Revision of the mirine plant bug genus *Philostephanus* Distant and allies (Heteroptera: Miridae: Mirinae: Mirini)*

Tomohide Yasunaga & Michael D. Schwartz

The East Asian mirine plant bug genus *Philostephanus* Distant, 1909 is revised. Twenty-three species are recognized, including 9 new species from Japan, Taiwan, Thailand, Nepal, and Indonesia (Sumatra). Synapomorphies of the female genitalia uniquely define the genus as a monophyletic group. *Arbolygus* Kerzhner, 1979 is proposed as a junior synonym of *Philostephanus*, thus forming twelve new combinations: *P. ailaensis* (Lu & Zheng), *P. difficilis* (Lu & Zheng), *P. fulvus* (Jakovlev), *P. glaber* (Kerzhner), *P. himalayicus* (Lu & Zheng), *P. longustus* (Lu & Zheng), *P. pronotalis* (Zheng & Liu), *P. renae* (Lu & Zheng), *P. rubripes* (Jakovlev), *P. tibialis* (Lu & Zheng), *P. ulmi* (Kerzhner), and *P. wuzhiensis* (Lu & Zheng). *Lygus variegatus* Poppius, 1914 is transferred to *Philostephanus*. Each of the fourteen known species of *Philostephanus* is diagnosed and redescribed. A new genus *Orientocapsus*, regarded as a close relative of *Philostephanus*, is proposed to accommodate two Chinese species and three new species from Japan, Taiwan, and China. *Liocapsus* Poppius, 1915, also related to *Philostephanus*, is diagnosed and contains four species; one from Nepal and two from Taiwan are described as new. Keys are provided to distinguish all known species of *Philostephanus*, *Orientocapsus*, and *Liocapsus*. The genus *Mahania* Poppius, 1915, incorrectly synonymized with *Philostephanus*, is restored, and a single representative, *M. elongata* Poppius, 1915 is redescribed. Lectotypes are designated for *Lygus variegatus*, *Liocapsus brevirostris*, *Mahania elongate*, and *Philostephanus vitaliter*. The phylogeny of *Philostephanus* species and relative outgroup taxa is discussed.

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During our studies to clarify the fauna of *Philostephanus*, 23 species were recognized. Of these, nine new species are required to accommodate specimens from Japan, Taiwan, Thailand, Nepal, and Sumatra. *Arbolygus* is proposed as a junior synonym of *Philostephanus*; herein we transfer twelve species of *Arbolygus* to *Philostephanus*. Two Chinese species, *Arbolygus picinus* Lu & Zheng, 1998 and *A. zhangi* Lu & Zheng, 1998, and three undescribed species from Japan, Taiwan, and China were found to represent a new genus closely related to *Philostephanus*; we propose a new genus, *Orientocapsus*, to accommodate the five East Asian species.

The monotypic genus *Mahania* Poppius, 1915 previously synonymized with *Philostephanus* (Carvalho 1952), is restored and redefined. This genus has no synapomorphies with *Philostephanus*. Its single representative, *M. elongata* Poppius, is redescribed, and a lectotype is designated.

The monotypic genus *Liocapsus* Poppius, 1915 was also found to be a relative of *Philostephanus*, based on the external similarity and modified female genital structure, and two undescribed species from Taiwan were recognized as additional members of *Liocapsus*. All the treated taxa are diagnosed, and described or redescribed. Keys are provided to distinguish the species of *Philostephanus*, *Orientocapsus*, and *Liocapsus*. Morphology and terminology of the genitalia and the phylogeny are discussed for *Philostephanus* and its outgroup taxa.

### Material and methods

More than 2,000 preserved specimens were examined. Depositories of the material cited in the text are provided under museum abbreviations below. Type material of all the known species was examined, however the genitalia of the types of three Chinese species described by Lu & Zheng (1998a), *P. renae*, *P. wuzhiensis*, *O. picinus*, could not be studied. The genitalia of these species are kept separately and not attached to the specimens by microvials. All measurements in the text are given in millimeters. In the synonymic lists, only selected references are cited for each taxon; for further information, see catalogs of Carvalho (1959), Kerzhner & Josifov (1999), and Schuh (1995). In the text and figures many morphological abbreviations are used to facilitate comparison and discussion of the genitalic features. The terminology is summarized in the Morphology and Terminology of the genitalia section. Photographs provided in this paper were made with
an Olympus OM-System (OM-4Ti 35 mm camera with T10 Ringflash, Auto Extension Tube, and 50 mm/ f3.5 macro lens). Canon EOS Kiss Digital Camera adapted with Olympus system by EOS-OM mount adapter is also used for some images (Figs 171–177, 179–181 and 210–215).

Museum abbreviations

AMNH Department of Entomology, American Museum of Natural History, New York
BMNH Department of Entomology, Natural History Museum, London, England
CNC Canadian National Collection of Insects, Ottawa, Ontario
DBNU Department of Biology, Nankai University, Tianjin, China
ELKU Entomological Laboratory, Kyushu University, Fukuoka, Japan
EUM Entomological Laboratory, Ehime University, Matsuyama, Japan
IC Mr. Ichita’s personal collection, Kuroishi City, Aomori, Japan
IZAS Institute of Zoology, Academia Sinica, Beijing, China
MC Dr Miyamoto’s personal collection, Fukuoka City, Japan
MNHA Museum of Nature and Human Activities, Kobe, Japan
NIAS National Institute of Agro-Environmental Sciences, Tsukuba, Ibaraki, Japan
NHMW Naturhistorisches Museum, Wien, Austria
NMTU Natural History Museum, Tribhuvan University, Swayambhu, Kathmandu, Nepal
NSMT Department of Zoology, National Science Museum, Tokyo, Japan
OMNH Osaka Municipal Museum of Natural History, Osaka, Japan
SEHU Systematic Entomology, Hokkaido University, Sapporo, Japan
TJNM Tianjin Natural Museum, Tianjin, China
USNM Department of Entomology, United States National Museum of Natural History, Washington, D. C.
YCN Yasunaga’s personal collection, Nagasaki City, Japan
ZMAS Zoological Institute, Russian Academy of Sciences, St. Petersburg
ZMUF Zoological Museum, University of Helsinki, Finland

Morphology and terminology of the genitalia

We primarily follow the terminology of Davis (1955) additionally the works of Kullenberg (1947), Dupuis (1955), Slater (1950), Kelton (1955), Schwartz (1994), and Schwartz & Foottit (1998) were also incorporated.

The following morphological abbreviations are employed in the illustrations of the genitalia of *Philostephanus*:

- **AS** apical sclerite (♂)
- **DLP** dorsal labiate plate (♀)
- **DOS** dorsal sac (♀)
- **DS** dorsal structure of posterior wall of bursa copulatrix or “posterior wall” (♀)
- **GC** genital chamber (♀)
- **GS** gonoporal sclerite (♂)
- **HP** hypophysis (♂)
- **IRL** interramal lobe of posterior wall (♀)
- **IRS** interramal sclerite of posterior wall (♀)
- **ISM** intersegmental membrane
- **LAV** strongly sclerotized lateralmost portion of anterior wall of vestibulum (♀)
- **LL** left lateral lobe (♂)
- **LLB** lateral lobe of posterior wall (♀)
- **LS** lateral sclerite (♂)
- **MPGC** medial process projecting into genital chamber from sclerotized portion of posterolateral margin of combined common oviduct and roof of genital chamber (♀)
- **MSGC** medial sclerite of combined common oviduct and roof of genital chamber (♀)
- **MSV** sclerotized plate of vaginal vestibule [medial sclerotized plate of vestibulum, situated at bend, or junction, of first valvula and ramus of first valvula] (♀)
- **OC** oviductus communis (or common oviduct) (♀)
- **OL** oviductus lateralis (or lateral oviduct) (♀)
- **PT** phallotheca (♂)
- **PWB** posterior wall of bursa copulatrix or “posterior wall” (♀)
- **RV1** ramus of first valvula (♀)
- **SD** seminal depository (♀)
- **SG** spermathecal (or vermiform) gland (♀)
- **SGP** subgenital plate medial process of sternum VII (♀)
- **SL** sensory lobe (♂)
- **SPGC** sclerotized perimeter of combined common oviduct and dorsal wall of genital chamber (♀)
- **SR** sclerotized ring (♀)
- **RP** ramal plate of the IX paratergite (♀)
- **TG** (abdominal) tergum
- **VL** ventral plate of the IX paratergite (♀)
- **VLF** valvifer (♀)
- **VLP** ventral labiate plate (♀)
- **VLV** valvula (♀)
- **VS** ventral sclerite (♂)
Several additional abbreviations are employed for discussion of *Orientocapsus* and *Liocapsus*; these are referred to in the appropriate generic descriptions. **Male genitalia** (see figures of each species). The male genitalia are one of the most important character systems in the modern classification of the Miridae. Externally, a pair of asymmetrical parameres, in dorsal view, represent the mirid genital segment, or abdominal segment IX, - a long, strongly curved left paramere and a shorter, almost straight right paramere. Each paramere is composed of an anterior or basal sensory lobe (SL) and posterior or apical shaft, sometimes referred to as the hypophysis (HP). In a majority of *Philostephanus* species, the right paramere is usually elongate and curved subapically at the junction of the sensory lobe and hypophysis; as a consequence the parameres are roughly symmetrical in dorsal view.

The phallic organ or vesica is as useful for distinguishing closely related species as for defining higher taxa (genera, subgenera, and species groups). The vesica in the *Philostephanus* species exhibits great interspecific variation, and it was initially difficult to determine the homology of its numerous features. However, close observation suggests that the vesica of *Philostephanus* is principally composed of six homologous lobes and/or sclerites. They are termed here as apical sclerite (AS), lateral sclerite (LS), left lateral lobe (LL), gonoporal sclerite (GS), ventral lobe (VL), and ventral sclerite (VS). All congener do not have a full set of vesical appendages, but all species of *Philostephanus* do have at least four of them. The apical sclerite and developed left lateral lobe are also found in members of *Orientocapsus*, which is, therefore, regarded as a sister group of *Philostephanus*.

The phallotheca (PT) of *Philostephanus* has a complicated shape. The apical part is highly modified in all the species and is accompanied by associated tubercles and processes. Similar structures are found in *Lygocoris* Reuter, 1875 (Yasunaga, 1991), *Castanopsides* Yasunaga, 1992 (Yasunaga, 1998), and some other genera of the tribe Mirini, however we consider, due to the conspicuous interspecific variation, that the phallotheca of *Philostephanus* is perhaps the most elaborate in the tribe.

**Female genitalia** (Figs 1–4 and also those of each species). The female genitalia were largely ignored in many previous works of mirid classification. In other genera these structures tend not to exhibit distinct interspecific variation, and it is sometimes very

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**Figs 1–2.** Schematic view of the female abdomen of *Philostephanus vitaliter*. – 1, Ventral view; 2, dorsal view. Scales 0.5 mm. – See text for abbreviations.
difficult to distinguish closely allied congeners by the female genitalia alone. But in *Philostephanus* the interspecific variation of both the male and female genitalia allow for the species discrimination. The detailed morphology and terminology for the mirine female genitalia were comprehensively discussed by Kullenberg (1947). Subsequently, Slater (1950), Davis (1955), and Dupuis (1955) provided many new terms. However, as species of *Philostephanus* have conspicuous structures not previously discussed by other workers, additional terms are needed to adequately indicate and discuss them. Some of the unique characters have not been documented in any other genera of the tribe Mirini, and are regarded as synapomorphic for *Philostephanus*. Figs 1–4 illustrate the general anatomy. The female genitalic segments comprise abdominal segments VIII and IX (Fig. 1). Externally, a medial tongue-like projection, or subgenital plate (SGP) of sternum VII, two valvulae (VLV), and two valvifers (VLF)
are recognizable in ventral view. The subgenital plate usually covers the vulva, or vaginal opening, and the male phallic organ is inserted under it while mating. The internal genitalic structures lie between segments IV and IX, and the anteriormost portion contains the expanded seminal depository (Fig. 2). The base of the internal genitalia is bounded laterally by the fusion of the rami of the first valvula (RV1) and anterior inner margin of the abdominal sternum IX (ST IX). In the dorsal aspect, a ‘seminal depository’ (SD), a pair of ‘sclerotized rings’ (SR), the ‘common oviduct’, or oviductus communis (OC), a slender membranous tube, the ‘spermathecal [vermiform] gland’ (SG), and a pair of ‘lateral oviducts’ or oviductus lateralis (OL) are recognizable when the abdominal terga (TG) are removed.

The combined common oviduct, roof of the genital chamber, and sometimes a ‘dorsal sac’ (DOS) forms a convoluted asymmetrical, dorsal membranous sac. This combined structure is usually thickened by sclerotization along its perimeter (SPGC) and between the lateral oviducts forming medial sclerotization (MPGC). Functionally, the seminal depository (SD) reserves sperm after copulation as whitish sperm liquids are frequently poured out from it while dissection. The sperm eventually moves to the common oviduct (OC) where, presumably, fertilization occurs. The ova develop in the lateral oviducts, with the fertilized ova passing through the common oviduct to the ovipositor for deposition in plant tissue.

In the genus Philostephanus, the sclerotized rings are separate from each other, each occupying a lateral position on the ‘dorsal labiate plate’ (DLP). The rings are raised or embossed on the dorsal surface of the dorsal labiate plate. The dorsal labiate plate and ‘ventral labiate plate’ (VLP) form the posterodorsal and posteroventral margins of the seminal depository where it opens into the genital chamber. The combined structure of the roof of the genital chamber and common oviduct of the genus is usually asymmetrically developed or swollen. Since the roof of the genital chamber of Orientocapsus and Liocapsus also exhibit more or less sclerotized and asymmetrical forms, these genera are considered as relatives of Philostephanus.

Structures that may be unique to Philostephanus (Figs 3–4) are found anteriorly on the vestibulum (LAV) and projecting from the posterolateral margin of the roof of the genital chamber (MSGC) into the chamber. The medially directed sclerotized lobe(s) projecting from the sclerotized posterolateral margin can be paired or unpaired and are sometimes long and attenuate or short and serrate. These structures exhibit conspicuous interspecific variation, and are one of the most useful characters to identify the adult female.

The ‘posterior wall [of the bursa copulatrix]’ (PWB) is an assemblage of variable structures that are also useful for interspecific recognition. The ‘posterior wall’ contains a dorsomedially located, usually bilobed, spinous covered, ‘dorsal structure’ (DS), and paired ‘lateral lobes’ (LLB), ‘interramal lobes’ (IRL), and ‘interramal sclerites’ (IRS). When present the LLB are strongly sclerotized, sometimes attenuate, situated dorsal to the IRL, and project posterior to the IRS. The IRL also are posterior directed outpockets of the IRS, usually covered with spinules. The IRS are flattened sclerotized plates, placed on either side of a narrow posterior sclerotized median process. The composite structures of the posterior wall are suspended in membrane that spans the space between the bases of the second valvifers, thus forming the posterior surface of the genital chamber. In Philostephanus, the DS and sometimes the interramal lobes are highly asymmetrical. These specialized structures may enable the vesica and parameres of the male in some manner during copulation and fertilization.

**Systematics**

**Philostephanus Distant**


**Lygocoris** (Arbolygus) Kerzhner, 1979: 24 (n. subgen.).


**Syn. n.**


**Diagnosis**

*Philostephanus* is distinguished from other genera of Mirini by the following combination of characters: body oval to elongate oval; size moderate to large; dorsum shining brown to fuscous; clypeus developed basally, sometimes divided into basal and apical parts by transverse suture; antennal segment II short and almost cylindrical, length about as long as or shorter than basal width of pronotum; antennal segment III short, equal to or shorter than half length of II; labium long, reaching or slightly exceeding hind coxa (only *pronotalis* has a short labium); pronotum glabrous and shining (exceptionally
Figs 5–12. Adults (5, 7, 9, 11 & 12) and final instar nymphs (6, 8 & 10) of Philostephanus spp. – 5 & 6, *P. fulvus*; 7 & 8, *P. rubripes*; 9 & 10, *P. ulmi*; 11, *P. glaber*; 12, *P. lucidus*.
distinctly pubescent in four species); hemelytra brown to fuscous, irregularly speckled with translucent, pale regions (but unicolorous in six species); hind femur equal to or longer than labium; parameres rather symmetrical (except asymmetrical in *pisolithus*); vesica variable, composed of three to six lobes or sclerites; phallotheca with highly modified apically; female genitalia with many unique structures (see ‘Morphology and terminology of the genitalia’ part).

**Redescription**
Body oblong-oval, size moderate to large, length 6–9 mm.

**Coloration.** Dorsal surface shining, generally dark brown to fuscous; hemelytra distinctly speckled with irregular, pale spots in many species; cuneus infuscate, usually with pale basal margin.

**Surface and vestiture.** Frons with several rows of dark, transverse lateral striae. Pronotum with sparsely distributed, fine, shallow punctures medially and coarse, larger punctures laterally, usually glabrous, with sparsely distributed, short setae; calli impunctate, weakly shagreened, not strongly margined posteriorly; mesoscutum shining or shagreened, with sparse, silvery, short vestiture; scutellum shallowly and transversely rugose, usually subglabrous; thoracic pleura widely shagreened or granulate. Hemelytra usually with uniformly distributed, simple vestiture. Tibiae with prominent, brown spines.

**Structure.** Head oblique; eyes contiguous to pronotal collar; vertex usually with shallow, longitudinal medial sulcation; basal half to two thirds of clypeus produced, sometimes divided by transverse medial suture, resulting in produced, basal region and rather flat, apical region. Antennae relatively short; segment I longer than IV; segment II slightly incrassate toward apex, subequal to or less than twice as long as III. Labium reaching hind coxa, about as long as or longer than hind femur. Pronotum narrowly carinate along lateral margin; collar narrow, about as broad as or narrower than base of antennal segment II; scutellum slightly tumid; cuneus about twice as long as width. Legs rather short.

**Male genitalia.** Parameres rather symmetrical in dorsal aspect, furnished with long sensory setae; right paramere with developed hypophysis. Apical part of phallotheca highly modified, with peculiar tubercles and/or processes. Vesica composed of 3–6 homologous, sclerotized and/or membranous lobes (AS, GS, LL, LS, VL and VS).

**Female genitalia.** More or less asymmetrical in general shape. Combined structure of common oviduct and roof of genital chamber partly or sometimes completely sclerotized, laterally or sometimes perim-uter surrounded by sclerotization (SPGC), always with paired, or unpaired inner lateral projections (MPGC). Sclerotized rings (SR) separated from each other; posterior wall of bursa copulatrix with bilobate, spinulate, asymmetrical dorsal structure (DS); interramal sclerite (IRS) divided medially; lateral lobes (LLB) sometimes developed.

**Distribution**
Widely distributed in the eastern Palearctic and the Oriental regions; known from southern slopes of the Himalayas (N. India and Nepal), continental China, Russian Far East, Korea, Japan, Taiwan, Indochina (Thailand), and the Sundaland (Java and Sumatra). Ranging from cold temperate zone to mountain areas of subtropics and tropics.

**Biology** (Figs 5–12, 171–177)
The majority of *Philostephanus* species appears to inhabit deciduous trees. One generation per year is assumed for temperate species, but collection records suggest that some Taiwanese and Himalayan species have bivoltine life cycles. In Japan and the Russian Primorski Territory, breeding host plants were confirmed for four species, *ulmi* (*Ulmus* spp., Ulmaceae and *Salix* spp., Salicaceae), *glaber* (*Quercus mongolica* and *Q. acutissima*, Fagaceae), *rubripes* (*Quercus mongolica*, *Q. dentata*, *Salix* spp. and *Sorbus commixta*, Rosaceae) and *fulvus* (*Acer* sp., Aceraceae, *Juglans ailantifolia*, Juglandaceae and *Fagus* sp., Fagaceae). In spite of being found on certain deciduous trees, both adults and nymphs of *ulmi*, *rubripes* and *fulvus* were observed to have preyed on other insects in laboratory tests (Figs 5, 7, 8). *Philostephanus* species are considered predominantly predaceous.

During recent fieldwork in Langtang Himal carried out by TY, fifth instar immatures of two Nepalese species were also found from *Acer* sp. and an unidentified rosaceous broadleaf (Figs 173–177). They developed into adults after a few days when provided with a lepidopteran larva and mango fruit (Fig. 174). Unfortunately, since the emerged adults were preserved while teneral, we cannot confirm the accurate identities of the two species. Based on the external structures, a male shown in figs 173 and 174 is identical with *P. himalayicus* and a female (175–177) possibly fits *P. pilosus*.

All the species of *Philostephanus* are frequently attracted to light. Several species (e.g., *ulmi*, *ovalis*, *fulvus*) have been collected in good number by light traps rather than sweeping plants (Figs 12, 171 & 172). *Philostephanus* species appear more or less nocturnal.
Discussion
Originally Philostephanus did not seem to represent a monophyletic group based solely on the male genitalia because of the great interspecific variation exhibited in this character system. However, monophyly of the genus is strongly supported by apomorphic characters of the female genitalia i.e., the more or less asymmetrical general shape, developed dorsal region of the genital chamber usually accompanied by strong sclerotization, and presence of the inner process. Such remarkable asymmetry of the female genitalia has not been found in other genera of the Mirinae, but is known in the interramal lobes (‘K-structures’) of the Orthotylinae (Schuh 1974; Yasunaga 1999). Because all the species of Philostephanus and Arbolygus Kerzhner share these apomorphic characters we regard them as congeneric. On the other hand, two Chinese species described by Lu & Zheng (1998a), picinus and zhangi, do not have most of the above mentioned apomorphies, and must be accommodated in another genus. Also, an Indian species, elongatus Poppius, is excluded from Philostephanus as it does not have any of the above stated apomorphic characters.

Key to Philostephanus species
Due to considerable variation exhibited in coloration and size, accurate identification of several species, especially those appearing after couplet 11, is not always satisfactory with this key, because some of the taxa are currently represented by just the holotype only or a few specimens. Examination of the genitalia is essential to unequivocally identify difficult material.

