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Contribution to the study of the Oriental genus *Rhopalopsole* (Plecoptera: Leuctridae)

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ABSTRACT

Genus *Rhopalopsole* was first described by KLAPÁLEK based on his study of Formosan material early in the previous century. Few species, from scattered localities in the Oriental region, were recognized until the last two decades when 12 additional species were described from China. The lack of access to Chinese material limited our ability to revise the genus, therefore we present a preliminary assessment based on available Chinese specimens, together with descriptions of species from other countries. These descriptions include 9 new species from China, 8 from Japan, 4 from Taiwan, 2 from Malaysia, 4 from Thailand, 3 from Vietnam, 1 from Indonesia, 3 from the Philippines, and 1 from India, which brings the current number of recognized species to 61. Descriptions are supported with illustrations of male and female genitalia. Doubtlessly, the study of type specimens from China, and additional material from other localities will increase the number of species and provide a stable taxonomic basis for this Oriental stonefly genus.

Key words: Plecoptera, Leuctridae, *Rhopalopsole*, new species, SE Asia

IZVLEČEK

Prispevek k poznavanju orientalnega rodu *Rhopalopsole* (Pleucoptera: Leuctridae) Rod *Rhopalopsole* je prvi opisal KLÁPALEK s Formoze leta 1912. Pozneje je bilo opisanih še nekaj vrst tega rodu z različnih območij Orientalne regije kot so Japonska, Filipini, Malezija, Himalaja in Kitajska. Šele v zadnjih dveh desetletjih je bilo opisanih dodatnih 12 vrst s Kitajske. Ker nismo imeli na voljo tipskega materiala s Kitajske, ni bilo mogoče narediti podrobnejše revizije celotnega rodu, zato zgolj predstavljamo opis kitajskega material, ki nam je bil dostopen. V ostalem materialu je opisanih 8 novih vrst z Japonske, 4 s Tajvana, 2 iz Malezije, 4 s Tajske,

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3 iz Vietnama, 1 iz Indonezije, 3 s Filipinov in 1 nova vrsta iz Indije. Predstavljene so ilustracije moških in ženskih genitalij posameznih vrst. 61 vrst vsekakor ni končno število vrst tega rodu. Študij dodatnega materiala in predvsem tipskega materiala s Kitajske bo brez dvoma še povečal število vrst in imena v tem orientalnem rodu vrbnic.

Ključne besede: Plecoptera, Leuctridae, *Rhopalopsole*, nove vrste, Jugovzhodna Azija

INTRODUCTION

The genus *Rhopalopsole* was described by KLAPÁLEK in 1912 in his work on stoneflies from Formosa. Only a few species were described from this genus in the beginning of the century. 13 species were listed in the Catalogue of ILLIES (1966). He refers to KAWAI (1967) for a modern definition of genus and a key to Japanese species. Description of additional species mainly at the end of last century had restricted distribution of this genus to the Oriental region only. East Palaearctic species proved to be members of another Leuctrid genus, *Perlomyia* (ZHILTZOVA, 1995). The largest number of *Rhopalopsole* species were described from China. Types of the first species described in 1949 were lost or destroyed. An additional 12 species were described in the last two decades, however practically all descriptions are insufficient for safe identification of species. Most of descriptions are based on adult male stages only. Study of this genus from the other areas had shown the great similarity of males in some species, while females of those same species are very distinctly different. Probably this is the reason of the relative confusion and double descriptions among Chinese species. Most of our study was completed more than decade ago, and despite several personal visits to Beijing, we were not able to see Chinese type material except two species deposited in Zoological Institute of Chinese Academy of Sciences. Sole descriptions are in most cases insufficient for a reliable determination; therefore we can do nothing but to ignore Chinese *Rhopalopsole* species. We are only presenting the Chinese material that was at least briefly available to us. In the beginning we intended not to name new species, however to avoid even greater confusion among Chinese species we decided to give them names. Study of additional material collected from type localities of old species, detail study and association of both sexes as well as study and comparison with type specimens will be necessary to fix and clear nomenclature of Chinese *Rhopalopsole* species.

Despite the substantial number of new species we are adding to genus *Rhopalopsole*, taxonomy and distribution of this genus in the Oriental region is far from complete. Additional studies in future will increase the number of species in this genus not only in China but also in all other areas of the Oriental region.

Rhopalopsole KLAPÁLEK

1912 *Rhopalopsole* KLAPÁLEK, Ent. Mitt., 1:348 (Type species: *Rhopalopsole dentata* KLAPÁLEK.
1940 *Rhopalopsole* – CLAASSEN, Catalogue: 87.
1966 *Rhopalopsole* – ILLIES, Catalogue: 116.
1973 *Rhopalopsole* – ZWICK, Catalogue: 411.

General descriptions

Most *Rhopalopsole* are dark brownish, but colour varies considerably during the adult lifetime, from golden brown to dark-blackish. Teneral specimens are often very pale, and many features described below are not visible.

Most drawings are free-hand, some made through a drawing tube on a stereomicroscope.

All material was relaxed in KOH before study, whether it had been preserved in alcohol or pinned. Unrelaxed material is often difficult to examine, since the genital segments tend to curl up and the structures are often hidden. Relaxing does, however, cause some distortion in comparison with fresh specimens, and this should be kept in mind when using our drawings.

Care was taken to make the figures as comparative as possible, by using the same conventions and presenting similar views and angles.

Associations between the sexes are necessarily preliminary, since they are based on common occurrences. Colour rarely offers any confirming evidence and many species tend to occur together at the same time in any one habitat. There are also more female types than females in the collections. It should be noted that females are sometimes more varied than males in some closely related groups; they, however, display characteristics that are in general more qualitative than quantitive. When the group is better known, they will surely provide important diagnostic characters.

If not otherwise stated all type and other material is deposited in the Slovenian Museum of Natural History (PMSL). Other type depositary are: Institute of Applied Entomology, Yangzhou University (IAEYU), Department of Entomology, China Agricultural University, Beijing (DECAU), Museum für Naturkunde, Berlin (MNB), Prof. Dr. Peter Zwick's collection, Schlitz (PZCS), Lake Biva Museum (LBM), Musée zoologique, Lausanne (MZL).

Male genitalia:

- Segment 9; sternum generally (at least one exception) with a basal rounded plate-like drummimg appendage (ventral lamella) covered ventrally with closely appressed strong bristles; the hind border is extended caudally into a small subgenital plate which undergirds segment 10. Tergum generally weakly sclerified, often with various ornementations, including fields of knob-like or scale-like cuticular outgrowths (?) on the hind margin or the mid-line; more rarely the hind border is extended into a projecting plate.

- Segment 10, normally developed. Its dorsal surface broken into a tri-partite central plate, the pieces of which are more or less distinct and detached from one another; these plates covered with the usual macrotrichia, but also often with fields of scale-or knob-like cuticular ornementation particularly on the middle plate. Caudally, a pair of more or less triangular or trapezoidal transverse bars run on each side from the cercus to the epiproct. Laterally, variously developed projections extend outwards and slightly upwards, their tips often culminating into one or many points; these structures are vestigial in some species.

- The epiproct forms a strong upturned heavily sclerified hook arising from a hairy and membranous cushion-like support. The size, shape, and ornementation of this hook vary from species to species and are important diagnostic characters. The tip is often variously modified from a single rounded and acute structure to a flat and often indented plate. Care should be taken to examine this structure from different angles at high and low magnifications.

