

2011	Heteropterus Revista de Entomología Heteropterus Rev. Entomol.	11(2): 365-374
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ISSN: 1579-0681

A new mirine plant bug genus and species from Indian Sikkim, with a review of the related genera *Cheilocapsidea* Poppius and *Cheilocapsus* Kirkaldy (Hemiptera: Heteroptera: Miridae: Mirinae)

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Abstract

A new mirine plant bug genus, *Vairocanamiris*, is proposed to accommodate a conspicuously large, undescribed species, *V. jordiribesi*, from the southern slope of the Himalayas in Indian Sikkim. Two little known Asian genera of Mirini, *Cheilocapsidea* Poppius, 1915 and *Cheilocapsus* Kirkaldy, 1902, that are assumed to be related to the new genus, are reviewed. Redescriptions of *Cheilocapsidea insignis* (Distant, 1909) and *Cheilocapsus flavomarginatus* Kirkaldy, 1902 are provided, on the basis of examinations of their holotypes.

Key words: *Vairocanamiris jordiribesi* n. gen., n. sp., Heteroptera, Miridae, Mirinae, Mirini, Asia, *Cheilocapsidea*, *Cheilocapsus*.

Resumen

Un nuevo género y especie de mirido Mirinae de Sikkim, India, con una revisión de los géneros próximos *Cheilocapsidea* Poppius y *Cheilocapsus* Kirkaldy (Hemiptera: Heteroptera: Miridae: Mirinae)

Se propone un nuevo género, *Vairocanamiris*, que acomode a *V. jordiribesi*, una nueva especie de mirido Mirinae grande y conspicuo de la vertiente meridional del Himalaya en Sikkim, India. Se revisan dos géneros asiáticos poco conocidos de Mirini, *Cheilocapsidea* Poppius, 1915 y *Cheilocapsus* Kirkaldy, 1902, que se supone relacionados con el nuevo género. Se ofrecen redescriptiones de *Cheilocapsidea insignis* (Distant, 1909) y *Cheilocapsus flavomarginatus* Kirkaldy, 1902, basadas en el examen de sus holotipos.

Palabras clave: *Vairocanamiris jordiribesi* n. gen., n. sp., Heteroptera, Miridae, Mirinae, Mirini, Asia, *Cheilocapsidea*, *Cheilocapsus*.

Laburpena

Sikkimeko (India) Mirinae miridoen genero eta espezie berri bat, *Cheilocapsidea* Poppius eta *Cheilocapsus* Kirkaldy genero hurbilen berrazterketa batekin (Hemiptera: Heteroptera: Miridae: Mirinae)

Mirinae miridoen genero berri bat, *Vairocanamiris*, proposatzen da bere baitako espezie berri batekin, *V. jordiribesi*, zeina Himalaiaren hegoaldeko isurialdean dagoen Sikkim indiar estatuko espezie handia eta nabaria baita. *Cheilocapsidea* Poppius, 1915 eta *Cheilocapsus* Kirkaldy, 1902, Asiako bi genero ez oso ezagunak eta genero berriarekiko hurbiltzat hartzen direnak, berraztertzen dira. Berdeskribapenak ematen dira *Cheilocapsidea insignis* (Distant, 1909) eta *Cheilocapsus flavomarginatus* Kirkaldy, 1902 espezieenak, haien holotipoen azterketaren ondorioz.

Gako-hitzak: *Vairocanamiris jordiribesi* n. gen., n. sp., Heteroptera, Miridae, Mirinae, Mirini, Asia, *Cheilocapsidea*, *Cheilocapsus*.

Introduction

Constituents of the plant bug tribe Mirini of the subfamily Mirinae generally have large body size. However, species with length over 10 mm are uncommon in Asia. The present paper documents some little known mirine genera containing such large-sized species.

A new genus is proposed to accommodate an undescribed species found on the southern slope of the Himalayas in Indian Sikkim. The new genus is assumed to be closely related to *Cheilocapsidea* Poppius, 1915 and *Cheilocapsus* Kirkaldy, 1902. Diagnostic characters are provided for the new genus and its related genera. The type species of the latter genera, *Cheilocapsidea insignis* (Distant, 1909) and *Cheilocapsus flavomarginatus* Kirkaldy, 1902, are redescribed, based on examinations of their holotypes, which have received little attention since their century old original descriptions.

All measurements are given in millimeters. Terminology of the genitalia principally follows those of Cassis (2008) and Yasunaga and Schwartz (2007). Institutional abbreviations used in the material examined sections of the paper are as follows:

- BMNH Natural History Museum, London, UK.
 NSMT National Science Museum, Tokyo, Japan.
 ZMUF Zoological Museum, University of Helsinki, Finland.