1. Pronotum with uniformly distributed, silky pubescence ........................................ 2
   – Pronotum almost glabrous, or only with sparse, short setae ........................................ 5
2. Ventral surface of abdomen dark brown, with widely pale medial region ........ rubipes
   – Ventral surface of abdomen unicolorously brown, reddish brown or pale brown, or with small, dark spots ........................................ 3
3. Dorsal surface tingeled with red; setae on antennal segment II longer than basal diameter of segment ........ fulves
   – Dorsal surface black or brown, not tingeled with red; setae on antennal segment II apparently shorter than diameter of segment ... 4
4. Body slender, subparallel-sided; dorsal surface generally brown; corium and clavus speckled with pale, semitransparent portions, partly with sericeous, reclining pubescence ....................................... pilosus
   – Body ovoid, rumin; dorsal surface generally fuscous; corium and clavus unicolorously blackish brown, not speckled, only with simple, brown setae ................... tibialis
5. Hemelytra almost glabrous, or only with very sparse and short setae ................................ 6
   – Hemelytra distinctly pubescent or pilose .... 9
6. Corium and clavus almost unicolorously fuscous, not speckled ........................................ glaber
   – Corium and clavus speckled with pale or semitransparent portions .................................... 7
7. Pronotum widely fuscous, usually with a pale, short, medial posterior stripe .......... vitaliter
   – Pronotum widely pale laterally, without such medial stripe ........................................ 8
8. Antennal segment III longer than width of head including eyes; Sumatra Island .... poppii
   – Antennal segment III shorter than width of head including eyes; continental China and Nepal ........................................ difficultis
9. Hemelytra almost unicolorously brown or fuscous, not speckled ................................. 10
   – Hemelytra distinctly speckled with pale or semitransparent portions ............................. 11
10. Hind femur as long as or shorter than basal width of pronotum; Japan proper ....... lucidus
    – Hind femur longer than basal width of pronotum; Taiwan ........................................ ovalis
11. Scutellum dark brown, with widely pale lateral margins continuing to pale apex; Java ........................................ variegatus
    – Pale corner spots of scutellum small, separated each other .......................................... 12
12. Labium short, slightly exceeding apex of metacoxa ......................... pronotalis
    – Labium long, reaching or slightly exceeding apex of metacoxa .................................... 13
13. Scutellum distinctly pubescent ........... ulmi
    – Scutellum almost glabrous, or only with sparsely distributed, short setae ............... 14
14. Extreme base (knee) of hind tibia pale brown ................................................... castaneus
    – Base of hind tibia darkened ........................................ nepalensis
15. Labium pale brown, with darkened apical part of segment IV ......................... 16
    – Labium unicolorously brown .................... nepalensis
16. Labium almost equal in length to hind femur ................................................... longustus
    – Labium longer than hind femur .................. 17
17. Corner spots of scutellum usually pale green; procoxa with a single, dark spot at extreme base ........................................ 18
    – Corner spots of scutellum not tingeled with green; procoxa with 2 dark spots at base ... 19

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18. Pronotum without paler basal margin …
   – Pronotum with pale basal margin …
   ................................…………. ailaensis
19. Body very small, with total length less than
   5 mm ................................. sakuraii, male
   – Body larger, more than 6 mm ………. 20
20. Profemur usually with at least 3 clear, dark
   annulations or bands …………………. 21
   – Profemur pale, or only with obscure, partly
     interrupted annulations ………………. 22
21. Antennal segment II as long as, or longer
   than 2x of head width including eyes;
   Taiwan ................................. taiwanensis
   – Antennal segment II shorter than 2x of head
     width including eyes; continental China
     and Nepal, or slopes of the Himalayas ……
   .............................................. himalayicus
22. Posterior margin of pronotum fuscous medi-
   ally ................................. renae
   – Posterior margin of pronotum narrowly but
     continuously pale ……………………. 23
23. Montane areas of Taiwan ........................ monticola
   – Hainan Island of China ........................ wuzhiensis

Figs 13–18. Philostephanus species. – 13, P. ailaensis; 14, P. castaneus; 15, P. difficilis; 16, P. himalayicus; 17, P. monticola; 18, P. nepalensis.
**Philostephanus ailaoensis** (Lu & Zheng)

**comb. n.**

Figs 13, 25–30, 171–172


*Arbolygus ailaoensis*, Kerzhner & Josifov 1999: 69 (cat.).

**Diagnosis**

Recognized by the relatively small size, generally brown dorsum, pale green antennal segment I, lateral parts of the pronotum and corners of the scutellum (fading to pale brown in old specimens), rather simple form of the male vesica and the female dorsal sac, and slender dorsal structure and interramal sclerite.

**Redescription**

Body elongate oval, relatively small.

**Coloration.** Dorsal surface generally shining brown; head pale brown, tinged with green; vertex darkened medially; frons with 3–4 obscure striae and lateral brown bands; maxillary plate and apex of clypeus brown or dark brown. Antenna dark brown; segment I pale green; basal quarter to half of segment II and bases of III and IV pale brown. Labium pale
brown; apical half of segment IV darkened. Pronotum shining chestnut brown, widely pale green laterally and sometimes posteriorly; mesoscutum pale brown or brown, shining, with dark spots medially and laterally; scutellum shining dark brown, with pale green corners that are sometimes enlarged and fused with one another; thoracic pleura widely pale brown, somewhat tinged with green, partly darkened. Hemelytra shining brown, irregularly speckled with weakly sclerotized, pale brown portions, basal part and apex of cuneus somewhat paler; membrane pale grayish brown. Leg pale brown, partly tinged with green; femora each with 3–4 dark, dorsal annulations; hind femur with dark spots ventrally; each tibiae with 3–4 obscure, irregular annulations. Abdomen pale brown; ventral surface usually with pair of dark stripes laterally.

**Surface and vestiture.** Vertex with medial sulcation; frons weakly striolate. Dorsum with uniformly distributed silky vestiture on hemelytra; head shining; pronotum with sparsely distributed, silky, minute vestiture; scutellum with vestiture of several, short, silky setae; hemelytra shallowly and irregularly puncate, uniformly clothed with suberect, silky vestiture;
tibial spines pale reddish brown.

**Male genitalia.** Figs 25–27. Vesica with rather simple and widely membranous but full set of AS+GS+LL+LS+VL+VS; AS apically widened; LS short, slender; apical part of phallotheca simple, only with narrow fin-like process.

**Female genitalia.** Figs 28–30. DOS almost membranous, lacking noticeable sclerotized region; MPGC small, pointed, spinulate; DS weak; IRL remarkably narrowed, very slender.

**Dimensions.** $\delta / \varphi$: Body length 5.8–6.5/ 6.6–7.5; head width including eyes 1.04–1.08/ 1.08–1.16; vertex width 0.25–0.27/ 0.33–0.39; length of antennal segments I–IV: 0.79–0.80/ 0.76–0.87, 1.92–2.04/ 1.82–1.92, 0.98–1.01/ 1.00–1.16, 0.48–0.52/ 0.52–0.56; labium reaching apex of metacoxa, length 2.40/ 2.42–2.45; median pronotal length including collar 1.10–1.16/ 1.24–1.40; basal pronotal width 2.20–2.43/ 2.20–2.43; width across hemelytra 2.10–2.28/ 2.52–2.67; length of hind femur, tibia and tarsus: 2.20–2.28/ 2.40–2.64, 3.24–3.36/ 3.50–3.70, 0.72–0.80/ 0.81–0.84; length of hind tarsomeres I–III: 0.22–0.24/ 0.22–0.24, 0.31–0.34/ 0.30–0.38, 0.32–0.40/ 0.38–0.42.

**Distribution**
China (Yunnan Prov.), northern India (Sikkim), Nepal.

**Discussion**
This species was described from a male specimen from Yunnan, China. We examined the holotype but not the genitalia, which is kept separately. Additional specimens we identified as *ailaoensis* from northern India and Nepal with rather simple vesicae fit the illustrations of Lu & Zheng (1998a).

**Material examined.** China: 1 $\delta$, Mt. Ailao, Jingdong, Yunnan Prov., light trap, 4.x.1984, L.-y. Zheng (holotype, DBNU). India: 12 $\varphi$, Choka 3,050 m, W. Sikkim, light trap, 13.ix.1983, M. Tomokuni (NSMT); 1 $\varphi$, same data, except for date 23.ix.1983 (NSMT). Nepal: 5 $\varphi$ 5 $\delta$, 27°58′N, 85°00′E, 11,100 ft, without detailed locality, 31.v.–27.vi.1967, Can. Nepal Exped. (CNC); 1 $\delta$ 1 $\varphi$, Langtang Himal, Dhunche 1,950 m, at light, 8–9.vi.2006, T. Yasunaga (NMTU, YCN).

**Philostephanus castaneus** sp. n.

**Type material.** Holotype $\delta$, Nepal, 11,100 ft, 27°58′N, 85°00′E, without further locality name [the locality close to Dhunche of Rasuwa District], 27.vi.1967, Can. Nepal Exped. (CNC). Paratypes: Nepal: 5 $\delta$ 5 $\varphi$, same data as for holotype except for date, 25–27.vi.1967 (CNC); 1 $\delta$ 9 $\varphi$, Pulchauki [Mt. Pulchok], Ktmnd. [= Lalitpur, Kathmandu Valley], 5–6.vii.1967, Can. Nepal Exped. (CNC), China: 1 $\varphi$, Wei Chou 65 mi, NW Chengtu, 5,800 ft, Sichuan, vii. 1933, D. C. Graham (USNM).

**Diagnosis**
Recognized by the relatively small size, brownish general coloration with pale antennal segment I and extreme base of the hind femur, and structures of the genitalia, especially, the anteriorly situated inner lateral projections which are unique to this new species.

**Description**
Body elongate oval, subparallel-sided, relatively small in size.

**Coloration.** Dorsal surface generally brown; head pale brown; vertex somewhat darkened medially, frons with 6–7 rows of paired, brown striae; clypeus, mandibular and maxillary plates partly darkened. Antennae dark brown; segment I pale brown; segment II pale at basal 1/4–1/2, sometimes with darkened base; bases of segments III and IV pale brown. Labium pale brown, apical 1/2–2/3 of segment IV darker. Pronotum shining brown, with pale posterior medial part and posterior margin; calli dark brown, with pair of yellowish brown, small spots contiguous to yellowish brown collar; mesoscutum and scutellum shining brown, each angle of scutellum yellowish brown; pleura widely grayish brown; inner part of ostiolar peritreme yellowish brown. Hemelytra brown, speckled with pale, semitransparent portions; cuneus brown, with pale, semitransparent anterior margin and posterior apex; membrane pale grayish brown, semitransparent, with pale veins. Coxae pale brown, each with narrowly darkened base; legs pale brown; hind femur with three partly interrupted, brown bands at base, middle and apex; tibiae with 3–4 weak, obscure annulations; apical halves of tarsomeres III dark brown. Abdomen dark brown; ventral medial part widely speckled with pale portions.

**Surface and vestiture.** Dorsal surface shining with uniformly distributed, silky, subercet vestiture. Head with sparsely distributed, short, silky setae; vertex with narrow, weak, medial longitudinal sulcation; frons striolate. Pronotum sparsely and shallowly punctate with sparsely distributed, minute, erect setae; mesoscutum and scutellum with sparsely distributed, silky, subercet setae. Tibial spines pale reddish brown.

**Male genitalia.** Figs 31–33. Vesica with AS+GS+LL+LS+VS, lacking VL; as elongate, tapered and recurved apically; GS slender, very thin, transparent; LS sword-like; VS long, horn-like, pointed at apex; phallotheca with strong, hooked, apical projection.

**Female genitalia.** Figs 34–36. SR narrow, thin-rimmed;
DOS weakly sclerotized, with slender, semi-circularly curved MSGC above MPGC; MPGC located very anteriorly; DS weak, not strongly projected.

**Dimensions.** \( \delta / \varphi \): Body length 6.0–6.4/ 6.5–6.9; head width including eyes 1.10–1.13/ 1.10–1.13; vertex width 0.26–0.30/ 0.33–0.36; length of antennal segments I-IV: 0.79–0.84/ 0.72–0.77, 2.16–2.26/ 1.84–1.92, 1.00–1.08/ 0.96–0.99, 0.48–0.52/ 0.45–0.48; labium reaching apex of hind coxa, length 2.40–2.48/ 2.52–2.55; medial pronotal length including collar 1.17–1.20/ 1.26–1.32; basal pronotal width 1.92–1.95/ 2.11–2.19; width across hemelytra 2.23–2.28/ 2.40–2.64; length of hind femur, tibia and tarsus: 2.28–2.40/ 2.23–2.33, 3.55–3.60/ 3.24–3.29, 0.86–0.92/ 0.81–0.87; length of hind tarsomeres I-III: 0.24–0.27/ 0.25–0.27, 0.39–0.42/ 0.34–0.36, 0.40–0.45/ 0.39–0.41.

**Figs 31–36.** Male (31–33) and female (34–36) genitalia of *Philostephanus castaneus*. – 31, left paramere; 32, right paramere; 33, vesica; 34, sclerotized ring; 35, genital chamber; 36, posterior wall.
**Etymology**
From Latin, *castaneus*, referred to the brown general coloration; an adjective.

**Distribution**
China (Sichuan Prov.), Nepal.

*Philostephanus difficilis* (Lu and Zheng) *comb. n.*
Figs 15, 37–44, 256–261


**Diagnosis**
Recognized by the almost glabrous dorsum, wide pale lateral and posterior regions of the pronotum, rather shining, less shagreened mesoscutum, and subglabrous hemelytra. It is distinguished from the closely allied *vitaliter* by the wide pale lateral parts of the pronotum and different genitalic structure.

**Redescription**
Body elongate oval.

**Coloration.** Dorsal surface shining dark brown. Head pale brown; vertex darkened medially and along weak, basal transverse carina; frons with several rows of dark, transverse bands laterally; mandibular and maxillary plates and clypeus partly darkened. Antenna dark brown; segment I, basal quarter to half

Figs 37–41. Male genitalia of *Philostephanus difficilis*. – 37–38, left paramere; 39, right paramere; 40, vesica; 41, phallotheca. Scales 0.2 mm.
of II, and extreme bases of III and IV pale brown; segment I somewhat darkened on inward surface, with basal dark ring. Labium pale brown, medial part of segment I, base and apex of II and/or base of III sometimes darkened; apical part of segment IV widely dark brown. Pronotum bicolorous, shining, dark brown medially, and widely pale brown laterally and posteriorly; calli shining dark brown; collar pale brown; mesoscutum shining dark brown, somewhat paler laterally; scutellum shining dark brown, with yellow corners; thoracic pleura widely somber grayish brown, partly yellowish brown; ostiolar peritreme widely or partly darkened. Hemelytra shining dark brown, irregularly speckled with many, weakly sclerotized, pale portions; cuneus dark brown, with pale basal margin and apex; membrane pale grayish brown, partly semitransparent, with partly darkened veins. Leg pale brown; femora with many dark markings and spots; apical 2 dark rings of hind femur indistinct; each tibia with 3 or 4, irregular, dark annulations; tarsomeres I and III darkened. Abdomen dark brown, irregularly speckled with pale brown portions.

**Surface and vestiture.** Subglabrous, only with very sparsely distributed, minute setae. Head somewhat granulate, almost glabrous; vertex with weak, basal transverse carina and shallow, longitudinal medial sulcation; frons striolate. Antenna segment I sparse, suberect setae. Labium reaching apex of metacoxa. Pronotum finely and sparsely punctate medi ally, and coarsely and rather densely punctate near lateral margin, with sparsely distributed, very short setae; calli impunctate; mesoscutum with sparse, short, silvery pubescence; scutellum narrowly and transversely rugose; thoracic pleura shagreened. Hemelytra glabrous, shallowly and rather densely punctate; cuneus
with sparse, short, suberect setae.

**Male genitalia.** Figs 37–41. Genital segment and left paramere densely furnished with conspicuous, long, erect, somewhat woven setae; hypophysis of right paramere broadened. Vesica with fully set of AS+GS+LL+LS+VL+VS; as slender, basally twisted; LS thin, wide; VL long, horn-like.

**Female genitalia.** Figs 42–44. DOS with wide msgc; mpgc unpaired, lacking left one; DS wide, with membranous base; LLB smoothly extended.

**Dimensions.** \( \delta / \Omega \): Body length 7.2–8.0/ 6.7–7.2; head width including eyes 1.17–1.20/ 1.17–1.20; vertex width 0.33–0.34/ 0.38–0.39; length of antennal segments I–IV: 0.79–0.84/ 0.72–0.77; 2.08–2.12/ 1.82–1.83, 1.00–1.08/ 0.98–1.04, 0.52–0.56/ 0.54–0.56; labium reaching apex of hind coxa, length 2.59–2.62/ 2.61–2.64; medial pronotal length including collar 1.36–1.44/ 1.39–1.44; basal pronotal width 2.44–2.57/ 2.44–2.60; width across hemelytra 2.90–3.08/ 2.73–2.91; length of hind femur, tibia and tarsus: 2.52–2.57/ 2.47–2.72, 3.60–3.80/ 3.52–3.68, 0.86–0.89/ 0.86–0.89; length of hind tarsomeres I–III: 0.24–0.27/ 0.24–0.26, 0.36–0.45/ 0.38–0.42, 0.38–0.46/ 0.40–0.42.

**Material examined.** 43 specimens collected between May 30 and Oct. 5 from the following localities: China: Sichuan Prov.: Mt. Emei (1 \( \delta \) \( \Omega \) paratypes, DBNU); Mt. Emei, 11,000 ft (USNM, 1 \( \delta \) det. as *Philostephanus vitaliter* by Hsiao). Nepal: Nangbug, 2,550 m, Solukhumbu Dist (NSMT); Nangbug, 2,600 m (NSMT); Narayaki, Mahabharat Lekh Daman, 2,500 m alt. (SEHU); Katmandu, Pulchauki [Pulchoki of Godawari Valley], 8,000 ft (CNC); without locality name, 27°58’N, 85°00’E, 11,100 ft (CNC).

**Philostephanus fulvus** (Javoklev) comb. n.

Figs 5, 6, 45–52

*Calocoris fulvus* Javoklev, 1882: 170 (n. sp.).

*Adelphocoris fulvus* Reuter 2896: 226 (n. comb., desc.);

Carvalho 1959: 15 (cat.); Kulik 1965: 43 (list).

*Lygocoris (Arbolygus) fulvus*; Kerzhner 1979: 25 (n. comb., desc.); Kerzhner 1988a: 810 (key); Schuh 1995: 797 (cat.).

*Arbolygus fulvus*; Miyamoto 1987: 637 (n. comb., note);

Miyamoto & Yasunaga 1989: 159 (list); Yasunaga et al. 1993: 156, fig. 49 (diag.); Todo & Yasunaga 1996: 42 (list); Kerzhner & Josifov 1999: 69 (cat.); Yasunaga 2001: 223, fig. 220 (diag.).

**Diagnosis**

Easily recognized by the generally reddish brown body, densely pubescent dorsum, and densely distributed, upright setae on the antenna and leg. Based on the similarity of the dorsal vestiture and genital structure, this is a sister species of *rubripes*, from which *fulvus* is easily distinguished by the general dorsal coloration and the longer setae on the antennae and legs. The fifth instar of *fulvus* is recognized by the dark reddish brown body and the two yellowish brown annulations on each tibia (Fig. 6).

**Redescription**

Body suboval to elongate oval, relatively large.

**Coloration.** Dorsal surface generally tinged with red, reddish brown to dark chestnut brown, usually paler in female. Head pale reddish brown to chestnut brown, shining, sometimes darkened medially; frons with several rows of dark reddish brown, transverse bands on each side; mandibular and maxillary plates and clypeus sometimes partly darkened. Antenna dark reddish brown; segment I and basal 1/4–1/3 of II sometimes paler reddish brown; bases of segments III and IV yellowish brown. Labium pale brown; apical half of segment IV dark brown. Pronotum variable in color, reddish brown to dark chestnut brown, shining; calli more or less darkened; collateral pale brown or reddish brown; mesoscutum and scutellum varying from reddish brown to dark chestnut brown, shining; scutelum with yellow apex; thoracic pleurites widely reddish brown. Hemelytra varying from pale reddish brown to dark chestnut brown, shining; cuneus usually pale reddish brown, with pale, semitransparent basal margin; membrane pale grayish brown. Leg pale reddish brown; apical parts of tarsomeres III dark brown; Ventral surface of abdomen widely reddish brown, somewhat paler medially.

**Surface and vestiture.** Dorsum densely clothed with silky, suberect vestiture. Head with sparse, silky, short vestiture; vertex with shallow, longitudinal medial sulcation and an indistinct, transverse basal carina; frons weakly striolate. Antenna with uniformly distributed pale, suberect or erect setae. Pronotum uniformly and rather finely punctate, with uniformly distributed, suberect, silky vestiture; mesoscutum and scutellum with uniformly distributed, suberect, silky vestiture; scutellum finely punctate and roughly rugose. Hemelytra shallowly and coarsely punctate, densely covered with suberect, silky vestiture. Femur and tibia with densely distributed pale, erect setae; tibial setae as long as or longer than pale brown spines.

**Male genitalia.** Figs 45–48. Genital segment with brown, erect setae of moderate length. Vesica strongly expanded laterally when erected, with AS+GS+LL+LS+VL+VS; AS and GS developed; LS spinulate, membranous lobe.

**Female genitalia.** Figs 49–52. SR thick-rimmed, large and ovoid; DOS strongly projected and bending right; MSGC rather tumid, extending and
surrounding contiguous OL; MPGC long, spinulate, curved apically. PWB longer than wide; LLB with spinulate process anteriorly; IRL wide, asymmetrical, left one larger than right; DS twisted, highly asymmetrical.

**Dimensions.** ♂ / ♀: Body length 7.2–7.7 / 7.7–8.5; head width including eyes 1.22–1.29 / 1.27–1.37; vertex width 0.40–0.41 / 0.44–0.47; length of antennal segments I-IV: 0.86–0.93 / 0.88–0.96, 2.16–2.45 / 2.16–2.45, 1.20–1.32 / 1.22–1.23, 0.76–0.92 / 0.76–0.87; labium reaching apex of hind cox, length 2.88–3.00 / 3.04–3.08; medial pronotal length including collar 1.41–1.52 / 1.51–1.71; basal pronotal width 2.37–2.48 / 2.52–2.91; width across hemelytra 2.90–3.10 / 3.12–3.53; length of hind femur, tibia and tarsus: 2.64–2.76 / 2.64–2.69, 3.55–3.84 / 3.60–4.13, 0.78–0.82 / 0.82–0.87; length of hind tarsomeres I-III: 0.24–0.26 / 0.24–0.30, 0.34–0.36 / 0.36–0.38, 0.36–0.39 / 0.39–0.47.