- The subanal lobes join together to form a complex copulatory structure. Nearly all specimens available for study present this organ in its closed appearance. A few specimens, however, exhibit the structure in an unfolded and erect state (Figs. 41.3, 41.4) which reveals the existence

of various inner structures and appendages. Ultimately, these may prove to be of taxonomical interest, but we are not in a position to exploit them in this paper, since we were unable to tease out these structures even after relaxation in KOH. Further collectors should keep this in mind and try to squeeze out male genitalia before preserving the specimens, as is routinely done with many groups of Plecoptera.

- The cerci are normally membranous and covered with macrotrichia. In a number of species, they take on characteristic shapes, either by being exceptionally lenghtened or else upturned into a L-shape. Many species bear a terminal sclerified spine.

Female genitalia

The abdomen is generally unmodified, except the ventral areas of segments 7 and 8 associated with the gonopore. The dorsal surface remains unsclerified, except on segments 9 and 10 which are completely hardened and except for a transverse row of four dots near the anterior margin; various hardened plates occur on terga 1 and 2. Segments 1-8 bear narrow lateral plates just above the stigmatic openings. The ventral segments 1-8 bear a central sclerified plate, which is typically darked in its antero-lateral corners; there are also two small lateral sclerites on the anterior corners which can sometimes connect with the central plate, particularly on segment 7.

- Sternum 7 is typically lengthened to form a subgenital plate of varying dimension and shape which covers the genital opening, its hind margin often variously indented or unsclerified. The hind portion of the plate is darker and more sclerified and some specific patterns appear to exist. In some groups, the presence of internal vaginal sclerifications occur; we have noted these, but due to lack of associated material for many of our species, have not pursued any comparative study.

- Sternum 8 is correspondingly unscerified on its fore portion, and generally consists of a more or less indented transverse plate across the hind section of the segment. In other species, the plate is broken in two, with a membranous mid-region separating the two halves.

In the descriptions below, we will limit ourselves to pointing out features which differ from these general patterns and those which appear to be of significant diagnostic value.

The *magnicerca* Group

As presently defined, the group contains nine species. They form a very uniform assemblage characterized by the following features:

In males

- The hind margin of tergum 9 is bordered by two sublateral fields of small rounded knobs, which sometimes meet in the middle.

- The central plate of tergum 10 bears no ornamentation except the usual macrotrichia.

- The lateral appendages of segment 10 are developed into large plate-like spines, the shapes of which are important diagnostic characters.

- The epiproct is a small, slender, and hook-like projection arising from a membranous and hairy cushion.

- The subanal lobes are long and upturned, with distinct ventral flaps; their outline in side view is similar to that of a sauce- or incense-boat. In ventral view, distinct longitudinal furrows cover the ventral surface.

- The cerci are of medium length, poorly sclerified, upturned (L-shaped in side view), and without a terminal spine.

In females

- The subgenital plate on sternum 7 is variously produced generally into a triangular plate which has a central unsclerified lip; exceptionally (in *R. gladifera*) the lip is fitted with an inturned membranous flap.

1. *Rhopalopsole magnicerca* (JEWETT)
Figs.(1.1-1.5)

Leuctra (Rhopalopsole) magnicerca JEWETT, (1958): 321. Holotype ♂ Kote, Kulu Valley, India.

Description: In addition to the original description, the species has been redescribed twice by HARPER (1977) and ZWICK (1977).

Forewings 8 mm (female).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Hind border of tergum 9 with a band of knob-like ornementations, narrowly connected in the middle and slightly expanded on each side.
- Tergum 10 bearing a central plate, the three elements of which are broadly fused; plate covered with macrotrichia, but no conspicuous cuticular ornementation.
- Lateral projections more or less parallel-sided, very slightly tapering until just before the end where they narrow sharply into a sharp point, extending from the ventral margin.
- Epiproct a stocky, regularly tapering and pointed hook.
- Subanal lobes typical of the group.
- Cerci distinctly upturned in side view; no spine.

Female:

Subgenital plate on sternum 8 produced into a broadly triangular extension with an unsclerified middle knotch. Hind margin darkened as well as hind part of central area. Sternum 9 a transverse bar with a large excavation itself knotched in the middle.

Material examined:

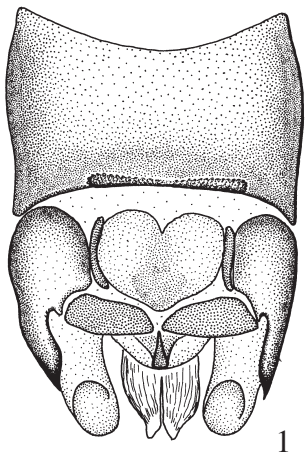
Types in Zoological Survey of India not available. Though elementary, the drawings accompanying the original description (Jewett, 1958) clearly show the diagnostic features.

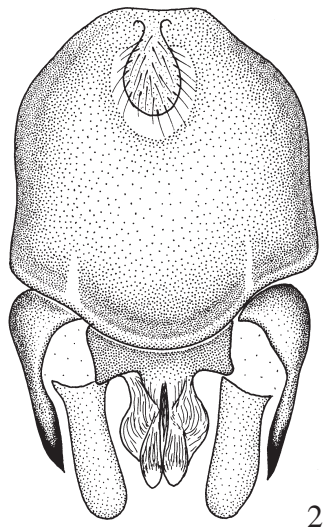
The original material was from Kulu Valley (Punjab); the species was later recorded from Nepal (Harper, 1977) and Bhutan (Zwick, 1977). We have reviewed some of this latter material, as well as new material from Assam in the Musée zoologique of Lausanne (Switzerland).

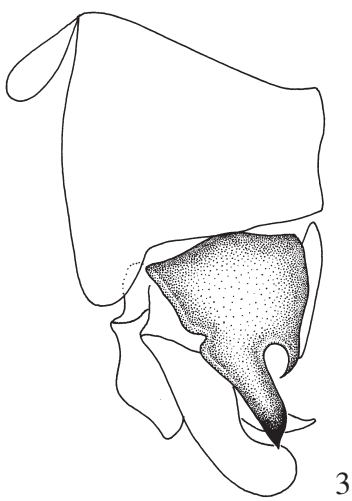
Comments:

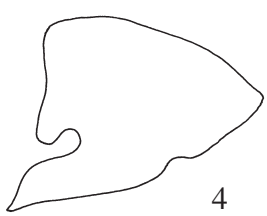
The outline in side view of the lateral projections of tergum 10 are the safest diagnostic characters; the near parallel sides culminating in a point originating at the ventral border are the diagnostic features.

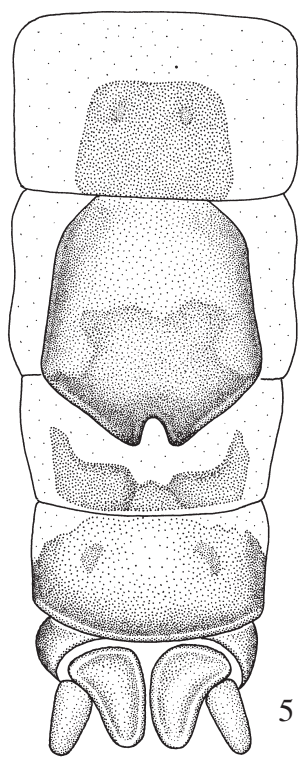
Figs.(1.1-1.5) *Rhopalopsole magnicerca.* 1.1. Male terminalia, dorsal aspect, 1.2. Male terminalia, ventral aspect, 1.3. Male terminalia, lateral aspect, 1.4. Lateral process of tergite 10, 1.5. Female terminalia, ventral aspect.