Results

Vairocanamiris n. gen.

(Figs. 1, 2c-k, 3)

Type species:

Vairocanamiris jordiribesi n. sp.

Diagnosis:

Primarily recognized by the large, elongated body (total length 9–11 mm), castaneous to fuscous general coloration, oily shiny, highly polished dorsal surface without noticeable punctures or vestiture, generally slender antennae, tumid scutellum, long legs, pygophore with noticeably developed protuberance, and large, contiguous sclerotized rings of the female.

Description:

Body generally castaneous to fuscous, large, elongated; dorsal surface oily shiny, highly polished, almost impunctate, with very sparsely distributed, simple, silky setae. Head oblique; vertex with a narrow, longitudinal, mesal sulcation, not margined or carinate basally; antennal tubercle rather developed. Antenna just shorter than body, slender; segment I shorter than head width across eyes; segment II slightly incrassate apically; segment IV shorter than I, about half as long as III. Labium reaching apex of metacoxa. Pronotum very shiny, almost glabrous, without distinct calli; calli somewhat shagreened, narrow, almost equal in thickness to base of antennal segment II; scutellum arched, tumid. Hemelytron shiny, minutely and sparsely punctate, with sparsely distributed, simple, silky, semierect setae; cuneus elongate. Legs long; metafemur longer than labium; tibial spines fuscous, prominent.

Male genitalia (Figs. 2g-k, 3): Pygophore with prominent, conical protuberance at base of left paramere and with small process at base of right paramere (Figs. 2g-h). Parameres lacking noticeable sensory setae; sensory lobe of left paramere weakly projected basally (Figs. 3a-b); right paramere short, with small hypophysis (Fig. 3c). Endosoma basically bilobate (Figs. 2i-k, 3d), with a bundle of hair-like appendages behind secondary gonopore (Figs. 2j, 3d) and four lobal sclerites distally.

Female genitalia (Figs. 2c-f): Bursa copulatrix with a pair of weakly sclerotized structures (Fig. 2d). Sclerotized rings enlarged, elongate-ovoid, thick-rimmed, contiguous to each other (Figs. 2c-d). Posterior wall with relatively narrow interramal lobes (Figs. 2e-f).

Etymology:

Named after Vairocana (Vairochana or Mahāvairocana), believed to be the most celestial Buddha (particularly in Tibetan Buddhism that is common in the Sikkim region, the type locality of the type species) and often interpreted as the universe itself, in combination with mirine generic name *Miris* F.; gender masculine.

Discussion:

This new genus is assumed to be most closely related to *Cheilocapsidea* Poppius, 1915 and *Cheilocapsus* Kirkaldy, 1902, judging from the large size, comparatively similar external appearance and shape of the parameres, and presence of several lobal sclerites on the endosoma. However, several diagnostic characters