**Distribution**
Japan (Hokkaido, Honshu, Shikoku, Kyushu), S. Kuril Isls., Russian Far East (Primorskij Kraj).

**Discussion**
This mirid is frequently attracted to light. The confirmed breeding hosts are *Juglans ailantifolia* (Juglandaceae) in the Russian Primorskij Territory and *Acer* sp. (Aceraceae) and *Fagus* sp. (Fagaceae) in Japan.

**Material examined.** More than 400 specimens (IC, MC, NSMT, ZMAS, YCN) collected between June 19 and Aug. 30 from the following localities: Japan: Hokkaido: Hokkaido Univ. Exp. Forest, Takaoka, Tomakomai

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![Figures 45-48](image-url)

**Philostephanus glaber** (Kerzhner) comb. n.

Figs 49–52. Female genitalia of *Philostephanus fulvus*. – 49–50, genital chamber and adjunct structures; 51, sclerotized ring; 52, posterior wall. Scales 0.5 mm.

Lygocoris (*Arbolygus*) glaber Kerzhner, 1988a: 810 (key, preceded original description); Kerzhner 1988b: 30 (n. sp.). Lectotype ♀: Russia: Primorskiy Kraj; Bitiaž, 15 km south of Sukhanovki, Khasanskiy Dist., 2–13.vii.1982, I. M. Kerzhner (ZMAS) [examined].

Arbolygus glaber; Miyamoto & Yasunaga 1989: 159 (list); Lu & Zheng 1998a: 80–81 (list, key); Kerzhner & Josifov 1999: 69 (cat.); Yasunaga 2001: 223, fig. 221 (diag.).

**Diagnosis**
Recognized by the oval and rather tumid body, fuscos, shining, almost glabrous dorsum, and unicolorous dark, unmottled hemelytra.

**Redescription**
Body oval, slightly elongate in male.

**Coloration.** Dorsal surface shining dark brown. Head pale brown or brown, partly darkened; frons with several rows of dark brown, transverse bands on each side; mandibular and maxillary plates and clypeus partly darkened. Antennae dark brown; segment I and basal 1/3 of II pale brown or brown; bases of segment III and IV yellowish brown. Labium shining brown; apical part of segment IV darkened. Pronotum shining blackish brown, with narrowly yellowish brown posterior margin; collar yellowish brown; mesoscutum and scutellum shining dark.

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Figs 53–56. Male genitalia of Philostephanus glaber. – 53, right paramere; 54, left paramere; 55–56, vesica. Scales 0.2 mm.
brown; scutellum with yellow apex; thoracic pleurites widely darkened with grayish brown ostiolar peritreme. Hemelytra shining dark brown; base of corium narrowly yellowish brown; cuneus with pale brown anterior margin and apex; membrane somber grayish brown. Leg pale brown; hind femur with two obscure rings near apex and at middle; tibiae in fresh specimens sanguineous; apical parts of tarsomeres III darkened. Abdomen dark brown; ventral medial part sometimes widely pale brown or brown. Surface and vestiture: Dorsal surface almost glabrous.

Head almost glabrous; longitudinal medial sulcus on vertex shallow and indistinct; frons striolate. Pronotum shallowly and coarsely punctate, very sparsely clothed with simple, minute setae; mesoscutum and scutellum with very sparse, minute vestiture; scutellum narrowly and transversely rugose; thoracic pleurites pruinose. Hemelytra shallowly and coarsely punctate, with sparsely distributed, simple, minute setae; cuneus with sparse, simple, short setae apically. Tibial spines brown.

**Male genitalia.** Figs 53–56. Genital segment with
Dorsal surface shining dark brown. / Quercus dentata

Distribution
Japan (Hokkaido, Honshu, Kyushu), Russian Far East (S. Primorski Kraj); Korea.

Discussion
This species is easily recognized by the shining, black, glabrous hemelytra. Other Philostephanus species occurring in the Far East are usually furnished with noticeable vestiture on the hemelytra. Kerzhner (1988a) recognized Quercus dentata (Fagaceae) as the host plant in the Russian Primorski Territory, and Josifov (1992) reported Q. acutisima in Korea. Host association of Pl. glaber appears to be restricted to the deciduous Quercus genus.


Philostephanus himalayicus (Lu & Zheng) comb. n.

Figs 16, 61–68
Arbolygus himalayicus Lu & Zheng 1998a: 86 (n. sp.);
Kerzhner & Josifov 1999: 69 (cat.).

Diagnosis
Recognized by the elongate form of the male, shining, fuscous, almost impunctate and glabrous pronotum sometimes accompanied with clearly yellowish brown lateral margins, uniformly pubescent hemelytra, and highly sclerotized vesica and form of the female genitalia.

Redescription
Body elongate oval, subparallel-sided (♂). Coloration. Dorsal surface shining dark brown. Head yellowish brown; vertex darkened medially; frons with several rows of dark brown, transverse bands on each side; mandibular and maxillary plates and clypeus partly or widely dark brown. Antenna dark brown; dorsal part of segment I, subbasal part of II, and bases of III and IV pale brown; labium pale brown; lateral part of segment I and base of II somewhat darkened; apical part of segment IV dark reddish brown. Pronotum shining blackish brown, sometimes yellowish brown laterally; mesoscutum dark brown; scutellum shining dark brown, with whitish yellow corners; thoracic pleurites widely grayish brown, ostiolar peritreme widely dark. Hemelytra shining dark chestnut brown, speckled with pale, weakly sclerotized portions mainly on clavus and basal 2/3 of corium; cuneus with yellowish brown basal margin and apex; membrane pale grayish brown, partly and slightly darkened. Leg yellowish brown; each of femora and tibiae with 3–4 dark brown annulations; hind femur with several dark spots ventrally; apical parts of tarsomeres III darkened. Abdomen dark chestnut brown, not distinctly speckled; ventral medial part and spiracles yellowish brown.

Surface and vestiture. Dorsal surface with uniformly distributed, simple vestiture on hemelytra. Head weakly granulate, with very sparse, short, silky vestiture; vertex with shallow, longitudinal medial sulcation and indistinct basal transverse carina; frons striolate. Antennal segment I with sparse, suberect setae. Pronotum almost impunctate and glabrous,
Figs 61–68. Male (61–64) and female (65–68) of *Philostephanus himalayicus*. – 61, right paramere; 62, left paramere; 63, vesica; 64, phallotheca; 65, sclerotized ring; 66–67, genital chamber and adjunct structures. Scales 0.2 mm.
only with very sparse, minute setae; mesoscutum rather shagreened, with several, short, silvery vestiture; scutellum shallowly and transversely rugose, with few, very short vestiture; thoracic pleurites shagreened. Hemelytra uniformly clothed with silky, reclining vestiture. Tibial spines brown.

**Male genitalia.** Figs 61–64. Genital segment and parameters furnished with long, erect setae. Vesica with a fully set of AS+GS+LL+LS+VL+VS; AS short, slender; GS enlarged, flattened; LL reduced, slender; LS and VS horn-like; VL wholly sclerotized, elongate; phallotheca with pointed process apically.

**Female genitalia.** Figs 65–68. Heavily sclerotized; DOS strongly expanded dorsally and posteriorly, with developed MSGC; SG arising near anterior base of DOS; OL contiguous, situated laterally; MPGC short, brunt-tipped. DS small; IRS rounded posteriorly; LLB narrow.

**Dimensions.** $\delta / \varphi$: Body length 7.1–7.3/ 7.2–7.3; head width including eyes 1.12–1.16/ 1.12–1.16; vertex width 0.28–0.30 / 0.36–0.39; length of antennal segments I-IV: 0.84–0.87/ 0.76–0.87/ 2.12–2.19/ 1.89–1.97, 1.12–1.19/ 1.10–1.13, 0.60–0.63/ 0.67–0.69; labium reaching or slightly exceeding apex of hind cox, length 2.71–2.74/ 2.73–2.79; medial pronotal length including collar 1.27–1.37/ 1.36–1.40; basal pronotal width 2.18–2.38/ 2.42–2.46; width across hemelytra 2.76–2.81/ 2.90–2.91 length of hind femur, tibia and tarsus: 2.42–2.60/ 2.52–2.60, 3.57–3.82/ 3.67–3.77, 0.84–0.89/ 0.84–0.87; length of hind tarsomeres I-III: 0.27–0.29/ 0.24, 0.36–0.38/ 0.36–0.38, 0.43–0.47/ 0.39–0.47.

**Distribution**
China (Xizang Autonomous Reg., Yunnan Prov.), Nepal.

**Discussion**
This species, *P. pronotalis* and *P. taiwanensis* are considered to constitute a monophyletic group because all of them have strongly produced, horn-like projections of the female lateral lobes that are regarded synapomorphic. On the other hand, the highly sclerotized vesica is unique to *himalayicus*.

**Material examined.** China: 1 $\delta$, Xizang Autonomous Region (Tibet), Yadong Country, light trap, 2.viii.1983, Ciren (paratype, DBNU); 1 $\varphi$, Bomi, Y’ong, 2.300 m, 28.vii.1983, Han (paratype, DBNU). Nepal: 2 $\delta$ $\delta$, Jilia Chaur, 2.700 m alt., Jumla Dist., 29.ix.1981, M. Tomokuni (NSMT); 1 $\varphi$, same locality and date. M. Sakai (NSMT); 1 $\delta$ $\delta$, Rara Lake, 3.000 m alt., Mugu Dist., 26.ix.1981, M. Tomokuni (NSMT); 1 $\delta$, Sete 2.600 m, Solukhnmbu Dist., light trap, 12.x.1979, M. Tomokuni (NSMT); 1 $\varphi$, Changma 2.200 m, Ramechhap Dist., 13.x.1979, M. Tomokuni (NSMT); 1 $\varphi$, Janakpur, Rolwaling Valley, Dongo Kharka-Beding, 2.800–3.000 m alt., 22–23.viii.1983, Hokkaido Univ. Exp. (SEHU).

**Philostephanus longustus** (Lu & Zheng) comb. n.
Figs 69–75


**Diagnosis**
Recognized by the slender and nearly parallel-sided body, long hemelytra, and long hind femur that is subequal in length to the labium.

**Redescription**
Body elongate, relatively slender, nearly parallel-sided; eyes large; vertex narrow.

**Coloration.** Dorsal surface dark brown, shining. Head dark brown. Antenna dark brown; segment I slightly paler; basal 1/5–1/2 of segment II pale brown except for dark base; extreme base of segments III and IV pale brown. Labium pale brown, apical half of segment IV darkened. Pronotum almost unicolorously dark brown, shining, with narrowly pale brown posterior margin and yellowish brown collar; calli with pair of small, yellowish brown spots contiguous to collar; mesoscutum dark brown, pale laterally; scutellum dark brown, with pale brown lateral margin and allow-shaped yellow apex; pleura widely dark brown; propleuron yellowish brown except for dark ventral margin; ostiolar peritreme widely darkened. Hemelytra pale brown, semitransparent, speckled with irregular, brown spots; cuneus dark brown, with pale anterior margin and reddish brown apex; membrane pale grayish brown, semitransparent. Coxae pale brown, with narrowly darkened bases; legs dark brown; femora with several, weak, pale annulations; basal halves of tibiae pale; tarsi brown; tarsomere III dark brown.

**Surface and vestiture.** Dorsal surface with uniformly distributed, silky, suberect vestiture on hemelytra. Head with sparse, short, silky setae; vertex narrow, with weak, longitudinal, medial sulcation; frons weakly striolate. Pronotum shallowly and sparsely punctate, almost glabrous; mesoscutum with sparse, short, silky vestiture. Tibial spines pale.

**Male genitalia.** Figs 69–72. Vesica with AS+GS+LL+LS+VL+VS, lacking VL; AS short, pointed at apex; LL strongly spinulate; LS shortened, flat; VS horn-like, with toothed base; phallotheca with 3 small, pointed processes.

**Female genitalia.** Figs 73–75. SPGC continuous posteriorly; DOS with distinct, medial MSGC.
separating OL; MPGC rather short, pointed. LLB with thin extension dorsal to IRL.

**Dimensions.** ♂ / ♀: Body length 7.7/ 7.8; head width including eyes 1.13/ 1.11; vertex width 0.24/ 0.32; length of antennal segments I-IV: 0.96/ 0.88–0.89, 2.40 / 2.23–2.24, 1.20/ 1.20, ?/ 0.58. Labium exceeding apex of midcoxa but not reaching apex of hind coxal; length 2.64/ 2.64; medial pronotal length including collar 1.16/ 1.30; basal pronotal width 2.04/ 2.16; width across hemelytra 2.64/ 2.64; length of hind femur, tibia and tarsus: 2.64/ 2.64, 3.91/ 3.84, 0.91/ 0.84; length of hind tarsomeres I-III: 0.27–0.28/ 0.24, 0.39–0.40/ 0.36, 0.40–0.41/ 0.37–0.38.

**Distribution**
China (Hubei Prov.).


Figs 69–75. Male (69–72) and female (73–74) genitalia of *Philostephanus longustus*. – 69, right paramere; 70, left paramere; 71, vesica; 72, phallotheca; 73–74, genital chamber and adjunct structures; 75, posterior wall. Scales 0.2 mm.
Figs 76–79. Male genitalia of *Philostephanus lucidus*. – 76, right paramere; 77, left paramere; 78–79, vesica. Scales 0.2 mm for 76–77, 0.5 mm for 78–79.
**Philostephanus lucidus** sp. n.

Figs 12, 76–83

**Type material.** Holotype ♂: Japan, Mt. Shiraga, 1,400
m alt., Monobe Vil., Kochi Pref., Shikoku, 25.vii.1996, light trap, T. Yasunaga et al. (AMNH). **Paratypes:** Japan: Honshu: 1♂ 2♀, Futakuchi-keikokou, Akiu-machi, Miyagi
Pref., light trap, 12.vii.1985, K. Konishi et al. (YCN); 2♀, same locality, 29.viii.1979, K. Watanabe (NSMT); 1♂, Motoyu Spa, Shiobara, Tochigi Pref., 23.vi.2001, S. Sakurai (YCN); 1♀, Katsuki, Niigata Pref., 5.vii.1985, K. Konishi (YCN); 1♀, Sanmengawa Riv., Niigata Pref., 2.vii.1985, S. Nomura (YCN); 1♂, Mt. Mitumine, Oku-
Chichibu, Saitama Pref., 1.vii.1984, M. Hayashi et al.
(YCN); 3♂ 1♀, Sugadaira (1,330 m), Nagano Pref., 3 &
25.vii.1996, M. Hayashi et al. (YCN); 2♂ 2♀, Kakuma
Valley (1,000–1,200 m), 20. vii & 26.vii.1995, 3. vii &
25.vii.1996, M. Hayashi et al. (YCN); 1♀, Oshirakawa,
(YCN); 1♂ 2♀, same locality and date, Y. Sawada (YCN);
1♀, Sengataki, Karuisawa, Nagano Pref., 30.vii.1962,
R. Kano & K. Kaneko (NSMT); 1♂, Asama-Misuzu
L., 900 m alt., Hongo Vil., Nagano Pref., 9.vi.1991,
M. Tomokuni (NSMT); 2♂, Mt. Takao, Tokyo, 3.vii.1959,
T. Maenami (NIAS); 1♂, Mt. Katsuragi, Kishiwada C.,
Osaka Pref., 16.vii.1993, Y. Nakatani (YCN); 1♂, Ikeno-
kouchi, Tsutaga C., Fukui Pref., 27.vi.1993, O. Kishimoto
(YCN); 1♂, Mt. Hoki-daisen, Tottori Pref., 12.vii.1994,
K. Yoshizawa (YCN); 1♂, Osugi-dani, Mt. Oto-san, Hi-
gashimuro, Wakayama Pref., 1–4.vii.1978, M. Owada &
Diagnosis
Recognized by the suboval and rather tumid body, almost entirely shining fuscous dorsum, and unicolorously fuscous, distinctly pubescent and unspckled hemelytra. In Japan resembling the sympatric *P. glaber* (Kerzhner), but *P. lucidus* is easily distinguished from it by the pubescent and less shining hemelytra (see figs. 11 and 12).

Description
Body suboval, somewhat elongate in male.

Coloration. Dorsal surface almost entirely shining black. Head variable in color, usually widely dark brown, shining; frons with several rows of pale, transverse bands on each side; clypeus widely darkened. Antennae blackish brown; subbasal part of segment II sometimes pale; bases of segments III and IV yellow. Labium variable in color, pale brown to almost entirely darkened; apical half of segment IV darkened. Pronotum shining blackish brown; collar usually pale brown; mesoscutum and scutellum shining dark brown; scutellum with narrowly yellow apex; thoracic pleurites widely darkened, with brownish ostiolar peritreme. Hemelytra shining blackish brown, posterolateral tip of corium narrowly yellowish brown; anterior margin and posterior apex of cuneus usually narrowly yellow; membrane grayish brown, with partly darkened veins. Legs pale brown; fore and middle femora usually with 2–3 obscure annulations; hind femur dark brown, sometimes with pale apex and/or subapical part; fore and middle tibiae with several obscure annulations; basal half to 2/3 of hind tibia usually dark brown; tarsomeres III darkened. Abdomen almost unicolorously shining dark brown.

Surface and vestiture. Dorsal with uniformly distributed, simple setae on hemelytra. Head with very sparse, silky, short vestiture; vertex with narrow, longitudinal medial sulcation; frons striolate. Pronotum relatively tumid, shallowly and coarsely punctate, with sparsely distributed, pale, very short setae; calli shining, impunctate; mesoscutum and scutellum with sparse, short, silky vestiture; scutellum shallowly and transversely rugose. Hemelytra somewhat roughened, uniformly and densely clothed with simple, pale, suberect setae; tibial spines reddish brown.

Male genitalia. Figs 76–79. Vesica with AS+GS+LL+LS+VS, lacking VL; as apically flattened and rounded, fan-like; GS developed; LS and VS short, slender.

Female genitalia. Figs 80–83. SR small, thick-rimmed; DOS with hemispherical, widened MSGC; SPGC continuous posteriorly; MPGC curved, bifurcate apically. PWB with wide DS.

Dimensions. δ / ϕ: Body length 6.5–6.9 / 7.1–7.6; head width including eyes 1.12–1.19 / 1.17–1.19; vertex width 0.30–0.32 / 0.38–0.39; antennal length of segments I–IV: 0.86–0.89 / 0.84–0.96, 2.13–2.28 / 1.99–2.24, 1.03–1.18 / 0.96–1.20, 0.61–0.68 / 0.57–0.65; labium reaching apex of hind coxa, length 2.61–2.64 / 2.64–2.74; medial pronotal length including collar 1.22–1.37 / 1.34–1.49; basal pronotal width 2.16–2.38 / 2.47–2.60; width across hemelytra 2.71–2.76 / 2.83–3.08; length of hind femur, tibia and tarsus: 2.44–2.55 / 2.49–2.81, 3.36–3.58 / 3.36–3.77, 0.72–0.75 / 0.72–0.77; length of hind tarsomeres: 0.24–0.26 / 0.24–0.28, 0.31–0.35 / 0.34–0.36, 0.34–0.36 / 0.36–0.38.

Etymology
From Latin, *lucidus* (shining, bright), referred to the shining dorsum of this new species; an adjective.

Distribution
Japan (Honshu, Shikoku, Kyushu).

Discussion
Most specimens of this new species have been collected by light traps, and its ecology remains unclear. The highly black body may suggest that this mirid is nocturnal.

For phylogenetic position of this new species, see discussion of its assumed sister species, *P. ovalis*.

*Philostephanus monticola* sp. n.

Figs 17, 84–89

**Type material.** Holotype δ, Taiwan: Mt. Shi-Nan Shan, near Liu Kui, S. Taiwan, 2.ix.1986, K. Baba (AMNH). Paratypes: Taiwan: 3 δ 3 ϕ*, Mt. Taiping, Taipei Hsien, 25–28.v.x.1932, K. Sato (ELKU); 1 δ, Sungkan-Meifeng, Nantow Hsien, 25–26.v.1972, M. Sakai (NSMT); 1 ϕ, same data as for holotype (MC); 1 ϕ, Gaoxiang, 12–13.v.1989, S. Gotoh (YCN); 1 ϕ, Pulq, Taichung Hsien, 22.v.1989, S. Gotoh (YCN); 2 δ 2 ϕ*, Wuling Guest
Diagnosis
Recognized by the widely pale brown lateral and posterior parts of the pronotum with continuously pale brown posterior margin, large anterior yellow spots of the scutellum, and moderate length of the setae on the genital segment. This new species is very similar in general appearance to *P. pronotalis* (Zheng & Liu), from which it can be distinguished by the longer labium and different structure of the genitalia.

Description
Body elongate oval.

Coloration. Dorsal surface dark brown, shining. Head pale brown, shining; frons with several rows of dark, transverse bands on each side; maxillary plate


Figs 84–89. Male (84–86) and female (87–89) genitalia of *Philostephanus monticola*. – 84, right paramere; 85, left paramere; 86, vesica; 87, posterior wall; 88, sclerotized ring; 89, genital chamber and adjunct structures. Scales 0.2 mm.
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and apical part of clypeus darkened. Antenna dark brown; segment I pale brown, somewhat darkened at ventral surface and apex; basal 1/6 to half of segment II pale brown; bases of segments III and IV yellowish brown. Labium pale brown; apical part of segment IV darker. Pronotum shining dark brown, widely pale brown laterally and posteriorly, with continuously yellow posterior margin; mesoscutum shining chestnut brown; scutellum shining dark brown, with yellow corners; two yellow spots of anterior corner enlarged; thoracic pleurites somber yellow, with dark brown parts; ostiolar peritreme somewhat darkened laterally. Hemelytra dark brown, not strongly shining, speckled with weakly sclerotized, pale brown or brown portions, except on unicolorously fuscous posterior part of corium; cuneus dark brown, with yellowish brown basal margin and apex; membrane pale grayish brown, with yellow and partly darkened veins. Leg pale brown; fore and middle femora with 2–3 obscure annulations; hind femur with dark bands at extreme base, middle and apex; tibiae each with 3–4 obscure annulations; apical parts of tarsomeres III darker. Abdomen pale brown, with many dark brown markings and spots.