2. *Rhopalopsole aculeata* HARPER
Figs. (2.1-2.2)

Rhopalopsole aculeata HARPER, 1977: 56. Holotype ♂ Kathmandu, Godavari, Nepal (Canadian National Collection of Insects in Ottawa).

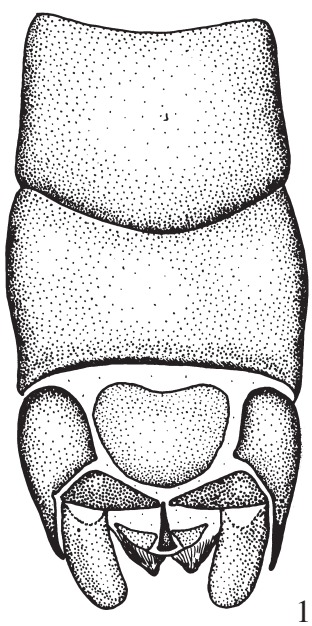
Length of body 9-11 mm, to tip of wing 11-14 mm.

The antennal segments bear a terminal row of unusually stout and long bristles, each bristle reaching about the length of the segment on proximal segments. In other species, these bristles are very short, reaching at most one quarter of the length of the corresponding segment.

Male:

- The ventral lamella present and normal on base of sternum 9.
- Hind border of tergum 9 with a band of knob-like ornementations, narrowly connected in the middle and slightly expanded on each side.
- Tergum 10 bearing a central plate, the three elements of which are broadly fused; plate covered with macrotrichia, but no conspicuous cuticular ornementation.
- Lateral projections gradually and regularly tapering ending in a sharp and slightly upturned point, the upper margin lightly encaved just before the point.
- Epiproct a pointed and curved hook.
- Subanal lobes typical of the group.
- Cerci distinctly upturned in side view; no spine.

Figs. (2.1-2.2) *Rhopalopsole aculeata.* 2.1. Male terminalia, dorsal aspect, 2.2. Lateral process of tergite 10.



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Female:

- Subgenital plate on sternum 8 produced into a broadly triangular extension with an unsclerified middle knotch, much as in *R. magnicerca*. Hind margin darkened as well as hind part of central area. Sternum 9 a transverse bar with a large excavation itself knotched in the middle.

Material examined:

The type series from Nepal in the Canadian National Collection of Insects (Ottawa, Canada) was re-examined. Further material was obtained from Assam (Musée zoologique, Lausanne).

Comments:

The regularly tapering lateral projections will allow an easy recognition of males. The females are difficult to separate from *R. magnicerca*. However, the long antennal bristles in both sexes will help in the diagnosis.

3. *Rhopalopsole ? bispina* Wu
Figs. (3.1-3.6)

Leuctra bispina Wu, 1949: 251. Holotype ♂ Ta-chu-luan, Shao-wu, Fukien, China (probably lost).

Antennal bristles short.

Male:
- The ventral lamella present and normal on base of sternum 9.
- Hind border of tergum 9 with a band of knob-like ornementations, narrowly connected in the middle and broadly expanded on each side.
- Tergum 10 bearing a central plate, the three elements of which are broadly fused; plate covered with macrotrichia, but no conspicuous cuticular ornementation.
- Lateral projections gradually and regularly tapering ending in a sharp and slightly upturned point, the upper margin lightly encaved just before the point. There is a distinct indentation at the lower base of the projection at its point of origin on the tergum.
- Subanal lobes typical of the group.
- Cerci distinctly upturned in side view; no spine.

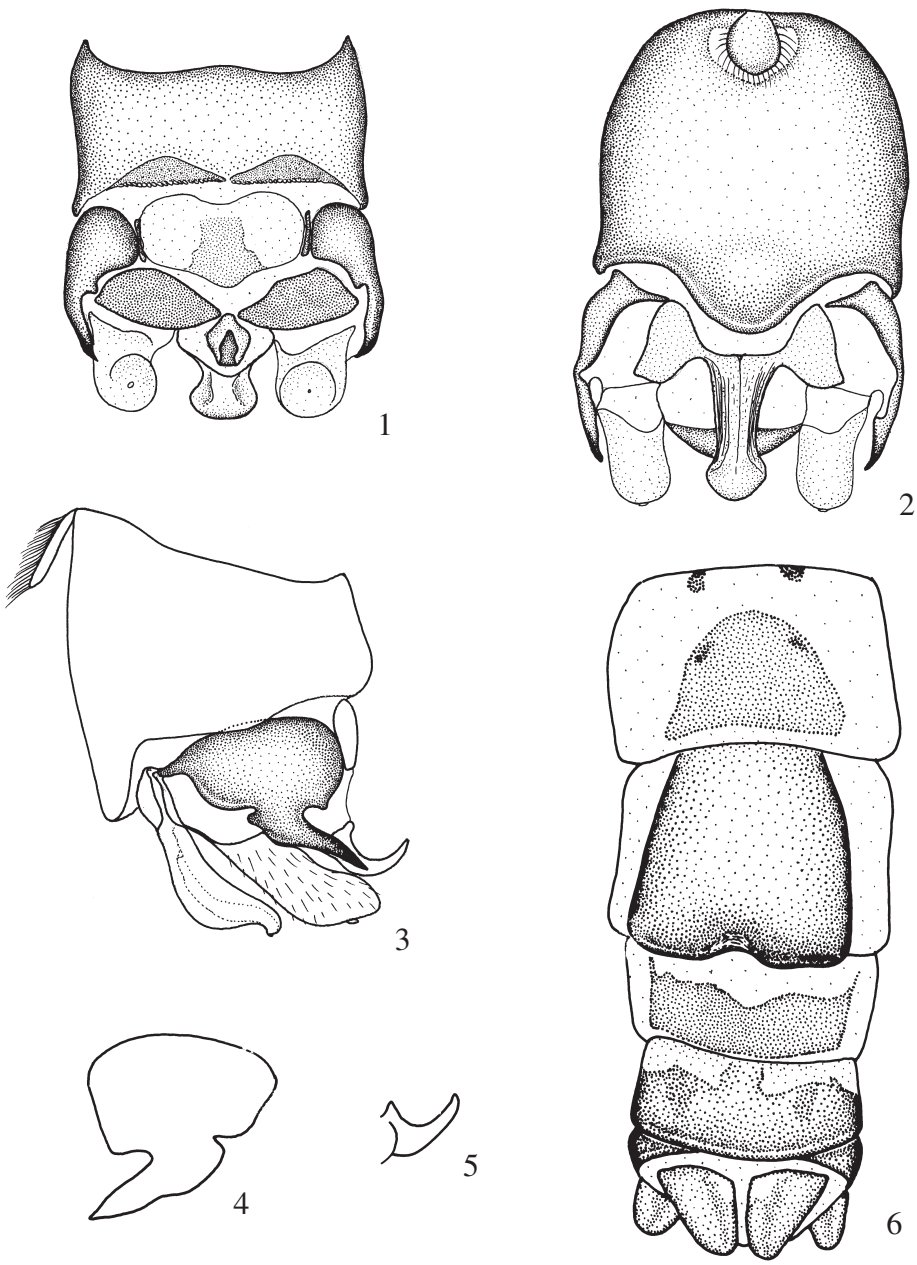
Female:
- Subgenital plate on sternum 8 produced into a broadly triangular extension with an unsclerified middle knotch, much as in *R. magnicerca* and *R. aculeata*. Hind margin darkened as well as hind part of central area. Sternum 9 a transverse bar with a large excavation itself knotched in the middle.