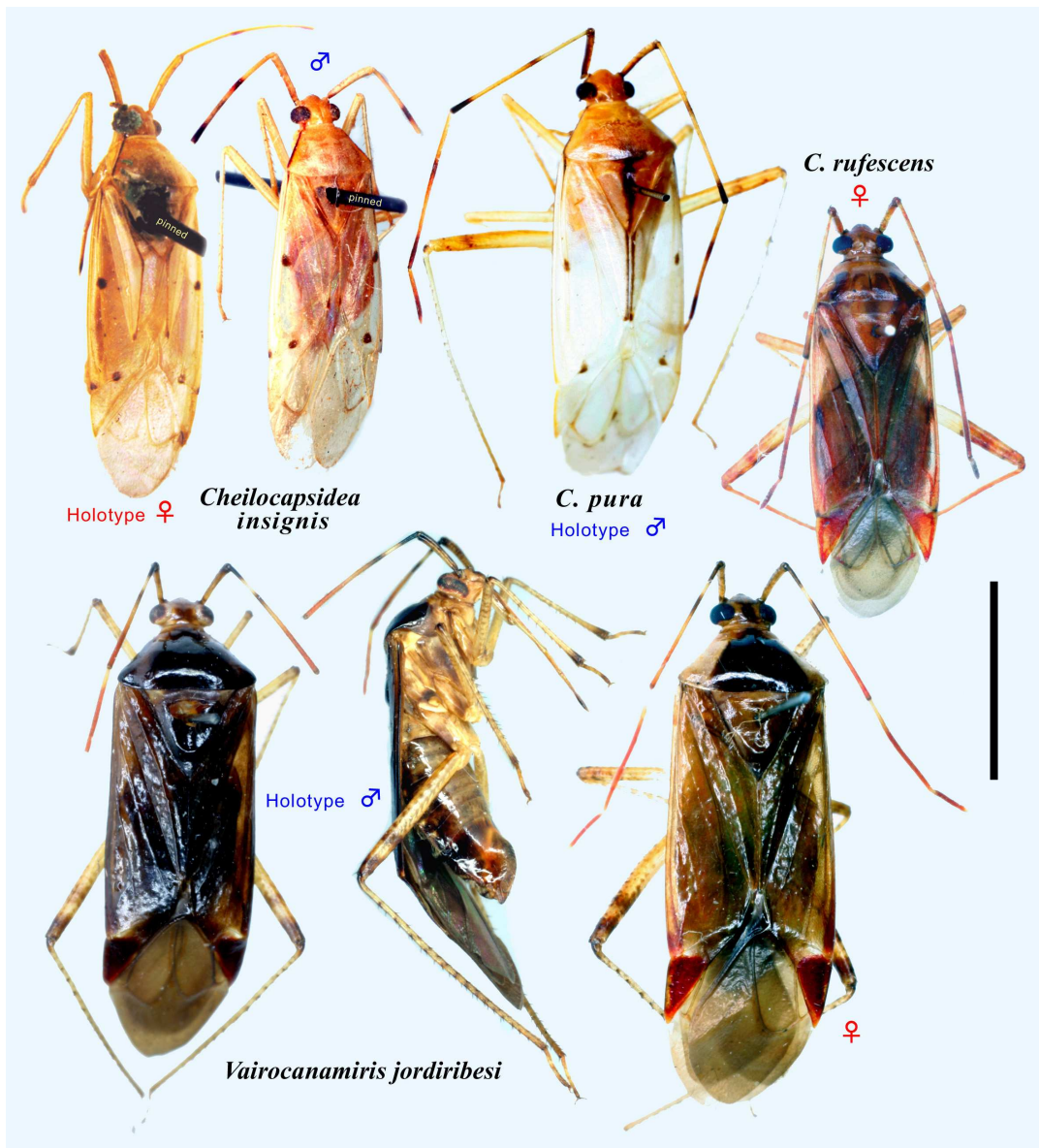


FIGURE 1. Habitus images of *Cheilocapsidea* species and *Vairocanamiris jordiribesi* n. gen., n. sp. (Scale bar = 5 mm).

(e.g., highly polished dorsum with sparse vestiture, slender antennae, male with hair-like appendages on the endosoma, prominent protuberance of the pygophore, and female with large, continuous sclerotized rings) warrant establishment of a new genus to accommodate the present new species.

Vairocanamiris also resembles *Liocapsus* Poppius, 1915,

Mahania Poppius, 1915, *Orientocapsus* Yasunaga & Schwartz, 2007, *Orientomiris* Yasunaga, 1997, and *Philostephanus* Distant, 1909, but the similarities to these genera are only superficial, as the above diagnosis readily distinguishes the new genus from them (for further information on these genera, see Yasunaga, 1997; Yasunaga and Schwartz, 2007).