Surface and vestiture. Dorsal surface with dense vestiture on hemelytra. Vertex with shallow but wide, longitudinal medial sulcation; frons striolate. Pronotum shallowly and coarsely punctate, with very sparse, short, silky vestiture; mesoscutum with sparse, short, silky vestiture; scutellum shallowly and transversely rugose, with sparse, short, silky vestiture. Tibial spines reddish brown

Male genitalia. Figs 84–86. Genital segment densely furnished with erect setae of moderate length. Vesica with full set of AS+GS+LL+LS+VL+VS; AS and LS broad, tapered toward apex; GS wide and long, with triangular apex; LL and VL slender; VS long, slender.

Female genitalia. Figs 87–89. DOS with developed MSGC; MGC very developed basally. DS divided into two lobes.

Dimensions. δ / ♀: Body length 6.3–6.6 / 6.6–6.9; head width including eyes 1.12–1.13 / 1.10–1.18; vertex width 0.33–0.34 / 0.36–0.39; antennal length of segments I-IV: 0.76–0.84 / 0.79–0.80, 2.04–2.20 / 1.98–2.14, 1.05–1.20 / 1.08–1.14, 0.58–0.60 / 0.52–0.60. Labium reaching or slightly exceeding hind coxa, length 2.61–2.64 / 2.64–2.74; medial pronotal length including collar 1.32–1.46 / 1.39–1.52; basal pronotal width 2.22–2.33 / 2.23–2.52; width across hemelytra 2.44–2.64 / 2.54–2.86; length of hind femur, tibia and tarsus: 2.44–2.50 / 2.47–2.64,

Figs 90–92. Female genitalia of Philostephanus nepalensis. – 90. posterior wall; 91–92, genital chamber and adjunct structures. Scales 0.2 mm.
3.40–3.60/ 3.60–3.72, 0.72–0.77/ 0.76–0.80; length of hind tarsomeres I-III: 0.22–0.24/ 0.24–0.26, 0.34–0.36/ 0.36–0.38, 0.39–0.40/ 0.37/0.40.

**Etymology**
Named for the habitat of this new species occurring in montane areas of Taiwan.

**Distribution**
Montane areas of Taiwan.

*Philostephanus nepalensis* sp. n.
Figs 18, 90–92


**Diagnosis**
Recognized by the suboval body and brown general coloration. This is considered to be a sister species of the other new species, *P. lucidus* and *P. ovalis*, from which it can be distinguished by the paler general coloration, speckled hemelytra and different structure of the female genitalia.

**Description**

**Female.** Body suboval; collar about as thick as base of antennal segment II.

**Coloration.** Dorsal surface brown, shining. Head pale brown. Antenna pale brown; base and apical 1/3 of segment II dark brown; segments III and IV darkened, except for basal 1/5 of the former pale. Labium brown. Pronotum brown, with infuscate anterior part and narrowly yellow posterior margin; calli each with yellow spot anteriorly; mesoscutum shining dark brown; scutellum dark brown, with yellow corners; pleura somber brown, with paler lateral parts and ostiolar peritreme. Hemelytra brown; corium, clavus and embolium speckled with small, pale, semitransparent portions; anterior margin of cuneus pale; membrane somber grayish brown. Legs brown; femora irregularly darkened; tibiae each with three obscure rings at base, middle and apex.

**Surface and vestiture.** Head slightly shagreed, with shallow, longitudinal medial sulcus from vertex to frons; frons weakly striolate. Pronotum shallowly and minutely punctate, almost glabrous; scutellum rather arched, almost glabrous. Hemelytra with uniformly distributed, pale, short, reclining setae bearing from somewhat convex sockets. Tibial spines reddish brown. *Male. Unknown.*

**Female genitalia.** Figs 90–92. SR small, rather thick-rimmed; SPGC conspicuously developed, completely surrounding DS; MPGC strong, spinulate apically. DS widened, triangularly projected laterally.

**Dimensions.** ♀: Body length 5.8; head width including eyes 1.13; vertex width 0.36; length of antennal segments I-IV: 0.74, 1.92, 1.03, 0.43; labium long, exceeding apex of hind coxa, length 2.47; medial prontal length including collar 1.35; basal prontal width 2.20; width across hemelytra 2.57; length of hind femur, tibia and tarsus: 2.21, 3.23, 0.72; length of hind tarsomeres I-III: 0.22, 0.34, 0.36.

**Etymology**
Named for its occurrence in Nepal.

**Distribution**
Nepal.

*Philostephanus ovalis* sp. n.
Figs 19, 93–98

**Type material.** Holotype ♂, Taiwan, Wuling Guest House, 1,900 m, Hoping, Taichung Hsien, light trap, 20.viii.1990, M. Tomokuni (NSMT). **Paratypes: Taiwan:** 1♀, Fuyuan, Hwaiian Hsien, 9–11.v.1972, M. Sakai (NSMT); 2♀, Gaioxiong, 12–13.v.1989, S. Gotoh (YCN); 1♂, Natou Hsien, E of Shankan, 2000–2200m, 28.v.1990, J. Heraty, H076, decid./pine forest (CNC); 1♀, Pishan Spa, 700–800 m alt., Taichung Hsien, 3.x.1986, K. Baba (MC); 1♀, Sungkan-Meifeng, Nantow Hsien, 25–26.v.1972, M. Sakai (NSMT); 1♂8♀, same data as for holotype (NSMT); 2♀, same data as for holotype, except for date 11.viii.1990 (NSMT).

**Diagnosis**
Closely allied to *P. lucidus*, but this new species can be distinguished by the paler antennal segment I, femora and tibiae, pale basal half of antennal segment II, and different structure of the genitalia, in addition to the allopatric distribution.

**Description**
Body oval, somewhat elongate in male.

**Coloration.** Dorsal surface shining dark brown. Head pale brown or brown, shining; vertex sometimes darkened medially; frons with several rows of dark brown, transverse bands on each side; maxillary plate usually darkened. Antenna dark brown; segment I unicolorously pale brown or brown; basal half to 1/3 of segment II pale brown; bases of segments III and IV yellowish brown. Labium pale brown; apical part of segment IV darkened. Pronotum shining blackish brown, posterior margin narrowly pale brown; collar pale brown; mesoscutum shining dark chestnut brown; scutellum shining dark brown, with narrowly pale apex; thoracic pleurites pruinose. Hemelytra dark brown, shining; basal margin and apex of
cuneus narrowly pale brown. Leg pale brown; femora less infuscate, except for obscure apical half of hind femur; apical halves of tarsomeres III dark brown. Abdomen dark chestnut brown; ventral medial part sometimes widely pale brown.

**Surface and vestiture.** Dorsal surface with uniformly distributed, simple setae on hemelytra. Head very sparsely pubescent; vertex with shallow, longitudinal medial sulcation; frons striolate. Pronotum shallowly and coarsely punctate, sparsely clothed with very short, silky, suberect vestiture; mesoscutum with sparsely distributed, silky vestiture; scutellum narrowly and rather densely rugose, with sparse, short, silky vestiture. Hemelytra shallowly and coarsely punctate, with uniformly distributed, pale, suberect setae. Tibial spines reddish brown.
Male genitalia. Figs 93–95. Genital segment with erect, moderate to long setae. Vesica resembling that of *lucidus*, with AS+GS+LL+LS+VS, lacking VL; AS rounded and flattened, fan-like; GS weakly sclerotized, wide; LS very short; VS elongate, widened apically; phalotheca with long process and smaller process apically.

Female genitalia. Figs 96–98. DOS with distinct and dorsally developed MSGC; MPG straight, with pointed apex. DS rather wide, triangular, projected laterally.

**Dimensions.** \( \delta / \varphi \): Body length 5.9–6.0/ 5.7–6.8; head width including eyes 1.04–1.11/ 1.05–1.08; vertex width 0.30–0.32/ 0.36–0.39; length of antennal segments I–IV: 0.69–0.72/ 0.72, 1.84–1.92/ 1.75–1.90, 1.00–1.08/ 0.98–1.13, 0.50–0.51/ 0.48–0.56. Labium reaching apex of hind coxa, length 2.40–2.52/ 2.47–2.64; medial pronotal length including collar 1.24–1.32/ 1.24–1.44; basal pronotal width 2.01–2.16/ 2.04–2.36; width across hemelytra 2.32–2.49/ 2.49–2.74; length of hind femur, tibia and tarsus: 2.16–2.21/ 2.13–2.40, 3.12–3.22/ 2.92–3.32, 0.72–0.75/ 0.72–0.77; length of hind tarsomeres I–III: 0.18–0.24/ 0.24–0.26, 0.25–0.30/ 0.31–0.36, 0.32–0.35/ 0.34–0.38

**Etymology**
From Latin, *ovalis* (oval), referred to the rather short, oval body of this new species.

**Distribution**
Taiwan.

**Discussion**
Judging from similar possession of the fan-like AS in the vesica, and the small and thick-rimmed SR and widened DS in the female genitalia, this new species is assumed to be a sister species of *lucidus*. The similar forms are also found in *nepalis* and *ulmi*; thus, these four species appear to constitute a monophyletic group.

*Philostephanus pilosus* sp. n.

Figs 20, 99–106

**Type material.** Holotype \( \delta \), Nepal, Jumla, 2,450 m alt., Jumla Dist., light trap, 1.x.1981, M. Tomokuni (NSMT). Paratypes: Nepal: 10 \( \varphi \), same data as for holotype, except for date 19–20 ix.1981 (NSMT); 1 \( \varphi \), Ghughuti, 2,600 m alt., Jumla Dist., 21 ix.1981, M. Tomokuni (NSMT); 1 \( \varphi \), Jajiare, 3,400 m alt., Jumla Dist., 30 ix.1981, M. Tomokuni (NSMT); 3 \( \varphi \), Jillya Chaur, 2,700 m alt., Jumla Dist., light trap, 29 ix.1981, M. Tomokuni (NSMT); 1 \( \delta \), same data as for holotype (NSMT); 1 \( \delta \), Ktm. [= Lalitpur, Kathmandu Valley], Pulcharki 8,000 ft, Can. Nepal Exped. (CNC).

**Diagnosis**
Distinguished from other congeners by the brown general coloration, uniformly distributed, silky vestiture and fine punctures on the pronotum and hemelytra, and the modified shape of the right paramere.

**Description**
Elongate oval.

**Coloration.** Body generally brown, dorsal surface shining. Head pale brown, somewhat darkened medially; mandibular and maxillary plates and clypeus castaneous. Antenna dark brown; segment I, basal 2/3 of II and base of III pale brown; base of segments II dark brown; segment IV unicolorously dark. Labium pale brown; apical half of segment IV darker. Pronotum shining chestnut brown, with pale brown posterior half; collar yellowish brown, rather broad, slightly thicker than base of antennal segment II; mesoscutum pale brown; scutellum shining chestnut brown, with pale brown corners; thoracic pleurites pale brown; episternum and ostiolar peritreme partly darkened. Hemelytra brown, shining; clavus and corium indistinctly speckled with irregular, paler portions; basal margin of cuneus slightly paler; membrane pale grayish brown. Leg pale brown; middle and hind femora each with 2–3 obsolete annulations apically; each tibia sometimes with 2–3 weak annulations; apical parts of tarsomeres III dark brown. Abdomen generally chestnut brown (\( \delta \)), pale brown (\( \varphi \)).

**Surface and vestiture.** Dorsal surface shining, with uniformly distributed, silky vestiture on pronotum and hemelytra. Head with sparse, short, silky vestiture; vertex with narrow, longitudinal medial sulcation; frons less striolate. Pronotum uniformly and finely punctate, with uniformly distributed, silky, suberect vestiture; mesoscutum uniformly pubescent; scutellum narrowly and transversely rugose, with uniformly distributed, silky, suberect vestiture. Hemelytra shallowly and irregularly punctate, with uniformly distributed, silky, suberect vestiture. Tibial spines pale reddish brown.

**Male genitalia.** Figs 99–103. Parameres exceptionally asymmetrical in form; right paramere modified in shape, somewhat excavated between sensory lobe and very flattened hypophysis. Vesica widely membranous; only with spinulate AS, LL and thin LS; phalotheca tuberculate along apical margin.

**Female genitalia.** Figs 104–106. SR subtriangular, with slender, continuous DLP; LAV rather widened; DOS membranous, lacking noticeable sclerite; MPG straight, tapered toward apex. DS weakly differentiated; LLB thin, widened above apically bilobate, IRL with sclerotized base, heart-shaped; lateral margin of IRS thickened, distinctly folded.
Dimensions. ♂ ♀: Body length 6.8–7.0/ 6.4–7.8; head width including eyes 1.00–1.06/ 1.00–1.13; vertex width 0.31–0.32/ 0.33–0.41; length of antennal segments I-IV: 0.76–0.80/ 0.76–0.84, 1.87–2.12/ 1.75–1.92, 1.03–1.14/ 0.96–1.08, 0.52–0.56/ 0.50–0.63; labium slightly exceeding apex of hind coxa; rostral length 2.61–2.64/ 2.59–2.79; medial pronotal length including collar 1.12–1.18/ 1.32–1.37; basal pronotal width 1.92–2.09/ 2.06–2.36; width across hemelytra 2.47–2.57/ 2.47–2.81; length of hind femur, tibia and tarsus: 2.30–2.40/ 2.30–2.72, 3.36–3.58/ 3.31–3.72, 0.76–0.82/ 0.74–0.82; length of hind tarsomeres I-III: 0.22–0.23/ 0.21–0.24, 0.34–0.38/ 0.36, 0.37–0.41/ 0.37–0.41.

Etymology
From Latin, pilosus (hairy), referred to the uniformly pubescent dorsum of this new species.

Distribution
Nepal.

Figs 99–106. Male (99–103) and female (104–106) genitalia of *Philostephanus pilosus*. – 99–100, right paramere; 101, left paramere; 102, vesica; 103, phallotheca; 104, sclerotized ring; 105, genital chamber and adjunct structures; 106, posterior wall. Scales 0.2 mm.
Discussion
The modified shape of the right paramere and simple form of the vesica are unique to this new species. But the presence of distinct inner lateral process (MPGC) in the female genitalia warrants its placement in *Philostephanus*.

*Philostephanus poppii* sp. n.
Figs 21, 107–114
Paratypes: *Indonesia*: 1♂ 2♀, same data as for holotype (YCN); 1♂ 1♀, Dolok Merangir, Sumatra, without date, E. W. Diehl (AMNH); 8♀, Dairi, 1,600 m, NW end of Lake Toba, without date, E. W. Diehl (AMNH).
Diagnosis
Recognized by the dark antennal segment I, widely pale, shining and glabrous pronotum, tumid scutellum, and finely punctate and glabrous hemelytra. Allied to *P. variegatus* (Poppius), this new species can be distinguished by the shorter body, widely fuscous antennal segment I, pale basal half of the antennal segment II with an obscure, subbasal ring, and different structure of the genitalia.

Description
Body elongate oval.

Coloration. Head pale brown, somewhat tinged with green, weakly shagreened; frons with 4–5 rows of dark brown, transverse bands on each side; maxillary plate sometimes darkened. Antenna dark brown; extreme apex of segment I, basal half of II, and extreme bases of III and IV pale brown; segment II with obscure ring subbasally. Labium pale brown; apical half of segment IV darkened. Pronotum pale brown, shining, usually tinged with green, with an irregular, dark marking medially and pair of small, dark spots near posterolateral corners; mesoscutum dark chestnut brown; scutellum shining dark brown, with widely yellow anterolateral corners and posterior apex; yellow parts of scutellum sometimes becoming continuous and V-shaped; thoracic pleurites yellowish brown, partly dark brown. Hemelytra shining brown, speckled with weakly sclerotized, pale portions; cuneus brown, with pale brown basal margin and apex; membrane pale grayish brown. Leg pale brown, somewhat tinged with green; femora each with 3–4 irregular, dark annulations; tibiae each with 4 obscure annulations; apical parts of tarsomeres III brown. Abdomen pale brown with many dark spots.

Surface and vestiture. Dorsal surface almost glabrous. Head weakly shagreened; frons striolate. Pronotum almost impunctate and glabrous; scutellum relatively tumid, less wrinkled, almost impunctate and glabrous. Hemelytra glabrous and smooth. Tibial spines reddish brown.

Male genitalia. Figs 107–110. Right paramere rather short and broad. Vesica with AS+GS+LL+VS; AS broadened subapically and twisted medially, fused with membranous lobe; VS horn-like; LL with medial, small sclerotized process.

Female genitalia. Figs 111–114. SR slender, with extended anterior rim; SPGC continuous anteriorly; DOS with S-shaped, peculiar MSGC dividing OL to each side; SG arising from anterior margin of left OL; MPGC developed, straight, tapered and spinulate.

Dimensions. $\delta/\varphi$: Body length 6.7–7.7/ 8.0–8.3; head width including eyes 1.23–1.30/ 1.29–1.32; vertex width 0.28–0.32/ 0.42–0.44; length of antennal segments I-IV: 0.96–1.01/ 0.96–0.99, 2.20–2.33/ 2.08–2.14, 1.44/ 1.39–1.44, 0.57–0.58/ 0.57–0.63; labium reaching apex of hind coxa; length 2.64–2.67/ 2.78–2.88; medial pronotal length including collar 1.36–1.40/ 1.58–1.64; basal pronotal width 2.23–2.38/ 2.68–2.74; width across hemelytra 2.64–2.74/ 3.16–3.24; length of hind femur, tibia and tarsus: 2.61–2.88/ 2.76–2.88, 3.69–3.92/ 3.79–4.08, 0.84–0.94/ 0.96–1.01; length of hind tarsomeres I–III: 0.24–0.28/ 0.27–0.30, 0.36–0.39/ 0.43–0.45, 0.38–0.48/ 0.42–0.47.

Etymology
Named in honor of B. Poppius who greatly improved the faunal study of the Old World Miridae.

Distribution
Indonesia (Sumatra).

*Philostephanus pronotalis* (Zheng & Liu) comb. n.
Figs 115–120

*Arbolygus pronotalis* - Lu & Zheng 1998a: 80–81 (list, key); Kerzhner & Josifov 1999: 69 (cat.).

Diagnosis
Recognized by the short labium, dark brown, glabrous pronotum with widely pale lateral and posterior parts, dense, silvery, reclining pubescence on the hemelytra, widely pale basal half of the hind femur that lacks ventral dark dots, moderate length of the seta on the genital segment, and structures of the genitalia.

Redescription
Male. Body elongate oval, head oblique.

Coloration. Dorsal surface shining. Head dark brown; frons with 3–4 rows of pale, transverse bands on each side. Antenna chestnut brown; segment I somewhat paler dorsally; base of segment III pale brown. Labium pale brown, somewhat tinged with red, relatively short; apical part of segment IV widely dark brown. Pronotum dark brown, shining, widely pale brown laterally; calli with pair of small, pale spots at anterior margin; collar pale brown; scutellum shining dark chestnut brown, with pale brown corners; thoracic pleurites widely somber brown; ostiolar peritreme grayish brown. Hemelytra brown, widely and irregularly speckled with weakly sclerotized, pale portions; cuneus brown, with basal margin and apex
narrowly pale; membrane pale grayish brown. Leg pale brown, partly provided with obscure annulations; femora lacking dark dots; apical half widely and base of hind femur darkened; tarsi brown.

**Surface and vestiture.** Dorsal surface with densely distributed vestiture on hemelytra. Head somewhat granulate; longitudinal medial sulcus on vertex weak; frons striolate. Pronotum almost impunctate, with very sparse, short, erect, silky vestiture; scutellum impunctate, almost glabrous, indistinctly rugose; thoracic pleurites shagreened. Hemelytra with densely distributed simple, pale, reclining vestiture.

**Female.** Currently represented by a single, badly damaged specimen; a description of the external structure is not provided here; general appearance similar to that exhibited in male.

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**Figs 115–120.** Male (115–117) and female (118–120) genitalia of *Philostephanus pronotalis*. – 115, right paramere; 116, left paramere; 117, vesica; 118, posterior wall; 119–120, genital chamber and adjunct structures. Scales 0.2 mm.

Female genitalia. Figs 118–120. Highly sclerotized; SR rounded, with slender DLP; DOS with developed MSG; SPCG continuous posteriorly; MPG tumid basally, with pointed apex. DS rather small, with weak lateral projections; LLB with long, pointed process.

Dimensions. Body length 7.1; head width including eyes 1.13; vertex width 0.31; length of antennal segments I-IV: 0.79, 1.92, ?, ?; labium relatively short, slightly exceeding midcoxa; rostral length 2.64; medial pronotal length including collar 1.30; basal pronotal width 2.16; width across hemelytra 2.57 length of hind femur, tibia and tarsus: 2.42, 3.50, 0.77; length of hind tarsomeres I-III; 0.22, 0.28, 0.38.

Distribution
China (Hunan, Sichuan and Fujian Prov.).

Discussion
The female is reported for the first time. As mentioned above, a single available female specimen deposited in the United States National Museum of Natural History is badly mutilated. We tentatively regard this specimen as the female of *P. pronotalis* since its genitalia do not correspond to those of any other known congeners occurring in continental China.


*Philostephanus renae* (Lu & Zheng) comb. n.

*Arbolygus renae* Lu & Zheng, 1998a: 89 (n. sp.); Holotype ♂: China: Gansu Prov., Tianshui Country, Dangchuan (34°18’N, 106°06’E), without date, Lu (DBNU) [examined, except genitalia].

*Arbolygus renae*, Kerzhner & Josifov 1999: 70 (cat.).

Diagnosis
Recognized by the dark, rather slender body, dark antennal segment I with pale dorsal surface, segment II pale medially, pronotum shining fuscous, almost glabrous with a pair of yellow, short stripes along lateral margins of the calli, and shape of the male vesica (Lu & Zheng 1998a).

Redescription
Holotype male. Body elongate, subparallel-sided.

Coloration. Body elongate, with an infuscate, shallow, longitudinal, medial, furrow on vertex and frons; frons with 5–6 rows of paired bands; clypeus, gena and maxillary plate somewhat darkened. Antenna dark brown; dorsal side of segment I and subbasal part (2/7–7/3) of segment II pale brown. Labium pale brown; apical half of segment IV dark brown. Pronotum shining blackish brown, with pair of short, yellow stripes along lateral margins of calli; calli each with yellow spot at anteromedial margin; collar and posteralateral margin of pronotum pale brown; mesoscutum and scutellum dark brown, shining, narrowly yellow at lateral border; apex of scutellum yellowish brown; pleura dark brown, yellow laterally, with grayish brown ostiolar peritreme. Hemelytra dark brown, shining, speckled with pale, semitransparent portions; cuneus dark brown, with pale, semitransparent anterior margin; membrane pale somber brown, with somewhat darker veins. Coxae yellowish brown, each with dark lateral base and dark subbasal spot; legs pale brown; femora each with 4 dark brown bands; ventral surface of hind femur with two rows of dark spots between bands; tibiae each with 3–4 dark annulations; tarsomeres III somewhat darker.