Material examined:
17 ♂, 5 ♀ CHINA: Zheduo River, West 15 km of Kangding County, Sichuan Province, 2920 m., 8.VI.1996, leg. Du Yuzhou. (IAEYU).

Comments:
On first examination, we tentatively placed these specimens with *R. aculeata*. However, upon re-examination, it appears better to consider them separately, although the differences are slight. The long antennal bristles are present in all the specimens of *R. aculeata* from both Nepal and Bhutan; their absence here is therefore considered a significant character. As well, the rather identation at the base of the lateral projection of tergum 10 was found only in another species of this group (*R. tamdao*).

Type of Wu from 1949 is destroyed or lost. Collecting additional material from the type locality and comparison with the other similar species could resolve the exact identity of this species.

Figs. (3.1-3.6) *Rhopalopsole ? bispina.* 3.1. Male terminalia, dorsal aspect, 3.2. Male terminalia, ventral aspect, 3.3. Male terminalia, lateral aspect, 3.4. Lateral process of tergite 10, 3.5. Epiproct, 3.6. Female terminalia, ventral aspect.



4. *Rhopalopsole gladifera* ZWICK
Figs.(4.1-4.6)

Rhopalopsole gladifera ZWICK, 1977: 112. Holotype ♂ Chimakothi, Bhutan (Naturhistorisches Museum in Basel).

Length of forewing 7-8.5 mm.

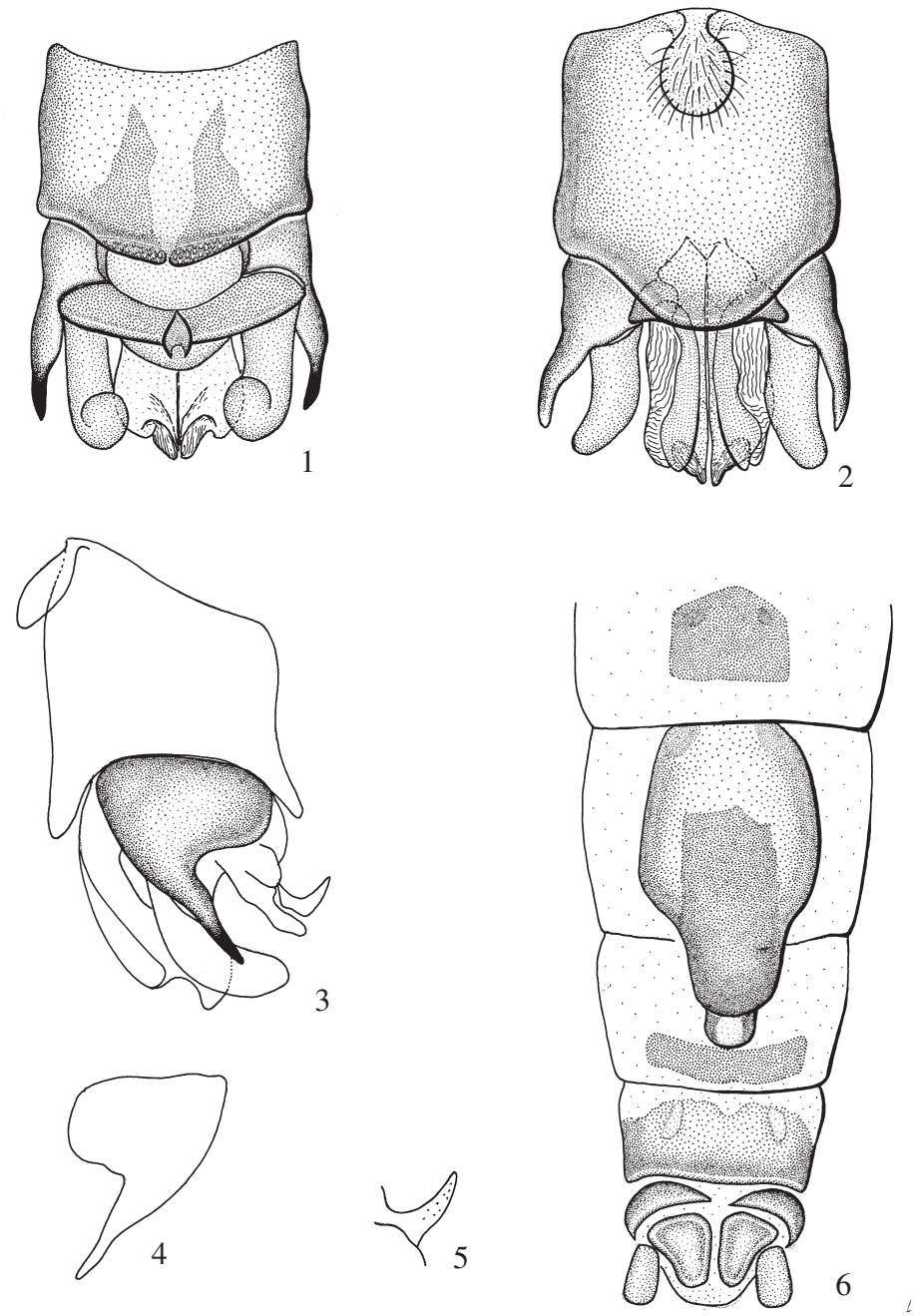
Male:
- The ventral lamella present and normal on base of sternum 9.
- Hind border of tergum 9 with a strong and somewhat upturned band of knob-like ornementations on each side, narrowly meeting in the middle.
- Tergum 10 bearing a central plate covered with macrotrichia, but no conspicuous cuticular ornementation.
- Lateral projections narrow, long and sinuous, gradually and regularly tapering ending in a sharp and slightly upturned point.
- Epiproct rather stocky, slightly curved, gently attenuated just before the end.
- Subanal lobes typical of the group, though somewhat more massive than in the preceding species.
- Cerci distinctly upturned in side view; no spine.

Female:
- Subgenital plate on sternum 8 produced into an unusually long and distally narrowed extension, itself prolonged by a short membranous flap which in fresh material tends to be turned under the plate. Hind margin darkened as well as much of the latter part of central area. Sternum 9 a simple narrow transverse bar.

Material examined:
Type series from Bhutan in the Naturhistoriches Museum in Basel. No additional material known.

Comments:
The combination of the narrow and slightly sinuous lateral projections (in side view) of tergum 10 with the wider than usual subanal lobes (in ventral view) will serve to distinguish the males of the species from others in the same group. In the female, the long narrow subgenital plate is characteristic.