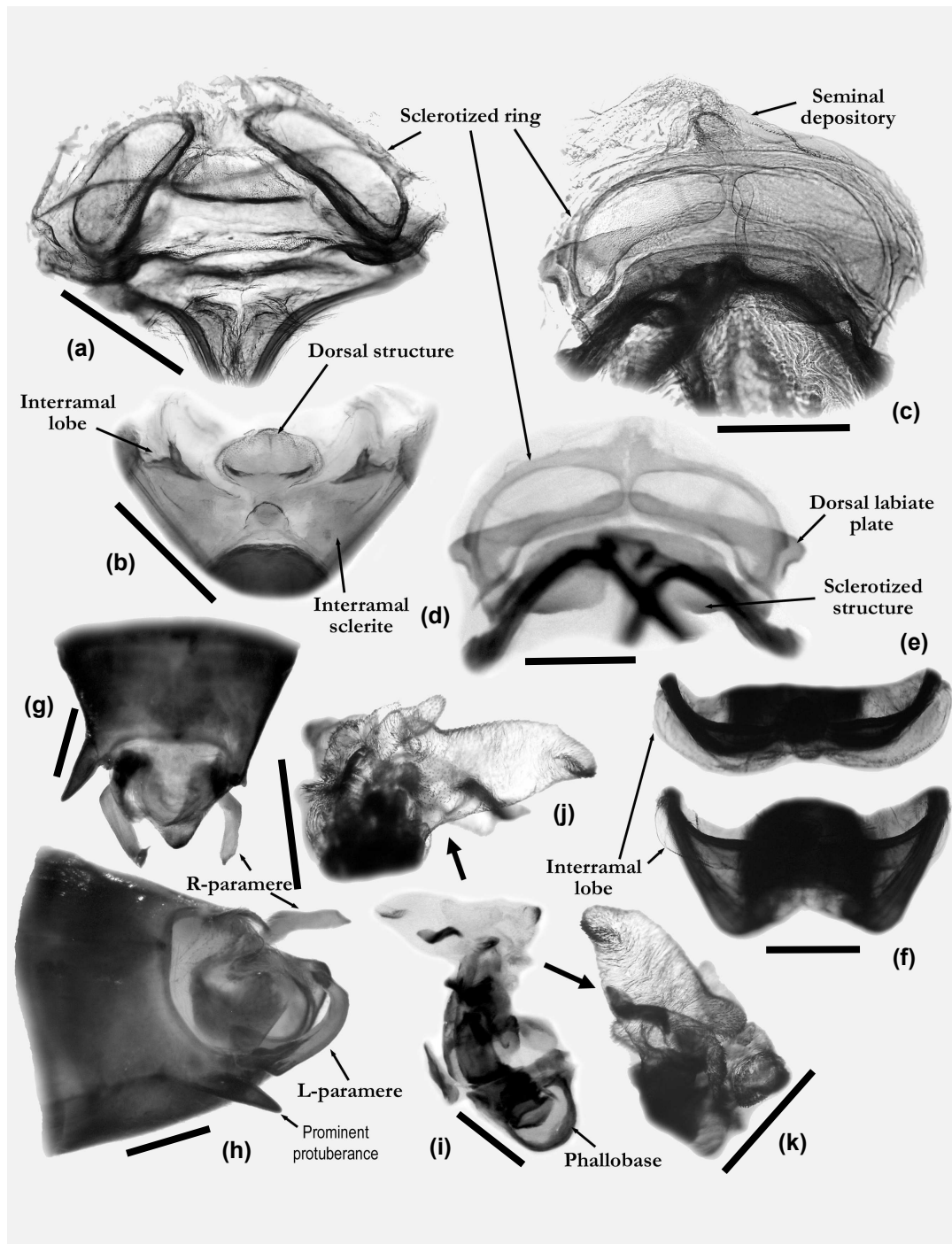


FIGURE 2. Female (a-f) and male (g-k) genitalia of: (a)-(b) *Cheilocapsus flavomarginatus*; (c)-(k) *Vairocanamiris jordiribesi* n. gen., n. sp.: (a), (c) Bursa copulatrix, ventral view; (b), (f) Posterior wall, anterior view; (d) Bursa copulatrix, dorsal view; (e) Posterior wall, dorsal view; (g) Pygophore, dorsal view; (h) Pygophore, left lateral view; (i) Endosoma, anterior view; (j) Endosoma, left lateral view; (k) Endosoma, right lateral view (Scale bars = 0.5 mm).