Surface and vestiture. Dorsal surface with uniformly distributed, simple, pale, suberect vestiture on hemelytra. Frons striolate. Pronotum shallowly and irregularly punctate except on weakly shagreened calli, almost glabrous; mesoscutum and scutellum with sparsely distributed short, suberect setae. Tibial spines pale brown.

Female. Not examined.


Dimensions. ♂: Body length 6.7; head width including eyes 1.14; vertex width 0.29; length of antennal segments I-IV: 0.80, 2.16, ?, ?; labium reaching apex of hind coxa, length 2.64; medial pronotal length including collar 1.30; basal pronotal width 2.14; width across hemelytra 2.40; length of hind femur, tibia and tarsus: 2.33, 3.43, 0.77; length of hind tarsomeres I-III: 0.24, 0.36, 0.35.

Distribution
China (Gansu Prov.).

Discussion
This species was described from two specimens, a male holotype and a female paratype. We examined the holotype, to which the male genitalia are not attached. Judging from the illustration of the male genitalia by Lu & Zheng (1998a), this is a good
species and seems to be related to *P. poppii* from Sumatra, Indonesia.

**Material examined.** China: 1 ♂, Gansu Prov., Tianshui Country, Dangchuan (34°18’N, 106°06’E), without date, Lu (holotype, DBNU); dissected genitalia not attached.

**Philostephanus rubripes** (Jakovlev) comb. n.  
Figs 7, 8, 121–129

*Caloconis rubripes* Jakovlev, 1876: 115 (n. sp.). Holotype ♂: RUSSIA: Primorskiy Territory, Ussury (ZMAS) [examined].


*Arbolygus rubripes*, Miyamoto 1987: 582 (n. comb.); Miyamoto & Yasunaga 1989: 159 (list); Yasunaga 1995: 29 (note); Todo & Yasunaga 1996: 42 (list); Yasunaga 1997: 223 (list); Lu & Zheng 1998a: 80–81 (list, key); Endo et al. 1998: 19 (host, list); Kerzhner & Josifov 1999: 70 (cat.); Yasunaga 2001: 223, fig. 222 (diag.).

**Diagnosis**

Recognized by the generally fuscous dorsum with uniformly distributed silky, suberect vestiture, and extensively pale ventral medial region of the abdomen. The final instar is easily recognizable by the white body with numerous black spots (Fig. 8).
**Redescription**

Body elongate oval.

**Coloration.** Dorsal surface shining fuscous. Head chestnut brown, shining, somewhat darkened medially; frons with several rows of dark brown, transverse bands on each side. Antenna blackish brown; segment I and subbasal part of segment II sometimes pale; bases of segments III and IV yellowish brown. Labium brown, apical part of segment IV darkened. Pronotum shining dark brown, basal margin narrowly pale; collar usually paler; mesoscutum and scutellum shining dark brown; scutellum with three yellow spots near anterior corners and at posterior apex; thoracic pleurites brown or dark brown, partly yellowish brown and pruinose; ostiolar peritreme usually yellowish brown. Hemelytra dark brown, shining; basal 1/5 of cuneus pale, semitransparent; membrane somber grayish brown. Leg pale brown; apical half of hind femur usually with two obscure annulations; tibiae variable in color, pale brown to dark brown, sometimes sanguineous in fresh specimens; apical halves of tarsomeres III darkened. Abdomen dark brown; ventral medial part widely pale brown or somber yellowish white.

**Surface and vestiture.** Dorsal surface with uniformly distributed, silky, suberect vestiture. Head with sparse, short, silky vestiture; vertex with shallow, longitudinal medial sulcation and weak, basal transverse

Figs 126–129. Female genitalia of *Philostephanus rubripes*. – 126, posterior wall; 127–128, genital chamber and adjunct structures; 129, Sclerotized ring. Scales 0.5 mm.
carina; frons striolate. Pronotum with uniformly and rather finely punctate, with uniformly distributed, silky, suberect vestiture; mesoscutum and scutellum uniformly clothed with silky, suberect vestiture; scutellum transversely rugose. Hemelytra shallowly and coarsely punctate, with uniformly and densely distributed, silky, suberect vestiture. Tibial spines brown.

**Male genitalia.** Figs 121–125. Similar to **fulvus**. Vesica with AS+GS+LL+LS, lacking VL and VS; AS and GS developed; LS subtriangular, wide.

**Female genitalia.** Figs 126–129. Similar to **fulvus**. SR thick-rimmed, large and ovoid; DOS rather strongly projected, hooked, and bending right; MSGC hooked, surrounding contiguous OL; MPPC long, spinulate, moderately curved. PWB longer than wide; LLB with spinulate process anteriorly; IRL wide, asymmetrical, left larger than right; DS twisted, highly asymmetrical.

**Dimensions.** δ / ?

- Body length 6.4–7.7 / 7.2–8.6;
- Head width including eyes 1.20–1.32 / 1.27–1.37;
- Vertex width 0.39–0.41 / 0.44–0.51 length of antennal segments I-IV: 0.91–1.08 / 0.96–1.08, 2.35–2.74 / 2.40–2.84, 1.21–1.44 / 1.24–1.50, 0.67–0.72 / 0.70–0.75; labium reaching apex of hind coxa, length 2.80–2.98 / 2.88–3.12; medial pronotal length including collar 1.39–1.56 / 1.51–1.73; basal pronotal width 2.19–2.64 / 2.56–2.91; width across hemelytra 2.64–3.15 / 3.07–3.46; length of hind femur, tibia and tarsus: 2.64–3.12 / 2.83–3.12, 3.67–4.20 / 3.88–4.73, 0.81–0.84 / 0.81–0.96; length of hind tarsomeres I-III: 0.24–0.26 / 0.24–0.32, 0.37–0.38 / 0.36–0.40, 0.38–0.41 / 0.38–0.48.

**Distribution**


**Discussion**

This species is easily distinguished from congeners in the Far East by the dark general coloration, uniformly pubescent pronotum, unspeckled hemelytra, and white ventral medial part of the abdomen.

We can confirm that immature stages of *P. rubripes* are associated with several deciduous trees, *Alnus* spp. (Betulaceae), *Quercus dentata*, *Q. mongolica* (Fagaceae), *Morus bombycis* (Moraceae), *Populus* spp., *Salix* spp. (Salicaceae), and *Sorbus commixta* (Rosaceae). The adults are sometimes found on conifers. Adults and nymphs were frequently observed feeding on other insects in laboratory tests (Figs 7, 8). This seems to be predominantly predaceous species.


**Philostephanus sakuraii** sp. n.

Figs 130–135

**Type material.** Holotype δ, Thailand, Doi Pui, 1,400 m alt., Chiang Mai, at light, 15.v.2001, S. Sakurai (AMNH).

**Paratype:** Thailand: 1 ?, same data as for holotype (YCN).

**Diagnosis**

Easily recognized by the small size. The female is very similar in general appearance to *P. ailaensis* (Lu & Zheng), from which it can be distinguished by the pale basal margin of the pronotum.

**Description**

Body elongate oval, subparallel-sided.

**Coloration.** Dorsal surface shining fuscous, partly pale brown. Head pale brown, partly tinged with green; vertex darkened medially, shining; frons in male with several rows of dark, transverse bands on each side; mandibular and maxillary plates and
Figs 130–135. Male (130–132) and female (133–135) genitalia of Philostephanus sakuraii. – 130, right paramere; 131, left paramere; 132, vesica; 133, posterior wall; 134–135, genital chamber and adjunct structures. Scales 0.2 mm.
clypeus (especially apex) more or less darkened. Antenna dark brown; segment II with pale brown ring at basal 1/3; bases of segments III and IV yellowish brown. Labium shining pale brown, apical half of segment IV darkened. Pronotum shining blackish brown, more or less pale brown laterally, with pale spot on anterior margin of callus; basal margin and collar yellow; mesoscutum and scutellum shining dark brown; scutellum, with whitish yellow (♀)/pale greenish brown (♂) corners; pleura widely dark brown except for dorsal and ventral margins; ostiolar peritreme widely dark brown. Hemelytra dark brown, shining, irregularly speckled with weakly sclerotized, pale portions; corium and clavus widely pale in ♀; cuneus dark brown, with pale brown basal margin and apex; membrane somber pale brown, semitransparent. Leg pale brown, partly tinged with green; femora and tibiae each with 3–4 variable, dark annulations; apical part of tarsomere III widely darkened. Abdomen in ♀ chocolate brown, widely whitish brown medially, speckled with whitish spots; ventral surface in ♀ widely pale brown, with numerous pale brown spots.

**Surface and vestiture.** Head with sparsely distributed, short, silky vestiture; vertex with narrow, longitudinal, medial sulcation, lacking basal transverse carina; frons in male striolate. Pronotum almost impunctate, smooth and glabrous; mesoscutum and scutellum almost impunctate and smooth; scutellum narrowly and transversely rugose, bearing several, short, silky setae; pleura partly shagreened; propleuron distinctly and coarsely wrinkled. Hemelytra shallowly and coarsely punctate, with uniformly distributed, silky, rather reclinling setae. Tibial spines reddish brown.

**Male genitalia.** Figs 130–132. Hypophysis of right paramere broadened. Vesica with AS+GS+LL+LS+VS, lacking VL; AS hooked, broad, with short, slender projection; GS widened; LS slender, somewhat winding, with pointed apex; VS broadened, strong.

**Female genitalia.** Figs 133–135. LAV weak; dos with medial sclerotized area; SPGC distinct, with pointed teeth. DS small; IRL slender.

**Dimensions.** ♀/♂: Body length 4.8/6.0; head width including eyes 1.01/1.13; vertex width 0.26/0.33; length of antennal segments I-IV: 0.75/0.78, 1.85/1.74, 0.95/1.05, 0.50/0.51; labium slightly exceeding (♀)/reaching (♂) apex of hind coxa; length 2.10/2.28; medial pronotal length including collar 0.92/1.24; basal pronotal width 1.58/2.13; width across hemelytra 1.80/2.37; length of hind femur, tibia and tarsus: 1.88/2.25, 2.70/3.15, 0.65/0.74; length of hind tarsomeres I-III: 0.23/0.23, 0.30/0.32, 0.32/0.33.

**Etymology.** Named after Mr. S. Sakurai, first collector of this new species.

**Distribution.** Northern Thailand (Chiang Mai).

**Philostephanus taiwanensis** sp. n.

Figs 22, 136–143

**Type material.** Holotype ♂, Taiwan, Puli, Nanshan, Taichung Hsien, 6. xii. 1991, Yoseikin (AMNH). Paratypes: Taiwan: 1♂1♀, Wuling Guest House, 1,900 m, Hoping, Taichung Hsien, light trap, 20.viii.1990, M. Tomokuni (NSMT); 1♂, Shanchuang, 2,500 m alt., Hoping, Taichung Hsien, light trap, 4.viii.1990, M. Tomokuni (NSMT); 1♀, same data as for holotype (YNC).

**Diagnosis.** Recognized by the dark brown antennal segment I, pronotum with very sparsely distributed, short and silky vestiture, and densely distributed silvery vestiture on the hemelytra. This new species is closely allied to *P. himalayicus* (Lu & Zheng) that also has elongate processes of the female lateral lobe, but is distinguished from the latter by the longer antennal segment II that is more than twice as long as the head width, different structures of the genitalia, and allopatric distribution.

**Description.** Body elongate oval, subparallel-sided.

**Coloration.** Dorsal surface shining fuscous. Head pale brown; vertex darkened medially, shining; frons with several rows of dark transverse bands on each side; mandibular and maxillary plates and apical part of clypeus usually darkened. Antenna dark brown; apex of segment I pale brown; basal 1/4 of segment II with pale brown band; extreme bases of segments III and IV yellowish brown. Labium reddish brown; base of segment II and apical part of IV darkened. Pronotum shining blackish brown, sometimes widely pale brown laterally or with several yellow spots anterolaterally; basal margin narrowly yellow; mesoscutum shining dark brown; scutellum shining dark brown, with yellow corners; thoracic pleurites widely dark brown; ostiolar peritreme dark. Hemelytra dark brown, shining, irregularly speckled with weakly sclerotized, pale portions; cuneus dark brown, with pale brown basal margin and apex; membrane somber pale brown. Leg pale brown; femora and tibiae each with 3–4 dark annulations; apical parts of tarsomeres III darkened. Abdomen dark brown; ventral medial part widely pale brown, with many dark spots.

**Surface and vestiture.** Dorsal surface pubescent. Head
with sparse, short, silvery, reclining vestiture; vertex with narrow, longitudinal medial sulcation, lacking basal transverse carina; frons striolate by several rows of dark transverse bands on each side. Pronotum shallowly and coarsely punctate, sparsely clothed with very short, silky vestiture; mesoscutum with sparse, short, silky vestiture; scutellum narrowly and transversely rugose, bearing several, short, silky vestiture; thoracic pleurites shagreened. Hemelytra shallowly and coarsely punctate, uniformly clothed with suberect, silvery vestiture. Tibial spines reddish brown.

**Male genitalia.** Figs 136–140. Genital segment with long, erect setae. Vesica with AS+GS+LL+LS+VS, lacking VL; AS conspicuously bifurcate, flattened and widened; LS widened medially, with pointed apex; VS slender, with membranous, spinulate apex; phallotheca with pair of fin-like processes at apex
and long subapical projection.

**Female genitalia.** Figs 141–143. LAV weak; dos with broad and apically hooked MPGC. LLB with long, pointed, somewhat curved process.

**Dimensions.** ♂ ♀: Body length 7.2–7.4/ 7.4–8.1; head width including eyes 1.12–1.16/ 1.17–1.18; vertex width 0.30–0.33/ 0.38–0.39; length of antennal segments I-IV: 0.88–0.92/ 0.86–0.89, 2.31–2.40/ 2.13–2.31, 1.08–1.20/ 1.17–1.18, 0.52–0.56/ ?; labium, slightly exceeding apex of hind coxa; length 2.88–2.96/ 2.95–3.00; medial pronotal length including collar 1.39–1.40/ 1.41–1.54; basal pronotal width 2.28–2.33/ 2.46–2.62; width across hemelytra 2.71–2.74/ 2.97–3.00; length of hind femur,
tibia and tarsus: 2.64–2.69/ 2.68–2.76, 3.79–4.01/ 3.91–4.20, 0.92–0.93/ 0.86–0.89; length of hind tarsomeres I-III: 0.27–0.28/ 0.26–0.27, 0.43–0.44/ 0.39–0.44, 0.40–0.41/ 0.40–0.42.

**Etymology**
Named for its occurrence in Taiwan.

**Distribution**
Taiwan.

*Philostephanus tibialis* (Lu & Zheng) comb. n.
Figs 144–150


**Diagnosis**
Recognized by the large, oval, tumid body, uniformly pubescent pronotum, unicolorous fuscous unspeckled hemelytra with pale portions, and clear, dark annulations of the femora and tibiae.

**Redescription**
Body rather large, suboval, calli distinct.

**Coloration.** Dorsal surface shining dark brown. Head brown; vertex dark brown medially except for narrowly pale, longitudinal, medial sulcation; frons with 5–6 rows of paired, narrow, dark fasciae; clypeus partly darkened; mandibular and maxillary plates widely infuscate. Antenna dark brown; basal half of segment II usually pale brown except for always dark basal 1/6; bases of segments III and IV yellowish brown. Labium pale brown, reaching apex of hind coxa; apical half of segment IV darkened. Pronotum shining blackish brown, sometimes castaneous posteriorly, with narrowly yellowish basal margin and anterolateral angles; calli with pair of small, yellow spots near pale brown collar; scutellum shining dark brown, with triangularly pale anterolateral corners and posterior apex; pleura pale brown, except for ventral parts and ostiolar peritreme darkened. Hemelytra unicolorously dark brown or blackish brown, not speckled; basal margin and apex of cuneus yellowish brown; membrane dark grayish brown; membrane somber grayish brown, with posterior part of vein, larger cell, and lateral spot near apex of cuneus semitransparent. Coxae yellowish brown, each with dark spot at base; legs pale brown; fore and middle femora each with 2 partly interrupted, obscure rings near apex; hind femur with 2 distinct, dark rings each at middle and apex; tibiae each with 3 dark annulations each at base, middle and apex; tarsi pale brown; tarsomeres I and II sometimes pale brown. Abdomen widely pale brown, with irregular dark spots.

**Surface and vestiture.** Dorsal surface with uniformly distributed, silky or silvery vestiture. Head with sparse, short, silky vestiture; frons striolate. Pronotum uniformly covered with fine punctures and silky, subrect vestiture; calli impunctate. Hemelytra with densely distributed, silvery, reclinig vestiture. Tibial spines pale reddish brown.

**Male genitalia.** Figs 144–147. Similar to those exhibited in *fulvus* and *rubripes*. Vesica with AS+GS+LL+LS; AS long, with sharp apex; LS thin, widened, with pointed apex.

**Female genitalia.** Figs 148–150. Similar to those of *fulvus* and *rubripes*, but DOS strongly expanded posteriorly; MPGC short, small; DS basally divided, not twisted; LLB with posterior, small, sclerotized projection, without basal spinulate process.

**Dimensions.** δ / ♂: Body length 7.6–7.7/ 8.1–8.5; head width including eyes 1.30–1.31/ 1.34–1.35; vertex width 0.37–0.38/ 0.43–0.48; length of antennal segments I-IV: 0.96/ 1.03–1.06, 2.47–2.48/ 2.44–2.59, 1.27/ 1.27, 0.72/ 0.64–0.70; labium reaching apex of hind coxa, length 3.04–3.05/ 3.07–3.12; median pronotal length including collar 1.56/ 1.63–1.71; basal pronotal width 2.61–2.62/ 2.85–2.88; width across hemelytra 3.07–3.08/ 3.36–3.48; length of hind femur, tibia and tarsus: 2.88/ 2.88–3.12, 4.08/ 3.88–4.25, 0.88–0.89/ 0.86–0.89; length of hind tarsomeres I-III: 0.31–0.32/ 0.25–0.28, 0.36/ 0.37–0.40, 0.45–0.46/ 0.43–0.45.

**Distribution**
China (Gansu, Hubei, Ningxia and Shaanxi Provs.).

**Discussion**
This species, *P. fulvus*, and *P. rubripes* are closely related based on the similar general appearance and genital structures. These three species apparently constitute a monophyletic group, sharing the following synapomorphies of the genitalia: vesical appendages AS+GS+LL+LS, pair of subapical tubercles on the phallobaeca, enlarged, ovoid sclerotized rings, strongly and obliquely projecting common ooviduct and roof of the genital chamber comprising an elongate, inner sclerite, and contiguous lateral oviducts surrounded by the rounded extension of the inner sclerite. Collection records suggest that *P. tibialis* is frequently attracted to light (Lu & Zheng 1998a), but no other information is available on its biology.

**Material examined.** China: 1♂3♀, Shaanxi Prov., Zhouzhi Country, Banfangzi (33°48′N, 108°00′E), 1.200 m, 7.viii.1994, light trap. N. Lu & W. Bu (paratypes, DBNU).
**Philostephanus ulmi** (Kerzhner) comb. n.

Figs 9, 10, 151–158

*Lygocoris (Arbolygus) ulmi*, Kerzhner 1978: 39 (faunal list, preceding original description) [unavailable].

*Lygocoris (Arbolygus) ulmi* Kerzhner, 1979: 30 (n. sp.).

Holotype ♂: Russia: Primorskiy Territory, st. Sida, Sutchan, t-n, I. M. Kerzhner (ZMAS) [examined].

*Lygocoris (Arbolygus) ulmi*, Kerzhner 1988b: 810 (key);

*Arbolygus ulmi*, Yasunaga et al. 1993: 154, pl. 16, fig. 48 (n. comb., figured individual corresponding to *Orientalocapsus aquilus* n. gen. & sp. described below); Todo & Yasunaga 1996: 42 (list); Yasunaga 1997: 221 (list); Endo et al. 1998: 19 (list, host); Kerzhner & Josifov 1999: 70 (cat.); Yasunaga 2001: 224, fig. 223 (diag.).

**Diagnosis**

Recognized by the rather large size, distinctly striate
frons, shining, almost glabrous pronotum, pubescent and distinctly speckled hemelytra, and genital structure. The final instar is similar to that of *P. fulvus*, from which *ulmi* can be distinguished by the darker general coloration, clearly yellow basal halves of the antennal segments II and III, and single, apical yellow annulation of each tibia (Fig. 10).

**Redescription**

Body elongate oval.

**Coloration.** Dorsal surface generally fuscous, shining. Head pale brown or brown, shining; vertex darkened medially; frons with several rows of dark brown, transverse bands on each side, or sometimes widely darkened. Antenna dark brown; segment I and sub-basal part of II sometimes widely pale brown; base of segments III and extreme base of IV yellowish brown. Labium pale brown; apical part of segment IV darkened. Pronotum shining blackish brown, sometimes with short, yellow, medial stripe near

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**Figs 155–158.** Female genitalia of *Philostephanus ulmi*. – 155–156, genital chamber and adjunct structures; 157, sclerotized ring; 158, posterior wall. Scales 0.5 mm for 155–156, 0.2 mm for 157–158.
continuously yellow posterior margin; anterolateral corner sometimes narrowly yellow; collar yellowish brown; mesoscutum dark brown; scutellum shining dark brown, with reddish brown anterior corners and yellow posterior apex; thoracic pleura usually widely darkened. Hemelytra dark brown, shining, speckled with brown or pale brown portions; cuneus dark brown, with pale brown basal margin and apex; membrane grayish brown, with almost dark vein. Leg pale brown; femora variable in color, with irregular dark annulations or almost entirely darkened; tibiae each with 3–4 obscure annulations, or sometimes entirely pale; apical parts of tarsomeres III darkened. Abdomen dark brown; ventral medial part sometimes widely pale brown or tinged with red.