Figs.(4.1-4.6) *Rhopalopsole gladifera.* 4.1. Male terminalia, dorsal aspect, 4.2. Male terminalia, ventral aspect, 4.3. Male terminalia, lateral aspect, 4.4. Lateral process of tergite 10, 4.5. Epiproct, 4.6. Female terminalia, ventral aspect.



5. *Rhopalopsole tamdao* SIVEC & HARPER, **n.sp.**
Figs. (5.1-5.5)

Length of forewing 5 mm (male), 6-7 mm (female).

Male:
- The ventral lamella present and normal on base of sternum 9.
- Hind border of tergum 9 with a band of knob-like ornementations, narrowly connected in the middle and slightly expanded on each side.
- Tergum 10 bearing a central plate, the three elements of which are broadly fused, the lateral borders of the plate heavily sclerified; plate covered with macrotrichia, but no conspicuous cuticular ornementation.
- Lateral projections very regularly tapering ending in a sharp point, somewhat triangular in outline. A deep knotch at the ventral point of origin of the projection.
- Subanal lobes typical of the group.
- Epiproct very slightly but regularly curved, tapering.
- Cerci distinctly upturned in side view; no spine.

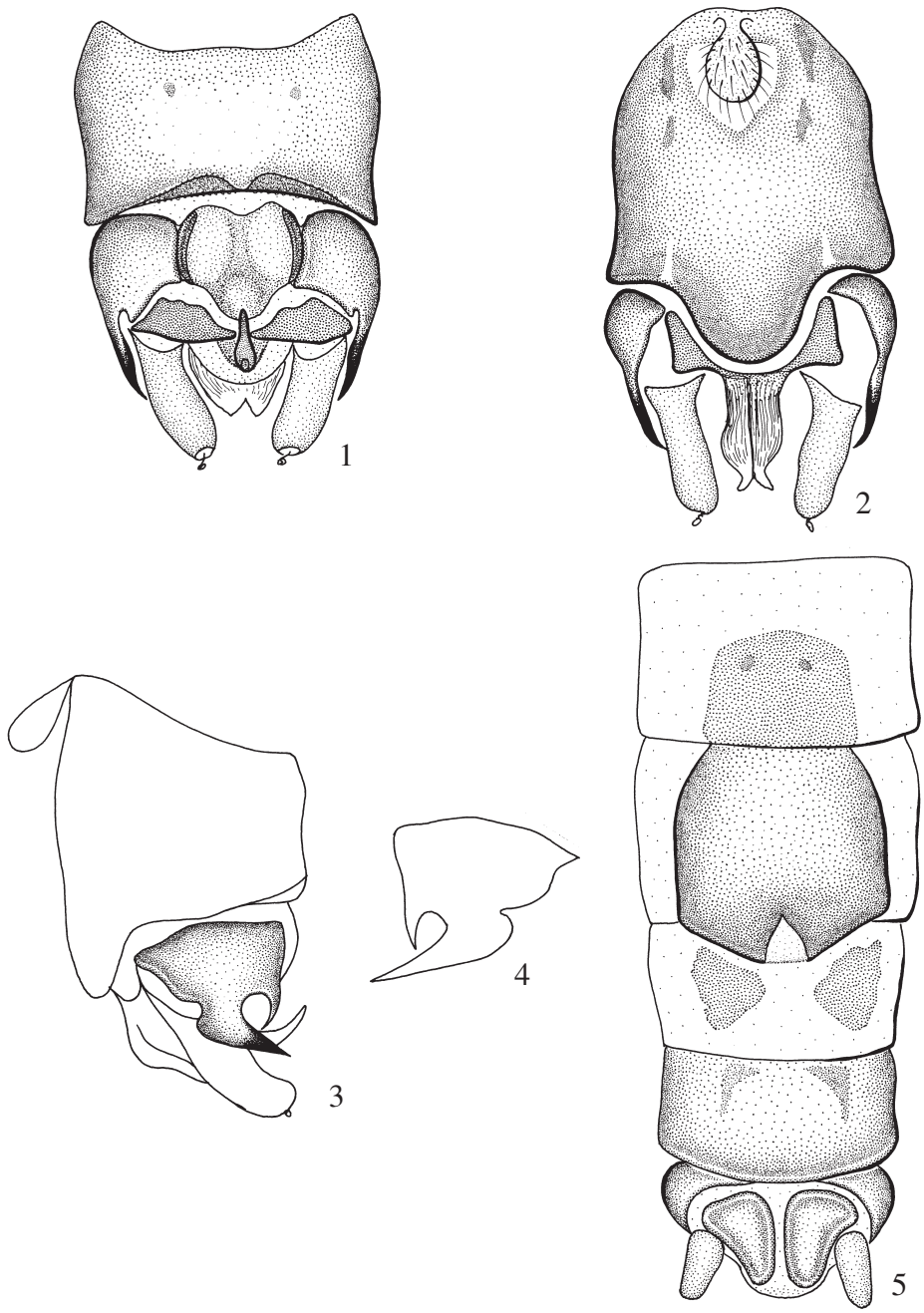
Female:
- Subgenital plate on sternum 8 produced into a rather short, broadly triangular extension with an unsclerified middle knotch. Hind margin darked as well as hind part of central area.
- Sternum 9 a pair of large sclerites on each side of the genital plate, central area membranous.

Material examined:
Holotype ♂, VIETNAM, Tam Dao, 800-100m., 21°28'N: 105°38'E, 19.V-13.VI.1995, leg. H. Malicky (PMSL). Paratypes, 5♂, 35♀ same data.

Comments:
The regularly tapering lateral projections of the male tergum 10 are the diagnostic characters. The deep knotch at the ventral origin of the projection and the heavily marked hind margin of tergum 9 are confirming characters. The short subgenital plate and the pair of sclerites on sternum 8 of the female may prove to be of diagnostic value.

Etymology:
The species is named after type locality Tam dao.

Figs. (5.1-5.5) *Rhopalopsole tamdao.* 5.1. Male terminalia, dorsal aspect, 5.2. Male terminalia, ventral aspect, 5.3. Male terminalia, lateral aspect, 5.4. Lateral process of tergite 10, 5.5. Female terminalia, ventral aspect.



6. *Rhopalopsole emeishan* Sivec & Harper, n. sp.
Figs. (6.1-6.6)

Length of forewing 6 mm (male), 7 mm (female).

Male:
- The ventral lamella present and normal on base of sternum 9, slightly elongated.
- Hind border of tergum 9 with a band of knob-like ornementations, narrowly connected in the middle and slightly expanded on each side.
- Tergum 10 bearing a central plate, the three elements of which are broadly fused; plate covered with macrotrichia, but no conspicuous cuticular ornementation.
- Lateral projections parallel-sided, ending in a small and sharp point.
- Subanal lobes typical of the group.
- Cerci distinctly upturned in side view; no spine.

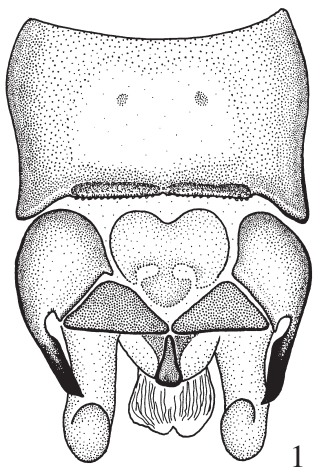
Female:
- Subgenital plate on sternum 8 produced into a very short triangular extension with an unsclerified middle knotch. Hind margin lightly darkened. Sternum 9 a broad band covering most of the ventral area.