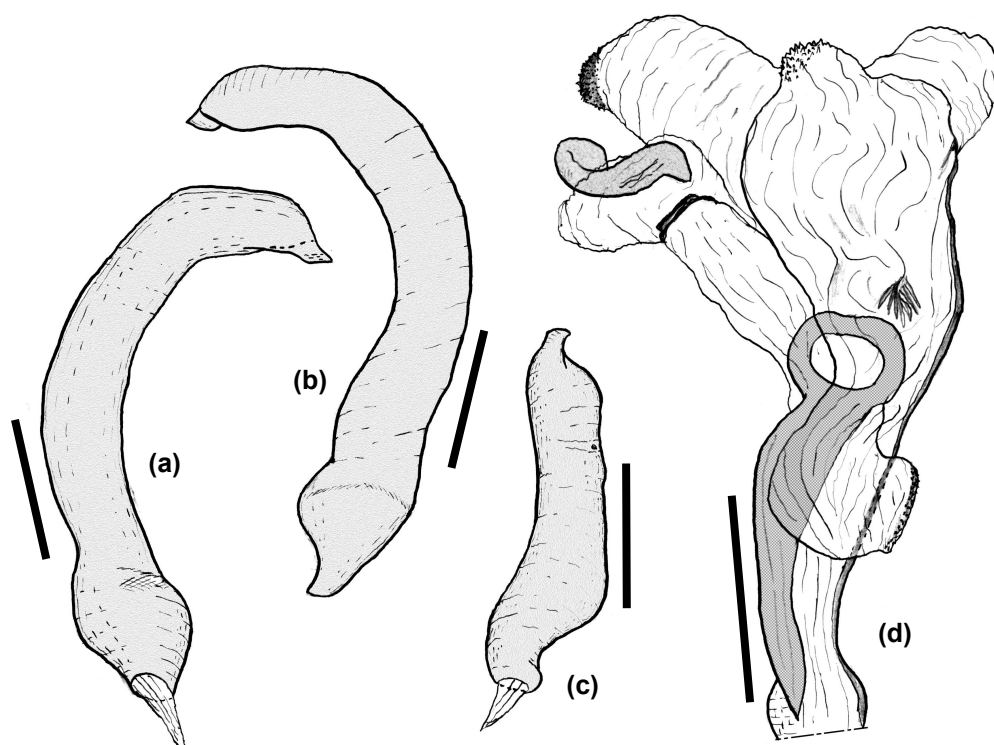


FIGURE 3. Male genitalia of *Vairocanamiris jordiribesi* n. gen., n. sp.: (a) Left paramere, ventral view; (b) Left paramere, dorsal view; (c) Right paramere, ventral view; (d) Vesica, posterior view (Scale bars: (a)-(c) = 0.2 mm; (d) = 0.5 mm).

***Vairocanamiris jordiribesi* n. sp.**

(Figs. 1, 2c-k, 3)

Type material:

HOLOTYPE: ♂, West Sikkim: Choka [Tsokha Village, 27°26'N 88°10'E], 3,050 m alt., light trap, 23. ix. 1988, M. Tomokuni (NSMT).

PARATYPE: 1 ♀, same data as for holotype (NSMT).

Diagnosis:

Easily recognized by the characters mentioned in generic diagnosis and general coloration. The female is significantly larger and paler than the male (Fig. 1).

Description:

Male: Body generally dark brown. Head shiny pale brown; median parts of vertex and frons more or less infuscate. Antenna reddish brown; segment I pale brown with fuscous base and apex; segment II with

fuscous basal half and apex, basal 1/4 with a yellowish band. Labium yellowish brown, partly tinged with red; apical half of segment IV dark brown. Pronotum shiny fuscous; collar somber yellow; scutellum fuscous, sparsely, narrowly and transversally wrinkled. Hemelytron fuscous, partly wrinkled, relatively delicate or thin; cuneus sanguineous except for yellowish basal margin; membrane pale smoky brown. Coxae and legs pale brown; all femora speckled with dark, small spots; apical part of metafemur with two obscure dark brown bands; apex of each tibia darkened. Abdomen generally chestnut brown, with reddish pygophore. Genitalia as mentioned in generic description.

Measurements: Total body length 9.41; head width including eyes 1.29; vertex width 0.49; length of antennal segments I-IV 1.15, 2.47, ?, ?; labial length 3.55; mesal pronotal length including collar 1.54; basal pronotal width 2.72; width across hemelytra 3.01; length of metafemur, tibia and tarsus 3.62, 5.39, 0.93.

Female: Coloration as in male except body generally castaneous; bases of antennal segments III and IV yellowish brown; pronotum pale brown laterally; scutellum castaneous; hemelytron castaneous except for darkened clavus and median part of corium; abdomen almost entirely stramineous brown. Genitalia as mentioned in generic description.

Measurements: Total body length 10.28; head width including eyes 1.40; vertex width 0.52; length of antennal segments I-IV 1.32, 3.43, 2.45, 1.23; labial length 3.65; mesal pronotal length including collar 1.72; basal pronotal width 3.09; width across hemelytra 3.47; length of metafemur, tibia and tarsus 3.92, 6.13, 0.98.

Etymology:

Named in honor of the Catalonian heteropterist Jordi Ribes, celebrating his 80th birthday; a noun in the genitive case.

***Cheilocapsidea* Poppius, 1915**

(Fig. 1)

Cheilocapsidea Poppius, 1915: 13 (n. gen.), type species: *Megacoelum insignis* Distant, 1909, original designation; Yasunaga and Kerzhner, 1998: 88 (gen. dist.); Kerzhner and Josifov, 1999: 83 (cat.); Zheng *et al.*, 2004: 235 (diag.).

Creontiades Distant, 1883 (part): Carvalho, 1952: 87 (cat.); Schuh, 1995: 743 (cat.).

Carvalbopantilius Yasunaga, 1995: 452 (n. gen.), type species: *Carvalbopantilius purus* Yasunaga, 1995, original designation (syn. by Yasunaga and Kerzhner, 1998: 88).

Diagnosis:

Recognized primarily by the large size (8–11 mm), longitudinally sulcate vertex, long antenna with segment II almost linear, weakly but continuously carinate lateral margin of the pronotum, semitransparent and delicate hemelytron, long legs, male with elongated lobal-sclerite on the endosoma, and female with relatively large, contiguous sclerotized rings. Further diagnostic characters are provided by Poppius (1915) and Yasunaga (1995, as *Carvalbopantilius*).