**Surface and vestiture.** Dorsal surface with densely distributed pale, suberect vestiture on hemelytra. Head with sparse, short, silky vestiture; vertex with narrow, longitudinal medial sulcation. Pronotum almost impunctate, very sparsely clothed with short, silky, suberect vestiture; mesoscutum bearing silky vestiture; scutellum shallowly and transversely rugose, sparsely but uniformly clothed with silky, suberect vestiture. Hemelytra densely covered with silky, suberect vestiture. Tibial spines reddish brown.

**Male genitalia.** Figs 151–154. Genital segment and parameres densely furnished with long, erect setae. Vesica with AS十GS十LL十LS十VS, lacking VL; AS with noticeably widened apex; GS well developed; LS and VS slender and pointed; phallotheca subapically with small, pointed process and subtriangular, fin-like process.

**Female genitalia.** Figs 155–158. LAV slender; DOS with enlarged, sutured, hemispherical MSGC; MPGC with two pointed projections; OL contiguously pale. DS divided into two lobes, somewhat twisted; IRS rather narrow.

**Dimensions.** δ/♀: δ / ♀: Body length 6.7–7.8/ 6.9–7.7; head width including eyes 1.20–1.30/ 1.20–1.25; vertex width 0.31–0.32/ 0.40–0.44; length of antennal segments I–IV: 0.94–0.99/ 0.88–0.92, 2.32–2.55/ 1.96–2.04, 1.10–1.23/ 1.00–1.05, 0.69–0.72/ 0.64–0.65; labium reaching apex of hind coxa, length 2.71–2.91/ 2.66–2.88; medial pronotal length including collar 1.36–1.54/ 1.46–1.56; basal pronotal width 2.23–2.52/ 2.41–2.64; width across hemelytra 2.76–3.08/ 2.90–3.20; length of hind femur, tibia and tarsus: 2.64–2.91/ 2.61–2.64, 3.76–4.08/ 3.60–3.70, 0.76–0.87/ 0.74–0.80; length of hind tarsomeres I–III: 0.25–0.27/ 0.24–0.26, 0.37–0.38/ 0.33–0.35, 0.37–0.42/ 0.37–0.41.

**Distribution**

Japan (Hokkaido, Honshu), Kuril Isls., Russian Far East, NE China. Yasunaga et al. (1993) incorrectly cited Shikoku and Kyushu of Japan as part of its distribution. This species appears to be a cold temperate zone inhabitant.

**Discussion**

The breeding host of this species was previously documented as elm, *Ulmus japonica* (Ulmaceae) by Kerzhner (1979 1988a). Investigations by TY and his students in Hokkaido, Japan discovered many adults as well as nymphs from this deciduous broadleaf host. Both adults and nymphs were also observed to have preyed on other insects (e.g., lepidopteran larvae, nymphs of spittlebugs) in laboratory tests. Todo & Yasunaga (1996) reported the frequent occurrence of the adults on willows, *Salix* spp. (Salicaceae), and TY also found many adults on a poplar, *Populus maximowiczii* (Salicaceae) in late July 1999. But no immature stages of this mirid have been collected from salicaceous plants; therefore, the host association of *P. ulmi* appears to be restricted to elm.

**Material examined.** 396 specimens (CNC, YCN, ZMAS) collected between June 22 and Sep. 2 from the following localities: **Japan:** Hokkaido: Moshiri-Shirakaba, Horokanai T., Sorachi; Etanetsu, Asahikawa C., Kamikawa; Higashikawa T., Kamikawa; Hattari, Atsuta Vil., Ishikari; Yotsui, Tobetsu T.; Ishikari; Sapporo C., Ishikari; Takaoka, Tomakomai C., Iburi; Mt. On'nebetu, Shiretoko Natl. Park, Abashiri; Kankama, Rubeshib T., Abashiri; Ashoro T., Tokachi, Honshu: Sugadaira (1,250 m), Nagano Pref. **Kurile Islands:** Tret jotako, Kunashiri Is. (2♀ 1♂ paratypes, YCN); Dubovoe bliz Golovnino, Kunashiri Is. (3♀ 3♂ paratypes, ZMAS). **Russia:** Primorskij Kraj: Ussurijsk Natural Reserve; Vinogradovka Ussurijsk (4♀ paratypes, ZMAS); st. Sida, Sutchan. r-n (Holotype δ, ZMAS); Rjazanovka, Khasanski Dist.; Krounovka, nr. Mt. Medvezh'ja.

**Philostephanus variegatus** (Poppius) comb. n.

Figs 23, 159–161


**Diagnosis**

Recognized by the elongate body, almost continuously pale lateral and apical parts of the scutellum forming a V-shape, pubescent hemelytra, and strongly sclerotized common oviduct and roof of the genital chamber and adjacent structures of the female genitalia.

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**Philostephanus variegatus** (Poppius) comb. n.

Figs 23, 159–161


**Diagnosis**

Recognized by the elongate body, almost continuously pale lateral and apical parts of the scutellum forming a V-shape, pubescent hemelytra, and strongly sclerotized common oviduct and roof of the genital chamber and adjacent structures of the female genitalia.
Redescription


Coloration. Dorsal surface principally brown, shining. Head pale brown, shining; frons with 5 rows of paired, brown bands; clypeus with short, dark stripe at base and pair of lateral short, dark stripe at middle; maxillary and mandibular plates partly dark. Antennal segment I pale brown, with base and subapical parts obliquely darkened; segment II dark brown, with pale brown basal half except for dark basal 1/6. Labium pale brown; apical half of segment IV darkened. Pronotum pale brown, shining, irregularly and symmetrically darkened; calli blackish brown, with pair of small, pale spots contiguous to pale, narrow collar; mesoscutum brown, narrowly darkened medially; scutellum dark brown, with lateral margins and apex continuously yellowish brown (forming V-shape; pleura irregularly darkened; ostiolar peritreme somber brown, with pale posterior margin. Hemelytra brown, speckled with pale, semitransparent portions; cuneus brown, with pale, semitransparent anterior margin; membrane pale somber brown, with somewhat darker veins. Coxae pale brown, each with basal and an obscure medial mark; foreleg (mid and hind legs mutilated); femur with irregular obscure spots or annulations; tibia with 4 dark annulations; tarsus brown.

Surface and vestiture. Dorsal surface with uniformly distributed, short, reclining, pale setae on hemelytra. Head almost glabrous; vertex with shallow, longitudinal medial sulcus; frons striolate. Pronotum almost glabrous and impunctate; scutellum with very sparse, short setae.

Male. Unknown.

Female genitalia. Figs 159–161. SPGC of right side conspicuously developed posteriorly, forming very wide sclerotized area covering right OL; DOS with slender MSGC along inner margin of left OL; MPGC strong, with wide base, tapered and spinulate apically. DS and IRS wide; IRL small, slender, somewhat constricted subbasally.

Dimensions. ♀: Body length 8.4; head width including eyes 1.23; vertex width 0.46; length of antennal segments I-IV: 0.96, 2.16, ?, ?; labium reaching apex of hind coxa, length 2.84; medial pronotal length including collar 1.47; basal pronotal width 2.62; width across hemelytra 2.88.
Distribution
Indonesia (Java).

Discussion
Poppius (1914) listed three syntypes from west Java, we have designated a female with the label data above and housed in the Zoological Museum, University of Helsinki, Finland as the lectotype for the species. This species and *P. poppii* are unique members of *Philostephanus*, being distributed in Sundaland of tropical Southeast Asia. They are considered to be sister species based on similar structure of the female genitalia; the medial, slender, snake-like sclerite dividing the lateral oviducts is regarded as synapomorphic for both species.

Material examined. Lectotype ♀ (see above).

*Philostephanus vitaliter* Distant
Figs 1–4, 24, 162–170
Diagnosis
Recognized by the shining dark brown dorsum, shining fuscous and almost glabrous pronotum usually with a pale, medial, short stripe posteriorly, very short setae on the speckled hemelytra, dense, long, woven setae on the male genital segment, and structures of the genitalia.

Redescription
Body oblong-oval, moderate in size.
Coloration. Dorsal surface dark brown, shining. Head pale brown; vertex darkened medially; frons with several rows of dark, transverse striations; maxillary plate and clypeus darkened. Antenna dark brown; segment I, basal part of II, and extreme bases of III and IV pale brown; segment I with basal dark ring. Labium pale brown; basal part of segment II and apical part of IV somewhat darkened. Pronotum shining dark brown, with short, pale posterior medial stripe; mesoscutum dark brown; scutellum shining blackish brown, with yellow corners; thoracic pleura dark

Figs 167–170. Female genitalia of *Philostephanus vitaliter*. – 167–168, genital chamber and adjunct structures; 169, sclerotized ring; 170, posterior wall. Scales 0.2 mm.
brown, partly pale brown; ostiolar peritreme pale brown with darkened lateral part. Hemelytra shining dark brown, distinctly speckled with irregular, pale spots; cuneus dark brown, not speckled, with yellowish basal margin and apex; membrane pale grayish brown, with dark veins. Leg pale brown; femora with several dark spots mainly on ventral surface; hind femur with 2 obscure, apical rings; each tibia with 3 or 4 dark annulations; apical parts of tarsomeres III somewhat darkened. Abdomen dark brown, irregularly speckled with pale portions.

Surface and vestiture. Dorsal surface, shining, with very sparse, short pubescence. Head glabrous; vertex with shallow, longitudinal medial sulcation; frons with several rows of dark, transverse striations; mandibular plate with narrow, transverse wrinkles. Pronotum narrowly carinate laterally, almost glabrous, only with very sparse, short setae; mesoscutum somewhat shagreened, with sparse, short, silvery pubescence; scutellum almost glabrous; thoracic pleura widely shagreened. Hemelytra with shallow punctures that bear very short setae. Tibial spines brown.

Male genitalia. Figures. 162–166. Similar to those of *difficilis*. Genital segment and parameres with conspicuous, long, erect, somewhat woven setae. Right paramere with tumid hypophysis. Vesica with full set of AS+GS+LL+LS+VL+VS; AS and LS broadened, with membranous bases; GS reduced; VS shortened.

Female genitalia. Figs 1–4, 167–170. DOS expanded medially, with slender MSGC; OL divided laterad by medial expansion; MPG C unpaired, weak. DS wide, with lateral, small, spinulose lobes.

Dimensions. ♂/♀: Body length 6.5–6.9/7.1–7.6; head width including eyes 1.12–1.19/1.17–1.19; vertex width 0.30–0.32/0.38–0.39; lengths of segments I–IV (♂/♀): 0.78–0.82/0.74–0.82, 1.92–2.04/1.80–1.88, 1.00–1.04/1.05–1.11, 0.52–0.63/0.55–0.58; labium reaching apex of metacoxa; length 2.61–2.64/2.64–2.74; medial pronomal length including collar 1.22–1.37/1.34–1.49; basal pronomal width 2.16–2.38/2.47–2.60; width across hemelytra 2.71–2.76/2.83–3.08; lengths of hind femur, tibia and tarsus (♂/♀): 2.37–2.48/2.40–2.55, 3.57–3.60/3.36–3.68, 0.79–0.82/0.79–0.82; lengths of hind tarsomeres I–III (♂/♀): 0.22–0.24/0.25–0.27, 0.36–0.39/0.36–0.38, 0.38–0.41/0.37–0.38.

Distribution
Northern India (Simla), Nepal. Record of this species from Sichuan, China (Hsiao 1942) is apparently based on misidentification (see Material examined for *P. difficilis*).

Material examined. India: 1 ♀ lectotype (see above).

Nepal: 1 ♂, Katmandu, Pulchauki 8,000 ft, 6.viii.1967, Can. Nepal Exped. (CNC); 1 ♂, Nagbug 2,550 m, Solukhumbu Dist., light trap, 5.x.1979, M. Tomokuni (NSMT); 2 ♂♀, Khari khola 2,050 m, Solukhumbu Dist., 7.x.1979, M. Tomokuni (NSMT); 1 ♂, Khari khola 2,100 m, Solukhumbu Dist., 7.x.1979, M. Sato (NSMT).

*Philostephanus wuzhiensis* (Lu & Zheng) comb. n.

*Arbolygus wuzhiensis* Lu & Zheng, 1998a: 85 (n. sp.).

Holotype ♂: China: Hainan Island, Mt. Wuzhi (18°54′N, 109°42′E), 22.vi.1964, Liu (TJNM), dissected genitalia not attached. [examined].

*Arbolygus wuzhiensis*; Kerzhner & Josifov 1999: 70 (cat.).

Diagnosis
Recognized by the relatively small body, narrow, mostly red, transverse fascia on the vertex, pale antennal segment I, and relatively simple form of the male vesica (Lu & Zheng 1998a).

Redescription
Holotype male. Body elongate oval, relatively small.

Coloration. Dorsal surface generally brown, shining. Head shining pale brown; vertex narrowly darkened along inner margin of eye, with dark, subtriangular mark medially and narrow, reddish, basal, transverse fascia; frons with medial, dark band and 3–4 rows of narrow, dark, lateral bands; clypeus, mandibular and maxillary plates partly, narrowly darkened. Antenna pale brown; inner medial part of segment I slightly darkened; apical 1/3 and base of segment III darkened; segments III and IV dark brown with yellowish extreme bases. Labium pale brown; apical half of segment IV dark brown. Pronotum shining dark brown, widely pale brown laterally, with narrowly yellowish brown posterior margin; calli blackish brown, with pair of small, pale spots contiguous to yellowish brown collar; scutellum dark brown, with widely yellowish anterolateral corners and posterior apex; pleura dark brown; propodeum and episternum widely yellowish brown; ostiolar peritreme darkened. Hemelytra dark brown, shining, speckled with pale, semitransparent portions; cuneus dark brown with pale anterior margin and posterior apex; membrane somber grayish brown, with cells, lateral spot near apex of cuneus and posterior part of vein pale. Coxae pale brown, each with dark spot at extreme base; legs pale brown; fore and middle femora with 3 dark rings; hind femur with rather wide, dark, medial ring, irregularly darkened apical part and 3 pairs of dark spots at basal half; tibiae each with 4 obscure annulations and pale brown spines; apical halves of tarsomeres III darker. Abdomen pale

Arbolygus wuzhiensis
Philostephanus wuzhiensis (Lu & Zheng) comb. n.

Yasunaga & Schwartz Revision of the genus *Philostephanus* (Miridae)
Figs 171–177. *Philostephanus* species in Nepal. – 171 & 172, male (171) and female (172) of *ailaoensis*; 173–174, a male individual assumed to be conspecific with *himalayicus* that was final instar when collected (174); 175–177, a female near *P. castaneus* that was final instar (177) when collected and emerged (175) after a few days.
brown, speckled with five dark brown spots ventrally (genital segment dissected).

**Surface and vestiture.** Dorsal surface with uniformly distributed, pale, reclining setae on hemelytra. Head with sparsely distributed, short setae; vertex shallowly and roundly sulcate medially. Pronotum shallowly and roughly punctate, almost glabrous; scutellum very sparsely clothed with silky, short vestiture. Tibial spines brown.

**Female.** Unknown.

**Male genitalia.** Not examined; described and illustrated by Lu & Zheng (1998a).

**Dimensions.**  ♂: Body length 6.7; head width including eyes 1.13; vertex width 0.33; length of segments I–IV: 0.89, 2.04, 1.01, 0.53; labium almost reaching apex of hind coxa, length 2.60; medial pronotal length including collar 1.25; basal pronotal width 2.21; width across hemelytra 2.45; length of hind femur, tibia and tarsus: 2.40, 3.60, 0.84; length of hind tarsomeres I–III: 0.24, 0.32, 0.39.

**Distribution**
China (Hainan Island).

**Material examined.** China: 1 ♂, (holotype, see above).

**Outgroup taxa**

**Orientocapsus** gen. n.

*Type species:* *Orientocapsus aquilus* Yasunaga & Schwartz sp. n., Japan.

**Diagnosis**
Allied to *Philostephanus* Distant, but distinct in having a narrower head, wider vertex, shorter antennal segment III and labium, apical thumb-like protuberance of the sensory lobe of the right paramere, bifurcate or deeply toothed sensory lobe of the left paramere, extensively membranous vesica with an apical sclerite and inner sclerotized area, symmetrical female genitalia without distinct inner sclerotized processes, medially subcontiguous sclerotized rings, shallow common oviduct and roof of genital chamber with a longitudinal medial keel dividing the lateral oviducts, and spermathecal gland situated near the posterior end of common oviduct.

**Description**
Body elongate, subparallel-sided.

**Coloration.** Dorsal surface shining fuscous.

**Surface and vestiture.** Dorsal surface with simple vestiture. Head shining; frons less striolate; antenna almost unicolorously fuscous, segment I with dark, suberect setae; the remaining segments with uniform suberect setae. Pronotum shining, with sparsely distributed, silky, short, suberect vestiture; scutellum with sparse, short, silky vestiture. Hemelytra shining, somewhat roughened, with densely distributed silky, reclining vestiture.

**Structure.** Head oblique, narrow; width of head across eyes much less than half as wide as pronotum; vertex with transverse medial carina reduced; clypeus weakly projected basally. Antenna rather short and slender; segment I slightly shorter than III; segment II equal to or more than twice as long as III, not strongly incrassate; segments III and IV slender, filiform. Labium reaching apex of hind coxa. Pronotum with lateral margin not carinate; calli impunctate; collar about as broad as base of antennal segment II; scutellum somewhat arched. Hemelytra with cuneus about twice as long as basal width. Leg relatively long; hind femur longer than labium; tarsomeres I shorter than II or III.

**Male genitalia.** Figs 186–190, 198–201, 205–207. Genital segment densely clothed with erect setae of moderate length. Right paramere with sensory lobe more or less developed apically; sensory lobe of left paramere with distinct, pointed process. Vesica with an apical sclerite (AS) and developed left lateral lobe (LL) that are considered homologous with those exhibited in *Philostephanus* but with characteristic inner elongate sclerite (INV) near base of LL; phalotheca not conspicuously modified, with subapical, or apical fin-like process.

**Female genitalia.** Figs 191–197, 202–204, 208–210. Rather symmetrical in general shape. Sclerotized ring large, thin-rimmed, anteriorly with continuous dorsal labiate plate (DLP); dorsal sac (DOS) shallow, not strongly expanded dorsally, surrounded by narrow, rounded lateral sclerotized edge (SPGC) as in *Philostephanus* but with more or less sclerotized, longitudinal, medial keel (MK) dividing each oviductus lateralis (OL) that are basally surrounded by radiately arranged, slender sclerites; spermathecal gland arising near medial, posterior end of DOS. Posterior wall of bursa copulatrix symmetrical, about as long as wide, with bilobate, finely spinulate dorsal structure (DS), weak lateral lobe (LLB), moderate interramal lobes (IRL) and medially divided, oblique interramal sclerites (IRS).

**Etymology**
From Latin, oriens or orientis (east), in combination with a mirine generic name *Capsus* Fabricius, referred to the occurrence of the members in eastern Asia; gender masculine.
Distribution
Japan, continental China, and Taiwan.

Discussion
This new genus is closely allied to Philostephanus, from which it is sometimes difficult to distinguish from based on superficial characters alone. However, Orientocapsus is characterized by unique structures of the genitalia as described above. Of these, the inner elongate sclerite in the male left lateral lobe, and the medial, longitudinal keel, slender sclerites radiatingly surrounding the lateral oviducts and posteriorly arising spermathecal gland exhibited in the female dorsal sac are considered as autapomorphies for Orientocapsus.

Additionally Orientocapsus and Philostephanus share some homologous structures, such as the apical sclerite, gonoporal sclerite and left lateral lobe of the vesica, and more or less sclerotized dorsal sac surrounded by the distinct lateral sclerotized edge. Judging from the homologous structures in the genitalia as well as the external similarity, these two genera are apparently closely related to each other. Therefore, Orientocapsus is here treated as the closest relative of Philostephanus.

The final instar immature form of O. zhangi shown in figure 180 is similar in general appearance to those of Philostephanus species, from which it significantly differs in having the body densely furnished with silky, long, erect setae. However, since the nymphs of any other Orientocapsus species have are yet to be discovered, we cannot regard the dense setae as a diagnostic character for the genus. Orientocapsus currently contains five species inhabiting deciduous forests of eastern Eurasia.

Key to species of Orientocapsus

1. Pronotum with uniformly distributed, silky pubescence ........................................... zhangi
   – Pronotum almost glabrous ........................................... 2

2. Hemelytra with very sparsely distributed, fine setae .................................................. cheroi
   – Hemelytra distinctly pubescent or pilose ........... 3

3. Anterolateral corners and posterior apex of scutellum pale ........................................... picinus
   – Only posterior apex of scutellum narrowly pale .......................................................... 4

4. Antennal segment II about as long as basal width of pronotum; Japan proper .......... aquilus
   – Antennal segment II shorter than basal width of pronotum; Taiwan .................. bicoloratus

Orientocapsus aquilus sp. n.
Figs 178, 186–194

Arbolygus ulna; Yasunaga et al. 1993: 155, fig. 48 (nec Kezner 1979).

Figs 186–190. Male genitalia of *Orientocapsus aquilus*. – 186, right paramere; 187–188, left paramere; 189–190, vesica. Scales 0.2 mm for 186–188, 0.5 mm for 189–190.

1♂, same locality, 1.vi.1953, T. E. & T. M. (EUM); 1♀, same locality, 14.vii.1952, S. Miyamoto (ELKU); 1♂, same locality, 24.vi.1971, M. Sakai (NSMT); 1♀, Mt. Takashiro, Naka-gun, Tokushima Pref., 29.vii.1979, M. Yoshida (NSMT); 1♂, Mt. Tsurugi, Tokushima Pref., 19–20.vi.1981, S. Naomi (MNHA); 1♀, same locality, 10.vii.1993, light trap, Ali et al. (YCN); 1♀, Odamiyama, Ehime Pref., 12.vi.1994, M. Takai (YCN), Kyushu: 1♂, Mt. Hikosan, Fukuoka Pref., 7.vi.1937, K. Yasumatsu (ELKU); 1♂ 1♀, same locality, 19.x.1987, light trap, T. Yasunaga (YCN); 1♂ 4♀, same locality, 21.xi.1987, light trap, K. Yahiro (YCN); 1♀, Mt. Shiratori, 700–1,300 m alt., Izumi Vil., Kumamoto Pref., 27–28.vi.1987, R. Noda (YCN); 1♀, same locality, 6.vii.1991, T. Yasunaga (YCN);
Diagnosis
Recognized by the elongate body, shining black general coloration, glabrous pronotum and scutellum, densely pubescent hemelytra (Fig. 178), and peculiar shape of the genitalia.