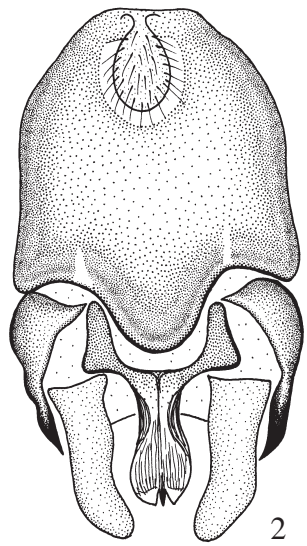
Material examined:
Holotype ♂, CHINA, Sichuan Province, Quingyin Pavillion, Emei Shan Range, 800-1000 m., 26-27.V.1991, leg. Sivec & Horvat (PMSL). Paratypes 4♂, 2♀ same data. 2♂ Sichuan Province, Pitiao river, Wolong, Balang Shan Pass, 2700-4000 m, 1.-4. 6. 1991, leg. Sivec & Horvat.

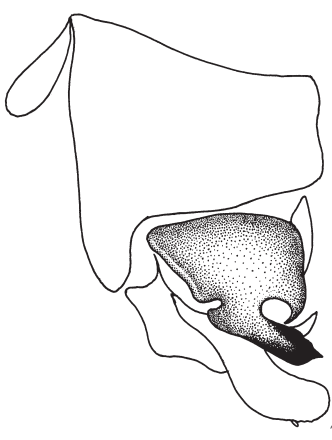
Comments:
The characteristic parallel-sided lateral projections of the male 1oth tergum will allow immediate recognition, as will the short subgenital plate of the female.

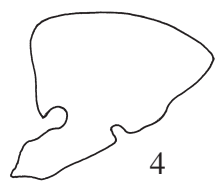
Etymology:
The species is named after type locality Emei Shan.

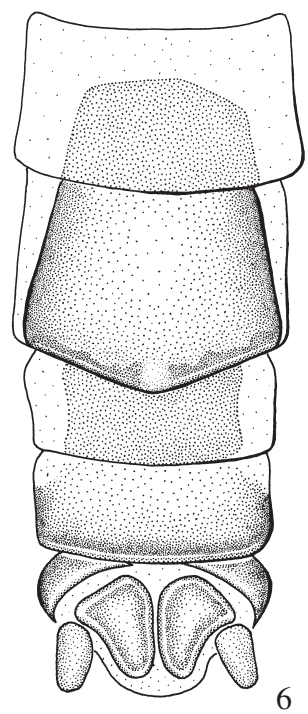
Figs. (6.1-6.6) *Rhopalopsole emeishan.* 6.1. Male terminalia, dorsal aspect, 6.2. Male terminalia, ventral aspect, 6.3. Male terminalia, lateral aspect, 6.4. Lateral process of tergite 10, 6.5. Epiproct, 6.6. Female terminalia, ventral aspect.











7. *Rhopalopsole porntipae* SIVEC & SHIMIZU, **n. sp.**
Figs. (7.1-7.6)

Length of forewing 5-6 mm (male), 6.5 mm (female).

Male:
- The ventral lamella present and normal on base of sternum 9.
- Hind border of tergum 9 with a band of knob-like ornementations, separated on the mid-margin and slightly expanded on each side.
- Tergum 10 bearing a central plate, the elements of which are broadly fused; plate covered with macrotrichia, but no conspicuous cuticular ornementation.
- Lateral projections long, broad at base, then rapidly narrowed and prolonged into an extended, slightly sinuous, and sharp point.
- Subanal lobes typical of the group.
- Epiproct a short upturned claw.
- Cerci distinctly upturned in side view; no spine.

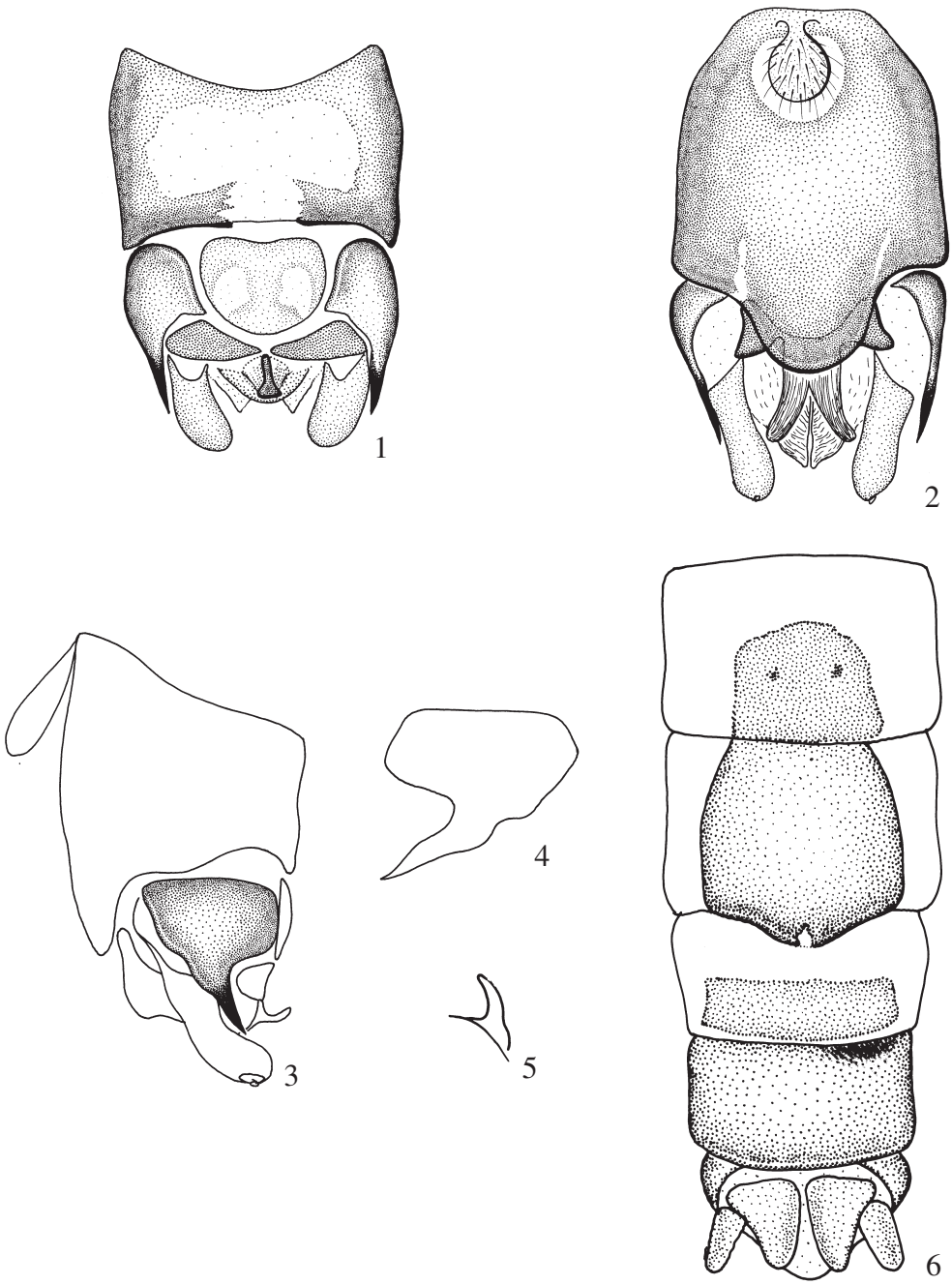
Female:
- Subgenital plate on sternum 8 produced into a short extension, about half the width of the sternite, with an unsclerified middle knotch. Hind margin darkened. Sternum 9 a broad transverse bar.