Distribution:

North India, Taiwan.

Discussion:

This little known Asian genus is currently known by three species, *C. insignis* (Distant, 1909) from North

India, and *C. pura* (Yasunaga, 1995) and *C. rufescens* (Yasunaga, 1995) from Taiwan. Yasunaga (1995) mentioned that this genus is related to the Palearctic genus *Pantilius* Curtis, 1833. However, the latter has a tough, coreid-like body, incrassate antennal segment II, and male with a pair of saw-shaped sclerites on the endosoma (Yasunaga, 1992; Wachmann *et al.*, 2004). The similarity between *Cheilocapsidea* and *Pantilius* is only superficial.

Cheilocapsidea may be confused with *Orientalimiris* Yasunaga, 1997, from which it is readily separable by the anteriorly projected frons, laterally carinate pronotum, and different structures of the male and female genitalia (Yasunaga, 1997).

Absent data of the genitalia for known species and the relationships of this genus to other Mirini remain unknown. Further investigation is required to correctly ascertain the accurate systematic position of *Cheilocapsidea*.

***Cheilocapsidea insignis* (Distant, 1909)**

(Fig. 1)

Megacoelum insignis Distant, 1909: 444 (n. sp.).

Creontiades insignis: Carvalho, 1959: 75 (cat.); Schuh, 1995: 745 (cat.).

Cheilocapsidea insignis: Poppius, 1915: 14 (n. comb., diag.); Yasunaga and Kerzhner, 1998: 88 (note).

Diagnosis:

Readily recognized by the generally whitish brown body, wholly pale scutellum without dark suffusion or marking, and three brown circular spots located on the mesial lateral margin and apical margin of the corium and apex of the embolium. Closely related to the Taiwanese *C. pura* (Yasunaga, 1995) from which this species is easily distinguished by the smaller size, completely pale scutellum, and circular spots on the hemelytron (Fig. 1).

Redescription:

Holotype female: Body generally brownish white, elongate, subparallel-sided; dorsal surface with three pairs of small, circular spots on hemelytra, rather shining, very weakly shagreened or pruinose, almost glabrous. Head pale brown, narrowly darkened behind eyes, subshining, weakly granulate, subvertical; vertex with narrow, longitudinal mesal sulcation; frons rounded, tumid. Antenna pale brown; segment I lon-

ger than width of head including eyes; segment II with sanguineous band on basal 2/5 and reddish brown apex. Labium pale brown, long, slightly exceeding apex of metacoxa; apical part of segment IV darkened. Pronotum brownish white, somewhat shagreened, with brown and weakly carinate lateral margin, almost glabrous; collar bearing several, pale, erect setae; scutellum completely pale, without significant markings. Hemelytron subhyaline, with three brown, small, circular spots on mesial lateral margin and apical margin of corium, and apex of embolium; basal part of costal vein infuscate; inner margin of clavus narrowly darkened; membrane pale grayish brown. Foreleg pale brown; tibia with pale brown spines; apex of tarsomere III slightly darkened; middle and hind legs missing.

Measurements: Total body length 8.78; head width including eyes 1.30; vertex width 0.55; length of antennal segments I-IV 1.44, 3.86, ?, ?; labial length 3.50; mesal pronotal length including collar 1.30; basal pronotal width 2.30; width across hemelytra 2.88.

Male: Antennal segment II with two dark brown bands at middle and apex, otherwise almost similar in basic coloration and external structures to female.

Measurements: Total body length 8.44; head width including eyes 1.28; vertex width 0.51; length of antennal segments I-IV 1.15, 2.47, ?, ?; labial length 3.26; mesal pronotal length including collar 1.32; basal pronotal width 2.33; width across hemelytra 2.94.

Male and female genitalia were not dissected, as only single specimens are currently available for each sex and the identity of the species is clearly determined by external characters alone.

Material examined:

HOLOTYPE: ♀, INDIA: United Provinces/ Mussoorie [Garhwal Himalayas, State of Uttaranchal, 30°27'N 78°04'E], Distant Coll./ 1911-383, *Megacoelum insignis* Dist./ type (holotype, BMNH). Additional material from India: 1 ♂, labeled as «Museum Paris/ Kurseong [Sikkim, 26°52'N 88°16'E]/ Oberthür 1899, *Cheilocapsidea*/ n. gen./ insignis (Dist.)» [handwritten possibly by Poppius] (ZMUH); this male specimen bears an additional label as «Mus. Zool. H: fors/ Spec. Type No. 10042/ *Cheilocapsidea insignis* Dist.», but it apparently does not belong to the type series because Distant (1909) described this species on a single female specimen.