Description
Body generally shining black; vertex wide; clypeus slightly produced.

Coloration. ead shining blackish brown, sometimes partly pale. Antenna blackish brown; extreme bases of segment III and IV pale brown. Labium pale brown; apical part of segment IV infuscate. Pronotum shining blackish brown, with narrowly yellow basal margin; collar shining, varying from yellowish brown to fuscous; mesoscutum and scutellum shining blackish brown; scutellum with yellow apex and sometimes with pair of yellow spots near anterolateral corners; thoracic pleurites widely fuscous, except for coxae and posterior margin of ostiolar peritreme yellow. Hemelytra shining blackish brown; anterolateral margin of cuneus narrowly pale, semitransparent; membrane somber grayish brown. Legs blackish brown; basal 1/4–1/3 of each femur yellow; apical 1/3 of hind femur usually with pale ring; subapical parts of fore and middle tibiae pale; hind tibia with two yellow, wide annulations; tarsomerses I and II somewhat pale. Abdomen almost entirely shining blackish brown.


Male genitalia. Figs 186–190. Right paramere with sensory lobe produced and setose apically and medi ally curved hypophysis; left paramere densely pubescent, with distinct, pointed process dorsally. Vesica widely expanded when elected, with reduced, triangular, very small AS at apex of membranous lobe that is accompanied by medial tubercle and minutely wrinkled region, and with developed, apically spinulate LL; gonopore small.

Female genitalia. Figs 191–194. DOS with 3, narrowly sclerite along SPCG; MK distinctly sclerotized, forming medial plate; small, visible, circular entrance of SG present at posterior end of MK in ventral view. PWB with conical DS.

Dimensions. δ / ♀: Body length 6.8–8.2/ 7.2–8.7; head width including eyes 1.05–1.18/ 1.15–1.25; vertex width 0.38–0.41/ 0.46–0.48; length of antennal segments I–IV: 0.84–1.03/ 0.96–1.11, 2.16–2.57/ 2.40–2.72, 0.98–1.20/ 1.17–1.23, 0.57–0.68/ 0.69–0.72; labium reaching apex of hind coxa, length 2.35–2.64/ 2.61–2.81; medial pronotal length including collar 1.27–1.52/ 1.29–1.66; basal pronotal width 2.18–2.63/ 2.40–2.84; width across hemelytra 2.64–3.12/ 2.92–3.36; length of hind femur, tibia and tarsus: 2.40–2.88/ 2.68–3.12, 3.60–4.28/ 3.96–4.49, 0.74–0.87/ 0.81–0.87; length of hind tarsomerse I–II: 0.22–0.26/ 0.24–0.28, 0.33–0.44/ 0.37–0.42, 0.37–0.38/ 0.39–0.41.

Etymology
From Latin, aquilus (blackish, dark colored), referring to the generally fuscous coloration of this new species.

Distribution
Japan (Hokkaido, Honshu, Shikoku, Kyushu), S. Kuril Isls. (Kunashiri Island).

Discussion
In Japan, this new species may be confused with Philostephanus lucidus, from which it is easily distinguished by the elongate body, less striolate frons, subapical pale ring of the hind femur, and noticeable pointed process of the left paramere. Since most specimens of Orientocapsus aquilus have been collected by light traps, the breeding hosts and immature stages remain unknown. TY collected some adults from Acer sp. (Aceraceae), Populus maximiophthii (Salicaceae) and Prunus sp. (Rosaceae) that are not currently confirmed as breeding hosts.

Orientocapsus bicoloratus sp. n.
Figs 182, 195–197

Type material. Holotype ♀, Taiwan, Mt. Kanto, Puli, Taichung Hsien, 17.iv.1986, S. Gotoh (AMNH).

Diagnosis
Closely allied to aquilus, but easily distinguished by the yellow lateral margin of the pronotum, and widely pale base of the cuneus, in addition to allopatric occurrence in Taiwan.

Description
Female. Body elongate oval.
**Coloration.** Dorsal surface shining dark brown. Head pale brown, shining; frons widely darkened; mandibular and maxillary plates and apical part of clypeus dark brown. Antenna dark brown; extreme bases of segments II and IV yellowish brown. Labium pale brown; apical part of segment IV dark brown. Pronotum shining dark chestnut brown; lateral and posterior margins yellow; calli with pair of small, yellow spots anteriorly; collar yellow; mesoscutum dark brown; scutellum dark chestnut brown, with yellow apex; pleura widely fusous, except for lateral margin, ventral half of ostiolar peritreme and coxae.
yellow. Hemelytra dark brown, shining; basal margin of cuneus continuously yellowish brown; membrane somber grayish brown. Leg dark brown; basal parts of femora yellowish brown; apical quarter of hind femur with pale ring; tibiae each with two yellow annulations. Abdomen dark brown; ventral medial part pale brown.

**Surface and vestiture.** Head with sparse, short, silky vestiture. Pronotum sparsely, shallowly and irregularly punctate, with sparsely distributed, silky, minute vestiture; mesoscutum somewhat shagreened, with sparse, short, silky vestiture; scutellum shallowly and transversely rugose, bearing sparse, short, silky vestiture. Hemelytra shallowly and coarsely punctate, with uniformly distributed, silky, reclining vestiture. Tibial spines pale brown.

**Male.** Unknown.

**Female genitalia.** Figs 195–197. Similar to those of *aquilus* but DOS with 5 narrow sclerites; MK widely membranous. PWB with weaker DS, squared posterior margin of IRS and pair of small sclerites posteriorly.

**Dimensions.** ♀: Body length 7.5; head width including eyes 1.15; vertex width 0.43; length of antennal segments I-IV: 0.98, 2.28, 1.15, 0.72; labium reaching apex of hind coxa, length 2.59; medial pronotal length including collar 1.58; basal pronotal width 2.69; width across hemelytra 3.02; length of hind femur, tibia and tarsus: 2.88, 3.84, 0.72; length of hind tarsomeres I-III: 0.24, 0.35, 0.36.

**Etymology**
Named for the bicolorous pronotum (black with yellow margins).

**Distribution**
Taiwan.

**Discussion**
This new species is currently represented by a single female, and a close relative of Japanese *O. aquilus*. In addition to the characters diagnosed above and allopatic distribution, *bicoloratus* is distinct in having the membranous medial keel and 5 narrow sclerites of the dorsal sac, and squared posterior margin of the interramal sclerite and a pair of small sclerites on the posterior wall of bursae.

**Orientocapsus cheroti** sp. n.
Figs 184, 198–204


**Diagnosis**
Easily distinguished from other congeners by the small size, slender and parallel-sided body, and almost glabrous hemelytra usually with speckled corium and clavus.

**Description**
Body variable in coloration, elongate oval, parallel-sided, rather small in size.

**Coloration.** Dorsal surface shining fuscous. Head shining dark brown, sometimes pale along inner margin of eye. Antennal segment I shining fuscous; segment II dark brown, with basal half pale brown except for dark base; segments III and IV mutilated in all examined specimens. Labium widely dark brown; segment II pale brown. Pronotum shining dark brown, sometimes widely pale posteriorly, with yellowish brown posterior and lateral margins; collar yellow but darkened laterally; mesoscutum and scutellum shining dark brown; pale area of each corner of scutellum variable, sometimes fused together and making continuous pale lateral margin; pleura widely darkened, with yellowish posterior margin of ostiolar peritreme. Hemelytra shining dark brown; corium and clavus usually speckled with paler areas; anterior margin of cuneus yellowish brown; membrane dark grayish brown. Coxae yellow, with dark bases; legs dark brown; basal 1/4–1/3 of each femur yellow; apical 1/3 of hind femur with a ventral, pale fascia; tibiae each with a subbasal and a subapical, yellow annulations; tarsi dark brown.

**Surface and vestiture.** Dorsal surface almost glabrous. Vertex smooth, without distinct sulcus medially; frons less striolate. Pronotum weakly punctate, almost glabrous. Hemelytra shallowly punctate, almost glabrous.

**Male genitalia.** Figs 198–201. Parameres with typical mirine shape; sensory lobe of right paramere weakly produced apically; sensory lobe of left paramere toothed along dorsal margin, flattened inward, weakly produced basally. Vesica with long AS; LL with rather narrow INV; phallothecal FP situated subapically.

**Female genitalia.** Figs 202–204. DLP widened, subtriangular; SPGC anteriorly continuous; DOS without narrow sclerites; MK tumid, widely membranous. PWB with small DS, narrow IRL and pair of posterior, small processes.

**Dimensions.** ♂/ ♀: Body length 6.3/ 6.6–7.2; head width including eyes 1.08/ 1.03–1.07; vertex width 0.45/ 0.44–0.46; length of antennal segments I to IV: 0.89/ 0.81–0.87, ?/ 1.96–2.09, ?/ ?, ?/ ?; labium slightly exceeding apex of midcoxa but not reaching hind coxa, length 2.57/ 2.52–2.55; medial pronotal length including collar 1.25/ 1.20–1.32; basal
pronotal width 2.12/2.08–2.24; width across hemelytra 2.40/2.37–2.84; length of hind femur, tibia and tarsus: 2.45/2.47–2.52, 3.65/3.57–3.60, 0.72–0.77; those of hind tarsomeres I-III: 0.24–0.26, 0.32–0.33, 0.31–0.36.

**Etymology**
Named in honor of our friend and colleague, Frédéric Chérot, who is enthusiastically working on mirine plant bugs.

**Distribution**
China (Yunnan Prov.).

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**Orientocapsus picinus** (Lu & Zheng) **comb. n.**
Fig. 183


**Diagnosis**
Recognized by the small size, fuscous slender body, entirely dark antennal segment II, narrow yellow basal margin of the pronotum, and shining, fuscous, unspeckled hemelytra.
Redescription

Holotype male. Body elongate oval.

Coloration. Dorsal surface shining fuscous. Head shining dark brown; vertex pale brown; frons narrowly pale laterally; buccula and gula yellow. Antenna almost unicolorously darkened; extreme base of segment III slightly paler. Labium pale brown; segment I, base of II and apical half of IV dark brown. Pronotum shining dark brown, with narrowly pale posterior margin; collar yellow with posterior margin and lateral part darkened; mesoscutum and scutellum shining dark brown, except for corners of the latter yellow; yellow spots on anterior corners of scutellum rather small; pleura widely dark brown; posterior margin of ostiolar peritreme yellow. Hemelytra shining dark brown, not speckled; basal margin of cuneus pale, semitransparent; membrane pale grayish brown. Coxae yellow, with dark bases; femora yellowish brown, with dark bases; fore and middle femora each with a few, obscure fasciae at apical half; hind femur widely dark brown at apical 2/3, ventral apical part with a fascia and some smaller spots yellow; tibiae dark brown, each with 3 pale annulations that are not clear in fore and middle tibiae; tarsi dark brown. Abdomen (except for dissected genital segment) widely dark brown.


Female. Unknown.

Male genitalia. Not examined; dissected genitalia not attached.

Dimensions. ♂: Body length 6.5; head width including eyes 1.06; vertex width 0.39; length of antennal segments I-IV: 0.78, 2.04, 0.94, 0.56; labium reaching apex of hind coxa, length 2.40; medial pronotal length including collar 1.15; basal pronotal width 2.04; width across hemelytra 2.40; length of hind femur, tibia and tarsus: 2.33, 3.48, 0.72; length of hind tarsomeres I-III: 0.24, 0.34, 0.35.

Distribution

China (Yunnan Prov.).

Discussion

This species is currently represented by a single male holotype. We examined the holotype to which the genitalia are not attached, but illustrations provided by Lu & Zheng (1998a) undoubtedly suggest this species to be a member of Orientocapsus rather than Philostephanus.

Material examined. China: 1 ♂, holotype (see above).

Orientocapsus zhangi (Lu & Zheng) comb. n.

Figs 179–181, 185, 205–210, 262–269


Diagnosis

Easily recognized by the reddish brown general coloration and uniformly distributed, silky, suberect pubescence on the pronotum.

Redescription

Body elongate oval.

Coloration. Dorsal surface shining brown, somewhat tinged with red. Head pale brown to brown. Antennae dark brown; segment I pale brown, usually darkened inwardly; basal 1/4 of segment II somewhat paler except for dark extreme base. Labium pale brown; apical half of segment IV dark brown. Pronotum dark brown but widely brown posteriorly, shining, with narrowly pale posterior margin; collar pale brown; mesoscutum shining dark brown, with pale lateral margin; scutellum dark brown, with pale brown angles; pleura widely dark brown. Hemelytra brown; anterior margin of cuneus pale grayish brown. Coxae pale brown, with obscure bases; femora dark brown, each with dark extreme base and a few, obscure rings; tibiae brown, not clearly annulated; tarsi pale brown; apical halves of tarsomeres III darker. Abdomen chestnut brown.

Surface and vestiture. Dorsal surface distinctly pubescent. Head with silky vestiture; vertex with a weak, medial sulcation; frons weakly striolate. Pronotum finely and uniformly punctate, with uniformly distributed, silky, suberect setae; collar distinctly pubescent; mesoscutum pubescent; scutellum relatively tumid, uniformly clothed with silky, suberect setae; Hemelytra with densely distributed, suberect brown setae and partly with appressed, sericeous vestiture; corium and clavus partly clothed with silvery, reclining vestiture.

Male genitalia. Figs 195–197. Right paramere shortened, with broadened and somewhat flattened hypophysis; left paramere with apically projected sensory lobe. Vesica with hooked AS, widened GS, small LL and developed INV.

Female genitalia. Figs 208–210. DOS with a pair of apically pointed MPG; MK reduced, represented by weak sclerites; DLP narrow, continuous. DS roundly swollen; IRL constricted basally.

Dimensions. ♂ / ♀: Body length 6.5–8.1/ 6.9–7.3; head width including eyes 1.15–1.28/ 1.05–1.18; vertex width 0.30–0.34/ 0.32–0.35; length of
antennal segments I-IV: 0.86–1.04/ 0.82–0.88, 1.96–2.38/ 1.95–2.00, 1.08–1.32/ 1.12–1.20, 0.48/ 0.50–0.60; labium reaching apex of hind coxa, length 2.64–2.88/ 2.75–2.80; medial pronotal length including collar 1.27–1.47/ 1.21–1.45; basal pronotal width 2.18–2.50/ 2.07–2.45; width across hemelytra 2.64–3.00/ 2.55–2.83; length of hind femur, tibia and tarsus: 2.56–2.84/ 2.32–2.60, 3.69–4.32/ 3.40–3.75, 0.86–0.96/ 0.72–0.80; length of hind tarsomeres I-III: 0.24–0.28/ 0.22–0.29, 0.36–0.45/ 0.35–0.39, 0.42–0.48/ 0.35–0.39.

**Distribution**
China (Yunnan Prov.), Nepal.

**Material examined.** China: 1♀ holotype(see above). Nepal: 2♂, 27°58′N, 85°00′E, 11,100 ft, without further locality name, 27.vi.1967, Can. Nepal Exped. (CNC); 1♀ 3♂, Langtang Himal, Dhunche, 1,950 m, at light, 8–9.vi.2006, T. Yasunaga (AMNH, NMTU, YCN).


**Liocapsus Poppius**


**Diagnosis**

Easily distinguished from the related genera, *Philostephanus* and *Orientalcapsus*, by the shining, highly polished dorsum (Figs 211–214, 217–222) and remarkably shortened labium (Fig. 214). Poppius (1915) offered a detailed description of the external structures, our brief redescription is provided to distinguish it from near relatives.

**Redescription**

Body suboval or elongate oval, moderate to large in size.

**Coloration.** Head vertical, smooth.

**Surface and vestiture.** Dorsal surface very shining, highly polished. Head with frons weakly and shallowly striolate. Pronotum very shining, glabrous and impunctate; collar somewhat shagreened; scutellum shining, glabrous, and impunctate, narrowly and shallowly wrinkled. Hemelytra shining, highly polished, with sparsely distributed, silky, short vestiture.

**Structure.** Head with width including eyes about as long as or shorter than half length of basal width of pronotum. Head with longitudinal medial sulcus of vertex weak or absent; frons tumid, rounded; clypeus distinctly appressed basally. Antennal segment I longer than IV; segment II less than twice as long as III, shorter than basal width of pronotum. Labium very short, less than 1.8 mm, shorter than antennal segment II, not reaching base of midcoxa. Pronotum with scutellum somewhat arched.

**Male genitalia** Figs 223–225, 228–231, 234–239, 241–243. Parameres asymmetrical; left paramere semi-circularly curved; sensory lobe rather thick, with more or less projected base; right paramere broadened apically, bifurcate. Vesica with a single, slender, minutely toothed spiculum (SPC), a spinule left lateral sclerite (LLS), and a smoothly extended, slender right lateral sclerite (RLS) that is mostly fused with membranous lobe; apical part of phallotheca with a narrow, fin-like process.

**Female genitalia** Figs 226, 227, 231–233, 239, 240, 244, 245. Primarily symmetrical in general aspect, except for obliquely bending or swollen dorsal sac (DOS) that appears to be thickened by inner sclerotization. Sclerotized rings (SR) thick-rimmed, subtriangular; roof of genital chamber with paired sclerotized [plates] structure (SS) present below oviductus laterales (OL) [these are not on the VLP as stated in Yasunaga & Schwartz (2000), but the extension of the DLP, the roof of the genital chamber]; dorsal sac slender, elongate, bending left or right, with oviductus communis (OC) at anterior base; medial sclerotized plate of vestibulum (MSV), situated at bend, or conjunction, of first valvula and ramus of first valvula larger than that found in *Philostephanus* structure in *Orientalcapsus* and *Mahania*. Posterior wall of bursa copulatrix (PWB) much wider than long, with widened, bilobate dorsal structure (DS, apical lobe minutely spinulate) and narrow but wide interramal lobes (IRL) that are subcontiguous mediately.

**Distribution**

N. India, Nepal, Taiwan.

**Biological**

No biological information had been available until TY discovered an undescribed species during recent field research in Langtang Himal of Nepal. The occurrence of this species, described below as *L. langtang*, was found restricted to inflorescences of fagaceous *Quercus* spp. Collection records of all treated species suggest that *Liocapsus* species were, without exception, captured from spring to early summer when *Quercus* spp. are in full bloom. *Liocapsus* species are assumed to have a relationship with *Quercus* oaks.

**Discussion**

This genus is characterized by the highly polished, very shining dorsum and remarkably shortened labium, in addition to the unique characters of the genitalia, as mentioned above. Especially, the obliquely elongate female dorsal sac is distinctly autopomorphic for the genus.

Judging from the great similarity of the dorsal habitus, *Liocapsus* is also considered to be a relative of *Philostephanus*. Some characters of the female genitalia in *Liocapsus* are shared by other mirine genera; for example, the paired sclerotized structure is also found in some genera of *Lygus* sensu lato (e.g., *Chilocrates* Horváth; see Schwartz & Footitt 1998, Yasunaga & Schwartz 2000). But asymmetrical and thickened modification of the dorsal sac appears to suggest a relationship with *Philostephanus*.

**Key to Liocapsus species**

1. Scutellum pale laterally ........................... 2
   - Scutellum wholly fuscous ......................... 5
2. Body large, longer than 7.6 mm .......................... brevirostris, female
   - Body shorter than 7.3 mm ........................... 3
3. Male ................................... langtang (part)
   - Female ................................... 4
4. Nepal, or south slope of Himalayas...langtang
   – Taiwan............................gotobi
5. Pronotum clearly bicolorous, yellowish brown anterorly and black posteriorly; hemelytra almost glabrous...ochromelas
   – Pronotum almost unicolorously fuscous; hemelytra with silky vestiture..............6
6. Pro- and middle femora almost entirely black; N. India.........brevirostris, male
   – Pro- and middle femora widely pale brown; Taiwan.................................7
7. Antennal segment IV almost equal to half length of segment III; Taiwan...gotobi, male
   – Antennal segment IV more than half length of segment III; Nepal.........langtang, male

Liocapsus brevirostris Poppius
Figs 217, 218, 223–227
Liocapsus brevirostris Poppius, 1915: 16 (n. sp.); Lectotype
δ: India (here designated): Darjeeling/ Juni/ Frühstorfer leg. (ZMUF) [examined].
Recognized by the large size, almost entirely fuscous body of the male, a longitudinal, medial, pale stripe on the pronotum, narrowly pale lateral margin of the scutellum, sometimes widely pale brown corium and clavus in the female, and structure of the genitalia. Distinct sexual dimorphism is exhibited in general coloration and size (Figs 198, 199); female is larger and much paler than male. Poppius (1915) offered further description of the external structure.

**Male genitalia.** Figs 223–225. Parameres almost glabrous; only basal part of left sensory lobe and apical part of right sensory lobe with several, short setae; basal process of left sensory lobe rounded.

**Female genitalia.** Figs 226–227. DOS bending left.

**Dimensions.** \( \delta / \phi \): Body length 7.0/ 7.6–8.2; head width including eyes 1.08/ 1.10–1.13; vertex width 0.41/ 0.46–0.51; lengths of antennal segment I 0.75/ 0.69–0.75, II 1.92/ 1.92–1.95, III / 1.30, IV / 0.48; labium length 1.44/ 1.68; medial pronotal length including collar 1.23/ 1.44–1.52; basal pronotal width 2.26/ 2.56–2.79; width across hemelytra 2.72/ 3.12–3.22; lengths of hind femur 2.52/ ?; tibia 3.36/ ?, tarsus 0.82/ ?.

**Figs 217–222.** Male (217, 219 & 221) and female (218, 220 & 222) of *Liocapsus* species. – 217 & 218, *L. brevirostris*; 219 & 220, *L. gotohi*; 221 & 222, *L. ochromelas*. 
**Distribution**
North India.

