Xiao-Li; 2 larvae, Lam Tsuen Valley, Lam Tsuen River, nr Tong Min Tsuen, 19 Sept. 1997, coll. TONG Xiao-Li; 10 larvae, Lam Tsuen Valley, Lam Tsuen River, Ma Po Mei section, nr Lam Kam Road, 22 Oct. 1997, coll. TONG Xiao-Li; 1 larva, Lam Tsuen Valley, Lam Tsuen River, Ma Po Mei section, nr Lam Kam Road, 29 Oct. 1997, coll. TONG Xiao-Li; 7 larvae and 1 female subimago, Lam Tsuen Valley, Lam Tsuen River, Ma Po Mei section, nr Lam Kam Road, 3 Dec. 1997, coll. TONG Xiao-Li; 5 larvae, Lam Tsuen Valley, Lam Tsuen River, Ma Po Mei section, nr Lam Kam Road, 5 Mar. 1998, coll. TONG Xiao-Li; 5 larvae, Lam Tsuen Valley, Lam Tsuen River, Ma Po Mei section, nr Lam Kam Road, 26 Mar. 1998, coll. TONG Xiao-Li; 1 larva, Sai Kung, Ho Chung, 31 Mar. 1998, coll. TONG Xiao-Li.

Remarks. The larva of this new species is similar to *Epeorus latifolium* Uéno from Northeastern China, North Korea and Japan (Gose, 1985; Imanishi, 1934, 1940), but can be distinguished from *E. latifolium* by the following combination of characters: 1) femur with brown markings as in Fig. 26, in the middle with a purple-brown marking on dorsal surface; 2)

gill lacking red-purple rounded spots; and 3) the expanded basal segment of the maxillary palp.

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中国扁蜉科二新种记述（昆虫纲，蜉蝣目）

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摘要 记述来自中国香港的蜉蝣目扁蜉科 2 新种。根据稚虫和成虫的形态特征, 详细描述了中国新纪录属康扁蜉属 *Componeuria* 1 新种: 大埔溜康扁蜉 *Componeuria*

taipokauensis sp. nov.。该新种的成虫标本由稚虫在实验室内饲养而成。根据稚虫形态特征, 详细描述了高翔蜉属 1 新种: 箭鬃高翔蜉 *Epeorus sagittatus* sp. nov.。

关键词 蜉蝣目, 扁蜉科, 康扁蜉属, 高翔蜉属, 新种, 中国.

中图分类号 969.213.4