FIGURE 4. Holotype of *Cheilocapsus flavomarginatus* Kirkaldy, 1902.

Cheilocapsus Kirkaldy, 1902

(Figs. 2a-b, 4-5)

Cheilocapsus Kirkaldy, 1902: 259 (n. gen.), type species: *Cheilocapsus flavomarginatus* Kirkaldy, 1902, monotypic; Schuh, 1995: 739 (cat.); Kerzhner and Josifov, 1999: 84 (cat.); Yasunaga, 2001: 229 (diag.); Zheng *et al.*, 2004: 237 (diag.).

Parapantilius Reuter, 1903: 5 (n. gen.), syn. by Yasunaga and Kerzhner, 1998: 88; Yasunaga, 1994: 684 (diag., redesc.).

Diagnosis:

Recognized by the large, tough body, more or less shagreened dorsum, long, thick antennal segment I, a mesial dark spot between the pronotal calli (Figs. 5c, e, g and i), striped lateral margin of the pronotum, a dark spot on the epimeron (Figs. 5b, d, f and h), rather long legs, male with five similar sized lobal-sclerites on the endosoma, and female with large sclerotized rings and posterior wall with relatively swollen dorsal structure and small interramal lobes. Further diagnostic characters were provided by Yasunaga (1994) under *Parapantilius*, a junior synonym of *Cheilocapsus*.