**Material examined. India:** 1♂ lectotype (see above), 2♀ paralectotypes, same data (ZMUF).

*Liocapsus gotohi* sp. n.
Figs 219, 220, 228–233

**Type material.** Holotype ♂, Taiwan, Wushe Sungkan, Puli, Taichung C., 22.v.1989, S. Gotoh (AMNH). Para-

types: Taiwan: 3♂ 1♀, same data as for holotype (YCN); 1♀, Sungkan, C. Taiwan, 9.v.1971, N. Fukuhara (NIAS); 1♀, Hewang-shan, Puli, Taichung C., 20.v.1989, S. Gotoh (YCN); 3♂ 3♀, Teng-ji Nature Reserve, Taichung C., 12.v.1989, S. Gotoh (CNC & YCN); 1♂ 4♀, same local-

ity and collector, 12–13.v.1989 (YCN); 3♂, Lishan-Tien-

**Diagnosis**
Allied to *brevirostris*, from which this new species is easily distinguished by the smaller size, a pale, medial spot on the male corium, widely pale lateral margin of the scutellum, and different structure of the geni-
talia. Distinct sexual dimorphism is exhibited in the

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*Figs 223–227.* Male (223–225) and female (226–227) genitalia of *Liocapsus brevirostris.* – 223, right paramere; 224, left paramere; 225, vesica; 226, posterior wall; 227, genital chamber and adjunct structures. Scales 0.2 mm.
coloration and size as in _brevirostris_ (Figs 194, 195); female is significantly larger and paler than male.

**Description**

**Male.** Body elongate oval; frons roundly arched. **Coloration.** Dorsal surface dark brown, highly polished and very shining. Head shining black, almost smooth; vertex with a pair of pale brown spots which are sometimes fused together and forming a continuous, transverse fascia. Antenna blackish brown; base of segment II sometimes narrowly pale. Labium pale brown; segment I and apical half of segment IV dark brown. Pronotum blackish brown, highly polished, almost impunctate; collar yellowish brown darkened laterally; scutellum with narrowly pale lateral margins; pleura variable in color, pale or yellowish brown to fuscous, somewhat tinged with red; posterior margin of ostiolar peritreme yellow. Hemelytra oily shining; apical part of clavus, latero-medial part of corium and base of cuneus pale brown; membrane somber grayish brown, with a pale spot near apex of cuneus. Coxae dark brown, usually with narrowly

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**Figs 228–233.** Male (228–231) and female (232 & 233) genitalia of _Lincapsus gotohi_. – 228, Right paramere; 229 & 230, left paramere; 231, vesica; 232, genital chamber and adjunct structures; 233, posterior wall. Scales 0.2 mm.
yellow apices; legs pale brown; apical part of hind femur widely darkened; base and apex of each tibia dark brown; tarsomeres III dark brown. Abdomen widely dark brown; lateral bases of sternum III–VIII and lateral parts of genital segment pale.

**Surface and vestiture.** Frons very weakly striolate. Pronotum only with very sparsely distributed, silky, short vestiture; collar shagreened; scutellum shallowly and transversely rugose, almost glabrous; pleura widely shagreened. Hemelytra with sparsely distributed, silky, short, suberect vestiture. Tibial spines fuscous.

**Female.** Body suboval.

**Coloration.** Dorsal surface variable in color from pale brown to dark brown, shining. Head usually widely pale brown or brown, or sometimes similar to that of male. Antennal segment I and base of II sometimes widely pale. Pronotum widely or sometimes almost wholly pale brown; medial part usually darkened with a narrow, medial, pale stripe or spot; collar entirely pale brown; lateral margin of scutellum widely pale brown. Hemelytra usually widely pale brown; apical parts of corium and cuneus usually darkened. Abdomen widely pale brown or brown.

**Male genitalia.** Figs 228–231. Sensory lobe of left paramere with a pointed, distinctly pilose basal projection; right paramere glabrous. Vesical spiculum curved and weakly twisted.

**Female genitalia.** Figs 232–233. DOS bending right.

**Dimensions.** \( \delta/\varphi \): Body length 5.7–6.7/6.3–7.2; head width including eyes 0.98–1.08/1.00–1.13; vertex width 0.37–0.41/0.48–0.70; length of antennal segments I–IV: 0.69–0.75/0.69–0.82, 1.75–1.90/1.51–1.83, 1.00–1.04/0.86–1.01, 0.50–0.51/0.45–0.53; labium short, not reaching midcoxal length 1.39–1.49/1.45–1.56; medial pronotal length including collar 1.15–1.30/1.27–1.49; basal pronotal width 1.87–2.19/2.18–2.40; width across hemelytra 2.37–2.48/2.49–2.88; length of hind femur, tibia and tarsus: 2.08–2.31/2.16–2.50, 3.00–3.24/3.12–3.36, 0.64–0.72/0.67–0.75; length of hind tarsomeres I–III: 0.22–0.24/0.24–0.26, 0.28–0.32/0.26–0.30, 0.34–0.38/0.34–0.39.

**Etymology**

Named after Mr. Shin Gotoh who kindly offered many specimens of this new species for our study but regretfully passed away in January, 2003.

**Distribution**

Montane areas of Taiwan.

**Liocapsus langtang sp. n.**

Figs 211–214, 234–240

**Type material.** Holotype \( \delta \), Nepal, Langtang Himal, Rimche-Lama Hotel, 2,340–2,500 m, on flower of *Quercus* sp., 3.vi.2006, T. Yasunaga (AMNH). **Paratypes: Nepal:** 7\( \delta \) 4\( \varphi \), same data as for holotype (CNC, NMTU, YCN); 1\( \delta \) 7\( \varphi \), Langtang Himal, Lama Hotel-Rimche, 2,340–2,440 m, 8.vi.2006, on flower of *Quercus* sp., T. Yasunaga (NMTU, YCN); 1\( \varphi \), Langtang Himal, Dhunche, 1,950 m, at light, 8–9.vi.2006, T. Yasunaga (YCN).

**Diagnosis**

Very similar in general appearance to *gotohi*, from which it can be discriminated by the antennal ratio of male as mentioned in the key and the genitalia, in addition to the remote distribution. The variable coloration makes it difficult to separate from *gotohi* consistently. Female is generally larger, thicker and lighter.

**Description**

**Male.** Body elongate oval.

**Coloration.** Dorsal surface dark brown, highly polished and very shiny. Head shiny dark brown, with a pair of pale, circular spots on vertex, or widely shiny pale brown, with a pair of dark stripe on frons; clypeus, jugum, lorum and gena as a rule dark brown. Antennae entirely fuscous; segment I shining. Labium pale brown; segment I and apical 1/3–1/2 of IV darkened. Pronotum widely fuscous, oily shiny, variable in color, sometimes yellowish brown anterior half (except for dark calli) and/or with a yellow, longitudinal medial stripe, glabrous, almost impunctate; collar always yellowish brown; scutellum shiny fuscous, usually with pale lateral margins; pleura dark brown, with yellow margins. Hemelytra oily shiny, dark brown; anterior part of corium and outer half of clavus usually pale, semitransparent; basal part of scutellum pale brown, size of pale portion variable; membrane smoky brown, with a pale spot behind apex of cuneus. Coxae and legs pale brown, sometimes tinged with red; basal half of each coxa dark brown; apical halves of pro- and middle femora usually brown or dark brown; apical 1/3 of hind femur usually darkened; base and apex of each tibia and all tarsi usually dark brown. Abdomen chocolate brown; genital segment furnished with yellowish parts.

**Surface and vestiture.** Almost glabrous. Scutellum narrowly and transversely rugose, glabrous; pleura shagreened or pruinosed except for shiny propleuron. Hemelytra with very sparsely distributed, silky, semierect pubescence. Tibia with fuscous spines.

**Female.** Body oval, tumid.

**Coloration.** Dorsal surface shiny, usually widely pale brown but in some darkened individual similar to male. Head shiny pale brown, or sometimes almost entirely darkened with a pair of pale spots on vertex;
clypeus always darkened. Antennae dark brown; basal part of segment I and basal half (except for base) of segment II pale brown; lengths of segments I-IV: Pronotum shiny pale brown or brown, with dark calli and posterior part; scutellum dark brown, with pale lateral margins; pleura pale brown, sometimes tinged with red, or widely darkened in some specimen. Hemelytra widely pale brown, with dark inner margin of clavus and apical parts of corium and cuneus. Color pattern of coxae and legs as in male but usually paler. Abdomen pale brown, sometimes tinged with red and/or irregularly darkened.

**Surface and vestiture.** As in male.

**Male genitalia.** Figs 234–238. Right paramere rather basic form. Vesical spiculum (SPC) broadened and strongly twisted; LLS weak, thin.

**Female genitalia.** Figs 239–240. DOS roundly swollen, toughened by weakly sclerotized anterior rim; SS not strongly projected posteriorly.

**Dimensions.** ♂/♀: Body length 6.3–6.9/ 6.5–7.3; head width including eyes 1.08–1.10/ 1.10–1.20; vertex width 0.37–0.40/ 0.49–0.54; lengths of antennal segments I-IV: 0.72–0.83/ 0.72–0.78, 1.92–2.08/ 1.62–1.98, 0.80–0.85/ 0.92–0.98, 0.43–0.45/ 0.50–0.52; labium reaching subapical part of mesocoxa, length 1.50–1.63/ 1.53–1.63; medial pronotal
length including collar 1.37–1.43; 1.42–1.55; basal pronotal width 2.26–2.35; 2.42–2.77; width across hemelytra 2.55–2.73; 2.90–3.15; length of hind femur, tibia and tarsus: 2.25–2.45/ 2.35–2.75, 3.37–3.65/ 3.32–3.80, 0.70–0.75/ 0.70–0.85; length of hind tarsomeres I-III: 0.23–0.25/ 0.23–0.32, 0.26–0.29/ 0.27–0.33, 0.35–0.38/ 0.37–0.40.

**Etymology**

Named for the type locality, Langtang Himal National Park of Nepal; a noun in apposition.

**Distribution**

Nepal (Langtang Himal).

**Discussion**

Although this new species is very similar in general appearance to *brevirrostris* and, particularly, *gotohi*, the genital structures of both sexes are rather remote from those of other congener. The basic mirror shape of the right paramere, the spiral, broad, strongly twisted vesical spiculum, and the rounded swollen dorsal sac are unique to *lantang*. 

TY recently found this new species in deciduous forests in Nepal. All of the individuals, except for a female attracted to light, were collected by sweeping inflorescences of *Quercus* spp. (Figs 214–215) that apparently are the breeding hosts. One generation per year is assumed for this species. Although the habitat is not so far from the known locality (Darjeeling, N. India) of *L. brevirrostris*, the latter is yet to be discovered in Nepal.

**Liocapsus ochromelas** sp. n.

Figs 221, 222, 241–245


**Diagnosis**

Easily distinguished from *brevirrostris* and *gotohi* by the small size, widely ocheros clavus, and anterior parts of the pronotum and corium. Significant sexual dimorphism is not exhibited in this new species (Figs 221, 222); only posterior fuscous part of the pronotum is wider in ♂.

**Description**

Body suboval.

**Coloration.** Dorsal surface shining yellowish brown, with contrastingly fuscous posterior margin of pronotum, scutellum, and posterior parts of corium, embolium and cuneus. Head dark brown (♂), pale brown (♀), shining; frons in male striolate with paired, several rows of pale, transverse fasciae; clypeus darkened. Antenna dark brown; subbasal part of segment II pale in female. Pronotum shining yellowish brown, with posterior margin widely fuscous; scutelnum fuscous; pleura pale brown; anterior margin of ostiolar peritreme infuscate. Hemelytra yellowish brown, very shining, with a continuous, black fascia across apical parts of corium and embolium; base of clavus narrowly darkened; apical half of cuneus fuscous; membrane somber grayish brown. Coxae and legs yellowish brown; bases and apices of middle and hind tibiae dark brown; apex of hind femur, entire hind tibia and all tarsi fuscous. Abdomen unicolorously pale brown.

**Surface and vestiture.** Dorsal surface including pronotum, scutellum, and hemelytra almost glabrous. Pronotum and hemelytra impunctate.

**Male genitalia.** Figs 215–217. Parameres with distinct setae; left paramere with thumb-like basal projection; hypophysis of right paramere slender. Vesical spiculum (SPC) elongate, curved medially.

**Female genitalia.** Figs 218–219. DOS bending left; SS broad; DS with a medial, thin sclerite.

**Dimensions.** ♂ / ♀: Body length 5.5- / 5.7–6.0; head width including eyes 1.02/ 1.03–1.06; vertex width 0.39/ 0.46–0.48; length of antennal segments I-IV: 0.67–0.68/ 0.67–0.70, 1.80/ 1.68–1.73, 0.92/ 0.96, 0.44–0.45/ 0.48; labium slightly exceeding apex of procoxa, length 1.32/ 1.41–1.42; medial pronotal length including collar 1.14/ 1.24–1.37; basal pronotal width 1.92/ 2.16–2.26; width across hemelytra 2.33/ 2.52–2.72; length of hind femur, tibia and tarsus: 2.09/ 2.16–2.31, 2.88/ 3.00–3.22, 0.60/ 0.64–0.68; those of hind tarsomeres I-III: 0.24/ 0.24, 0.24/ 0.26–0.30, 0.32/ 0.31–0.32.

**Etymology**

From Greek, ochros (yellow) combined with melas (black), referred to the bicolorous, black and yellow coloration of this new species.

**Distribution**

Taiwan.

**Other taxa**

**Mahania Poppius gen. rev.**


**Diagnosis**

Recognized by the large, elongate oval body, narrow head, short antennal segment II that is shorter than
basal width of the tumid, glabrous pronotum, and structure of the genitalia different from other superficially related genera.

**Redescription**

Body large, elongate oval.

**Coloration.** Dorsal surface generally shining pale brown.

**Surface and vestiture.** Head with vertex shining; frons smooth, very weakly or not striolate; clypeus raised, transversely rugose apically. Antenna with segment I shining, sparsely with dark, erect, short spines. Pronotum shining, glabrous, tumid, and nearly impunctate; collar subshining; propleuron pruinose, bearing silky, suberect pubescence; mesoscutum with silky, short, reclining pubescence medially; scutellum shining, glabrous and impunctate. Hemelytra shallowly and irregularly punctate, densely clothed with silky, reclining pubescence. Tibia with pale spines.

**Figs 241–245.** Male (241–243) and female (244–245) genitalia of *Liocapsus ochromelas*. – 241, right paramere; 242, left paramere; 243, vesica; 244, posterior wall; 245, genital chamber and adjunct structures. Scales 0.2 mm.
Structure. Head small, about half as wide as basal width of pronotum, height about half as long as width in anterior aspect; vertex with weak, medial longitudinal sulcation and narrow, basal transverse carina; clypeus raised, maxillary plate rather swollen. Antenna short; segment II gradually incrassate towards apex, about as thick as I, shorter than basal width of pronotum; segment III slender and filiform, slightly longer than segment I. Labium short and slender, reaching base of middle coxa. Pronotum tumid, roundly declivous laterally, weakly margined posteriorly; calli weak; collar very narrow, narrower than base of antennal segment II. Legs relatively long; hind tarsomere III longer than I or II.

Male genitalia. Figs 247–252. Left paramere strongly curved at right angle, with well developed sensory lobe (SL) and apically flattened hypophysis (HP); right paramere short, with broad and inwardly flattened sensory lobe. Phallotheca with a narrow, keel-shaped tubercle apically; vesica with a spiculum extending from subapical part of ejaculatory duct, an apical, thin, rounded sclerite, and a developed right lateral sclerite widened toward apex.

Female genitalia. Figs 253–254. Sclerotized ring (SR) large, rather thick rimmed. Posterior wall of bursa copulatrix with a wide, medial sclerotized dorsal structure (DS); interramal sclerite (IRS) continuous medially; interramal lobe (IRL) narrow, with a reflexed lateral lobe (LLB).

Distribution
Southern slopes of the Himalayas.

Discussion
Carvalho (1952) incorrectly synonymized this genus with Philostephanus. The external appearance and genital structure of Mahania are distinct and argue for separate generic status. Judging from the inwardly flattened right paramere, a single spiculum of the vesica and shape of the dorsal structure, Mahania is rather related to Castanopsides Yasunaga, 1992, from which it is easily distinguished by the more elongate body, less striolate frons, shining, shorter antenna, glabrous and impunctate pronotum, apical flap-like sclerite on the vesica, and reflexed lateral lobe (see Yasunaga 1998). Therefore, Mahania is here excluded from related outgroup taxa of Philostephanus. Mahania is known by a single, unique large plant bug occurring in southern slopes of the Himalayas.

Mahania elongata Poppius comb. rev.
Figs 246–254


Diagnosis
Easily recognized by the elongate body, pale brown dorsal surface, small head, short antenna, glabrous pronotum, and medial longitudinal stripe on the scutellum. The head, pronotum, scutellum and hemelytra of the males are sometimes darkened.

Redescription
Body generally pale brown.

Coloration. Dorsal surface shining. Head chestnut brown (♂), pale brown (♀), shining, almost glabrous; vertex 0.27 (♂)/ 0.39 (♀) times as wide as head including eyes; apical half of clypeus infuscate in female. Antennal segment I pale reddish brown; segment II dark brown with pale basal half; segment III yellow with darkened apical 1/3. Labium pale reddish brown (♂), yellowish brown (♀); apical part of segment IV darkened. Pronotum shining pale
brown, glabrous; calli becoming chestnut brown in male; mesoscutum pale brown, medially darkened; scutellum pale brown, with a dark, broad, medial longitudinal stripe. Thoracic side pale chestnut brown (♂), yellow with reddish tinge (♀). Hemelytra pale reddish brown; cuneus sanguineous; membrane somber pale brown. Legs pale brown, except for apical halves of tarsomeres III infuscate.

**Surface and vestiture.** Mesoscutum with silvery, reclining, short vestiture. Hemelytra shallowly and coarsely punctate, densely pubescent. Tibial spines brown. Male and female genitalia as mentioned in generic redescription.

**Dimensions.** ♂/♀: Body length 7.82/ 8.35–8.50, head width including eyes 1.15/ 1.18, vertex width 0.31/ 0.46; length of antennal segments I-IV: 0.74/ 0.79–0.91, 2.23/ 2.21–2.47, ?, 1.03, ?/ ?; length of labial segments I-IV: 0.48/ 0.55, 0.48/ 0.53, 0.46/ 0.43, 0.55/ 0.58; total length 1.75/ 2.04; medial pronotal length 2.26/ 2.64–2.69; basal pronotal width 2.26/ 2.64–2.69; width across hemelytra 2.52/ 3.12–3.29; length of hind femur, tibia and tarsus: 2.45/ 2.93, 3.53/ 4.15, 0.82/ 0.96; length of hind tarsomeres I-III: 0.28/ 0.36, 0.35/ 0.38, 0.40/ 0.48.

**Distribution**
Northern India, Nepal.
Discussion
This species is superficially similar to certain species of *Megacoelum* Fieber, 1858 or *Orientomiris* Yasunaga, 1997 rather than *Philostephanus* or *Castanopsides* species. *Mahania elongata* is easily distinguished from them by the short antenna and shining, glabrous pronotum.

Material examined. India: 1 ♂, lectotype (see above); 2 ♀, Darjeeling, June, Fruhstorfer (ZMUF; paralecotypes); 1 ♂, Sikkim, March-April, Fruhstorfer (ZMUF; paralecotypes). Nepal: 1 ♀, Godawari [= Godawari], Katmandu [Valley, Lalitpur], 30.iv.1983, Takakuwa (NIAS).

Phylogenetic discussion (Fig. 255)
Lu & Zheng (1998b) provided a hypothesis of the phylogenetic relationships for the *Philostephanus* species of China. In our view their efforts were unsatisfactory as they included some species of *Castanopsides* as conegers, and no character of the female genitalia was incorporated in the analysis.

Although many species of *Philostephanus* have conspicuous male and female genitalic structures, some are autapomorphic while others are strongly homoplasious. Such great interspecific variation has proven useful in the discrimination of species; however the morphological diversity has also made it difficult to interpret character homology and to determine synapomorphy. For this reason, we refrain from providing a comprehensive phylogeny until both male and female genitalia become available for all treated species. However we do believe it is warranted to suggest four recognizable monophyletic groups based on the genitalia of both sexes.

The first group is composed of *P. fulvus*, *rubripes*, and *tibialis*. These species share the following features: vesica with AS+GS+LL+LS, phallotesta with a pair of subapical tubercles, sclerotized rings enlarged and ovoid, dorsal portion of the genital chamber with a strongly and obliquely expanding DOS, elongate MPG, and contiguous OL surrounded by the roundedly extending MSG.

The second group consists of *P. himalayicus*, *pronotalis* and *taiwanensis*. These three species have a pair of elongate, horn-like lateral lobes (LLB) on the female posterior walls (PWB). Heavily sclerotized vesical appendages also support this species group. Within the group *pronotalis* and *taiwanensis* share the broadened as, whereas the very narrowed, slender PWB is unique to *himalayicus*.

The third group contains four species, *P. lucidus*, *nepalensis*, *ovalis* and *ulmi*, all of which have the well sclerotized genital chamber accompanied with the strong MPG, MSG and SPG, and the broad DS in the female genitalia. Three members, *lucidus*, *nepalensis*, *ovalis* and *ulmi* also share the rounded, flattened apex of the male apical sclerite (AS). The strongly developed MSG which overhangs the oviductus laterales (OL) is found in *lucidus* and *ulmi* only and supports a close relationship for the two species.

The fourth group includes two tropical species, *P. poppii* and *variegatus*, from Sumatra and Java. The medial, slender, snake-like sclerite, portion of the MSG, which divides each oviductus lateralis is only found in these species. Their known distribution in the Sundaland further supports the species group. Among the noirespeciesknown to us, the most basic or generalized genital structures are typified by the genital chamber of *P. ailaoensis* and the vesica of *castaneus*. These species are currently known only from the Himalayan region. This observation suggests to us that origins of *Philostephanus* may be from the Himalayas, as supposed for many Asian organisms.
Monophyly of the three related genera, *Philostephanus*, *Orientocapsus* and *Liocapsus*, is possibly supported by the sclerotized or toughened modification seen in the female genitalic chamber. Of the three genera, *Philostephanus* and *Orientocapsus* share the possession of some structures in the male vesicae, and a pair of distinct MPGC found in most species of *Philostephanus* is also recognized in the female genital chamber of *O. zhangi*. Based on the similarity of the male vesica and female SR and SS, another Himalayan genus *Chilocrates* Horváth also appears to be more or less related to *Liocapsus* (see Yasunaga & Schwartz 2000), although known species of *Chilocrates* are herb inhabitants not known from deciduous trees and have basically symmetrical female genitalia.
Figs 262–269. Scanning electron micrographs of Orientocapsus zhangi, male. – 262 & 263, head; 264, head and pronotum; 265, pronotum and propleuron; 266, pronotal setae; 267, genital segment with parameres; 268, metathoracic scent efferent system; 269, pretarsus.
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