Material examined:
Holotype ♂, THAILAND, Mae Korm, SW of Chiang Rai, 2.12.1993, leg. T. Shimizu, (PMSL), Paratypes: 3♂, same data, 2♂, 1♀ Doi Suthep-Pui, Chiang Mai, 11.12.1993, leg. T. Shimizu, 1♀ Bang Pang Aun, 1000 m., Chiang Mai, 15.III.1992, leg. T. Shimizu. 1♂ Doi Suthep, 1000 m, 30.4.1996, leg. H. Malicky.

Comments:
The long narrow and sinuous lateral projection of the male tergum 10 is characteristic. The short and narrow subgenital plate of the female is distinctive in this group.

Etymology:
Species is named after Prof. Dr. Porntip Chantaramongkol, limnologist from Chiang Mai.

Figs. (7.1-7.6) *Rhopalopsole porntipae*. 7.1. Male terminalia, dorsal aspect, 7.2. Male terminalia, ventral aspect, 7.3. Male terminalia, lateral aspect, 7.4. Lateral process of tergite 10, 7.5. Epiproct, 7.6. Female terminalia, ventral aspect



8. *Rhopalopsole belumensis* SIVEC & HARPER, **n. sp.**
Figs. (8.1-8.6)

Length of forewing 5 mm (male), 7 mm (female).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Hind border of tergum 9 with a very dark and raised band of knob-like ornementations, broadly separated in the middle and expanded on each side, this expansion continuing into a semi-circular sclerified and darkened surface. Middle area of tergum generally membranous, except for two small lateral sclerites near the anterior border.
- Tergum 10 bearing a central plate, the three elements of which are broadly fused; plate covered with macrotrichia, but no conspicuous cuticular ornementation, its lateral borders darkened.
- Lateral projections plate-like, their upper margin distinctly sinuate, their lower border more straight, except near the end where it forms a terminal hook.
- Epiproct an erect hook-like projection, its tip narrowing and turned forward.
- Subanal lobes typical of the group.
- Cerci distinctly upturned in side view; no spine.

Female:

- Subgenital plate on sternum 8 produced into a broadly triangular extension with an deep unsclerified middle knotch. Extension darkened, the anterior margin of the spot rounded.
- Sternum 9 a short and irregular transverse which occupies on the middle hind margin of the segment.

Material examined:

Holotype ♂, MALAYSIA, Hulu Perak, Belum Expedition, Base Camp, 5°30'07''N, 101°26'21'' E, 8-10.IV.1994, leg. Sivec (PMSL). Paratypes, 1♂, 1♀same data, 1♀ same locality, 13.2.-14.41994, leg. I. Sivec, 1♀ Gunung Jasab, Cameron Highlands, Perak, 11.3.1994, leg. H. Sato, 1♀ Kuala Lumpur, Gombak, 22.5.1996, leg. T. Trilar.

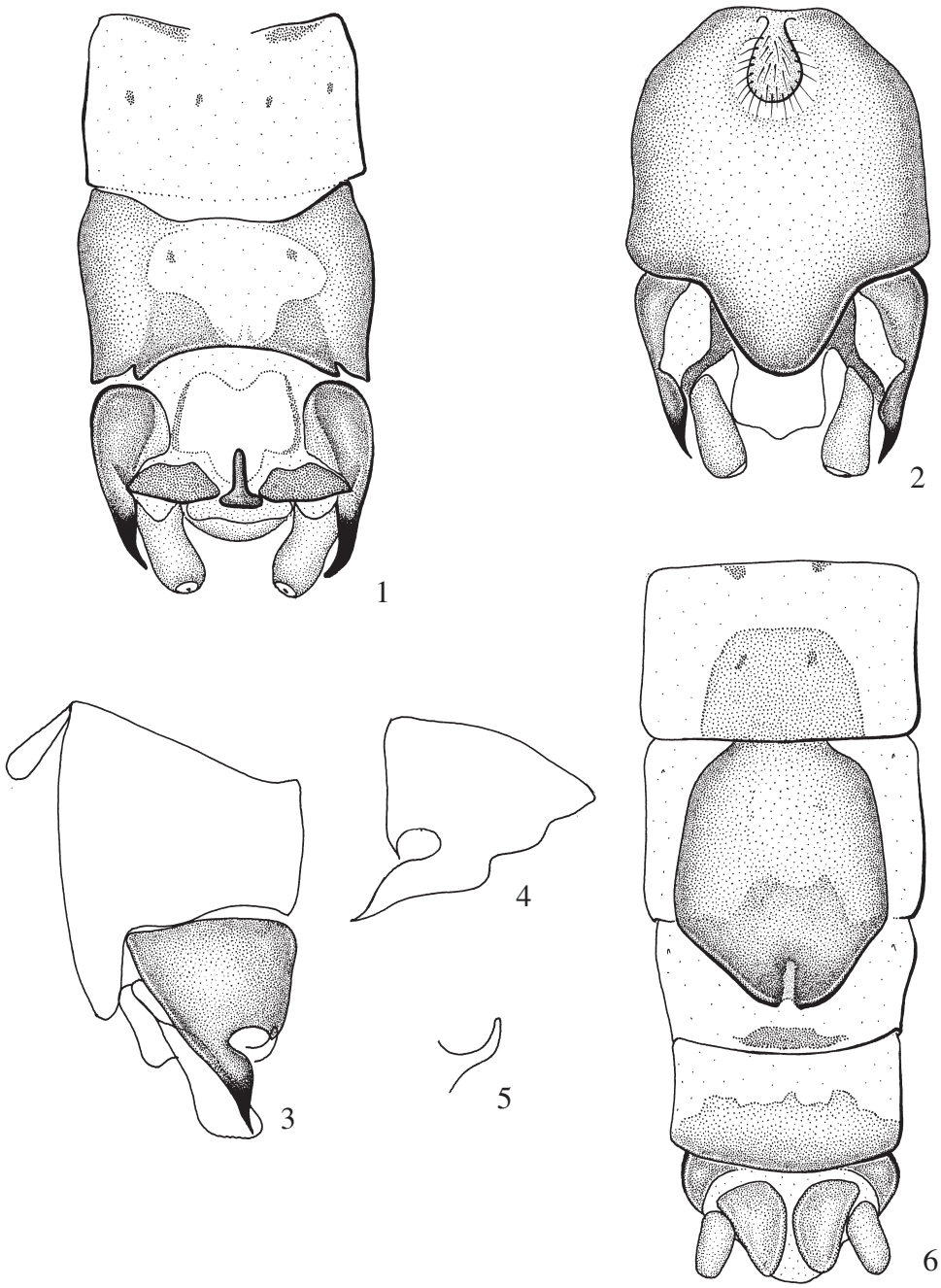
Comments:

The combination of the distinctive sinuous projections of tergum 10, the erect and flexed epiproct, and the ornementation of tergum 9 will make the identification of the male easy. In the female, the subgenital plate is distinctive in this group of species.