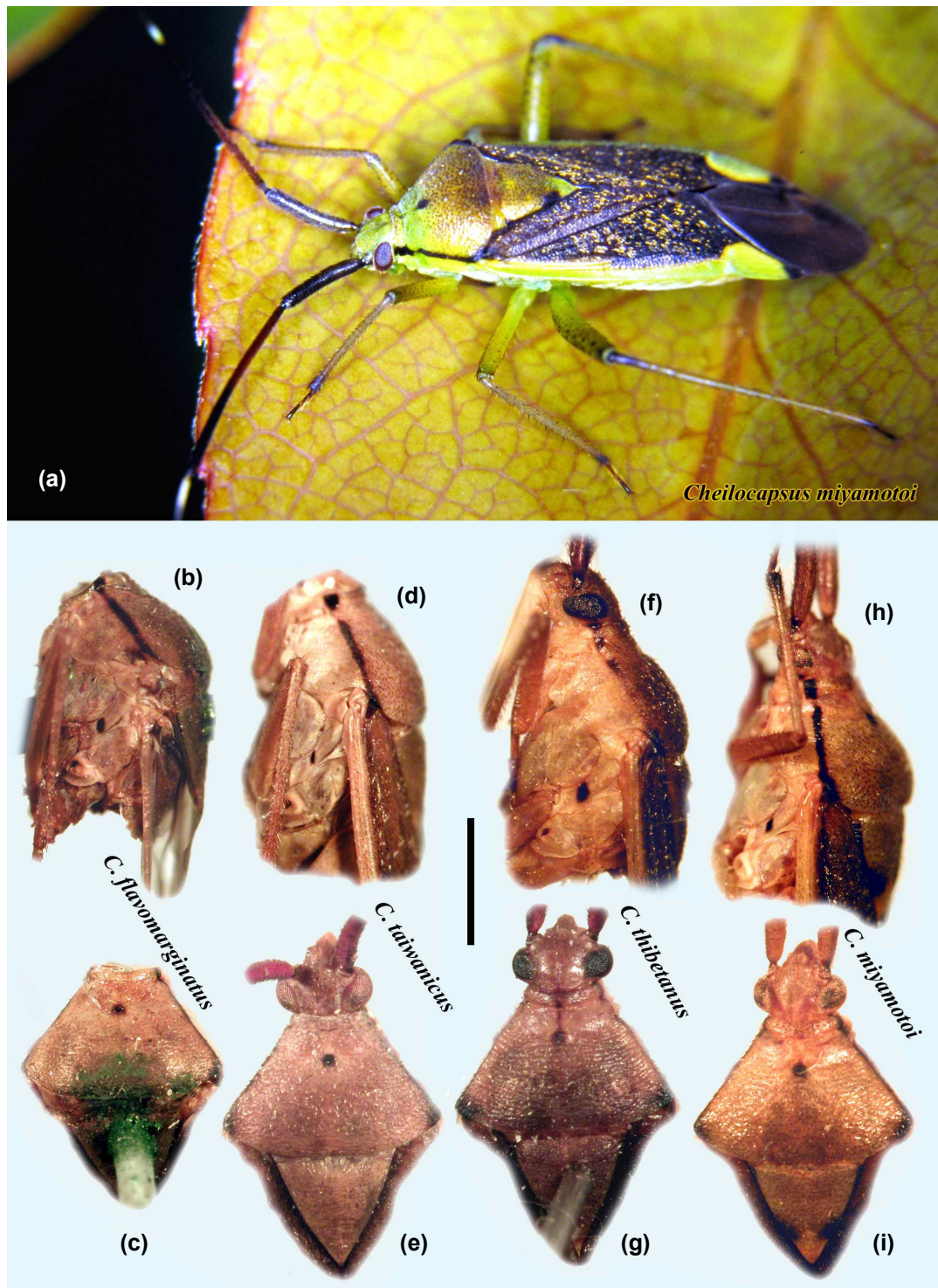


FIGURE 5. Habitus of live female individual (a) and images for female thoracic structures of *Cheilocapsus* species: (a), (h)-(i) *C. miyamotoi*; (b)-(c) *C. flavomarginatus*, holotype; (d)-(e) *C. tainanicus*; (f)-(g) *C. tibetanus*; (b), (d), (f), (h) Left lateral view; (c), (e), (g), (i) Dorsal view (Scale bar = 2 mm).

Distribution:

China, Japan (Ryukyu Islands), Myanmar, Taiwan.

Discussion:

This Asian genus is defined by the characters diagnosed above. As pointed out by Yasunaga (1994), the genus probably is most closely related to *Pantilius* Curtis, 1833 in having the tough, coreid-like body, tumid frons, incrassate antennal segments I and II, and presence of at least three homologous lobes on the male endosoma. The vivid general coloration is liable to fade after death (compare Fig. 5a to Figs. 5h-i).

Liu and Wang (2001) described two species, *Cheilocapsus maculipes* and *C. nigrescens*, from continental China, without comparison to the type species. Judging from the original description of the external structures, the former species particularly resembles *C. flavomarginatus*. As the female genitalia were neither described nor figured for these Chinese species, I cannot reconfirm their identities. Further examinations of the female genitalia are required for *maculipes* and *nigrescens* to correctly ascertain how they can be distinguished from the type species. *Cheilocapsus* is currently known by five species distributed in warm temperate and subtropical zones in eastern Asia.

***Cheilocapsus flavomarginatus* Kirkaldy, 1902**

(Figs. 2a-b, 5)

Cheilocapsus flavomarginatus Kirkaldy, 1902: 259 (n. sp.); Schuh, 1995: 739 (cat., misprinted as «*limbatu*») Kirkaldy; Yasunaga and Kerzhner, 1998: 88 (note).

Redescription:

Holotype female: Badly mutilated (Fig. 4). Pronotum somber pale brown, weakly shining, with a castaneous, circular spot between calli and a dark brown stripe along lateral margin; scutellum pale brown; epimeron with a fuscous, median spot. Mesofemur and tibia pale brown. Abdomen pale brown; dorsal surface somber dark brown, partly tinged with red. No other information is available.

Genitalia: Sclerotized ring large, ovoid, thick-rimmed (Fig. 2a). Posterior wall of bursae with bulbous dorsal structure and small interramal lobes (Fig. 2b).

Measurements: Mesal pronotal length including collar 1.86; basal pronotal width 3.31; length of mesofemur and mesotibiae 2.82 and 3.31. According to original

description by Kirkaldy (1902), total body length and width across pronotum of the holotype were 11 mm and 3.25 mm, respectively; because of the condition of the specimen, no other measurements are available. The original description is however insufficient to distinguish *C. flavomarginatus* from other congeners.

Material examined:

HOLOTYPE: ♀, BIRMANIA (MYANMAR): Chan Yoma [supposed to be Shan Hills of northeastern area of the country], Gribodo/ *Cheilocapsus flavomarginatus* Kirk. ♀ type (ZMUH).

Acknowledgments

I am grateful to Dr. L. Hulden (ZMUF), Mr. M.D. Webb (BMNH) and Dr. M. Tomokuni (NSMT) for their generous permission to examine invaluable specimens used in this paper. I also thank Drs. S. Pagola-Carte and I. Zabalegui (Entomological Society of Gipuzkoa, Basque Country, Spain) for kind invitation to this commemorative volume for Dr. Jordi Ribes. Thanks are extended to Dr. M.D. Schwartz (Agriculture & Agri-Food Canada) and an anonymous reviewer for providing valuable comments and suggestions.

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Received / Recibido / Hartua: 30/11/2010

Accepted / Aceptado / Onartua: 27/02/2011

Published / Publicado / Argitaratua: 15/12/2011