Etymology:

Species is named after Belum Expedition in the Norths of Malaysia.

Figs. (8.1-8.6) *Rhopalopsole belumensis.* 8.1. Male terminalia, dorsal aspect, 8.2. Male terminalia, ventral aspect, 8.3. Male terminalia, lateral aspect, 8.4. Lateral process of tergite 10, 8.5. Epiproct, 8.6. Female terminalia, ventral aspect.



9. *Rhopalopsole longispina* YANG & YANG

YANG and YANG, 1991: 78 Holotype ♂ Zhejiang, Mt. Tianmu, China (Department of Entomology, China Agricultural University, Beijing).

This species was placed near *R. magnicerca* by its authors. The figures they provide in the original description seem to support their claim, though we would have liked to see additional details. No ornementation is shown on tergum 9. The pointed caudal extension of the central plate (their Fig. 3) which they consider to be diagnostic is a highly variable character which has proved to be of little use in other species of this group. The outline of the ventral aspect of the subanal lobes (their Fig. 2) is consistent with the *magnicerca* group, but we would have expected a more pronounced bend on the lower surface of the side view (their Fig. 1). The cerci are upturned, but not as sharply as in other species.

As we were unable to obtain specimens from this series, we tentatively include it here on the basis of the shape of the lateral projections of tergum 10. It will, however, require redescription in the future, before its exact status can be ascertained.

The *prominens* Group

This group contains at present only one highly unusual species from Thailand. The characteristics are therefore by necessity those of the species, and the group will require re-definition when and if further species are added to it.

In many respects, this group appears to be closely related to the magnicerca group with an exagerately large extension of tergum 9; the subanal lobes and the cerci are somewhat similar, but other structures differ in nearly all particulars.

10. *Rhopalopsole prominens* Sivec & Harper, **n. sp**.
Figs. (10.1-10.6)

Length of forewing: 6 mm (male), 7 mm (female).

Male:
- The ventral lamella on sternum 9 lacking.
- Hind border of tergum 9 forming a large extended and expanding plate, with rounded margins and a distinct terminal knotch; end of plate to about the level of the knotch covered with knob-like cuticular ornementation.
- Tergum 10 bearing dorsally a pair of plates, each covered with macrotrichia, interspersed on their median half with spinules. Lateral plates (?) narrow.
- Lateral projections lacking, except what appears to be a short vestige.
- Epiproct short, stocky and claw-like in side view (with a few hairs), in top view, the outline is more slender, starting with a notched base, then narrowing somewhat, only to expand once more and terminate in a narrow point.
- Subanal lobes long and upturned with lateral flaps, with a sauce-boat outline in side view, much as in the *magnicerca* group.
- Cerci distinctly upturned in side view, roughly triangular; no spine.

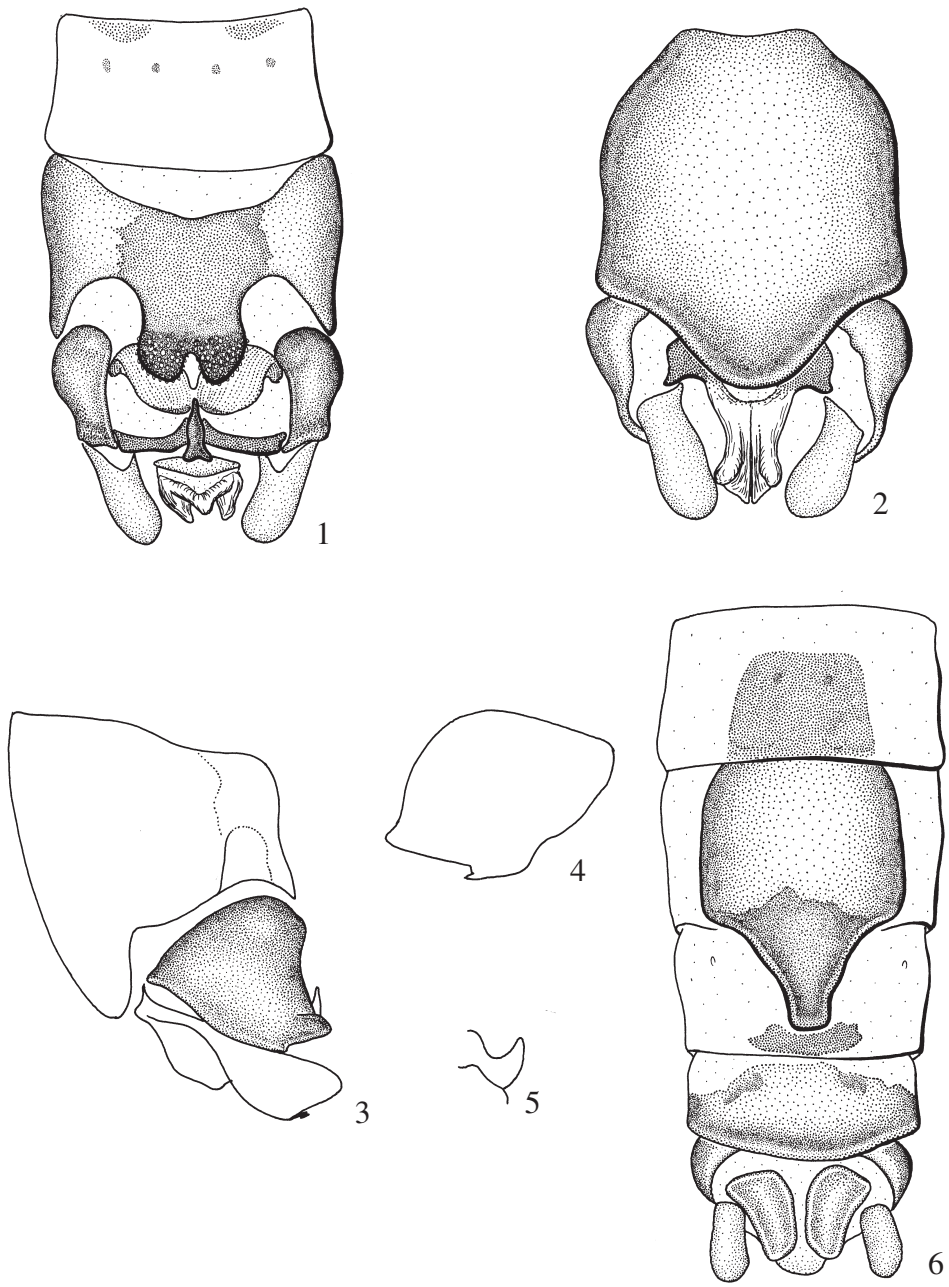
Female:
- Subgenital plate on sternum 8 produced into a long triangular lobe which is briefly prolonged by a short rectangular extension; hind borders rounded. Plate broadly darkened.
- Sternum 9 a short and narrow transverse plate which barely covers the middle part of the hind margin of the sternite.

Material examined:
Holotype ♂, THAILAND, Loei Province, Phu Luang Wildlife Sanctuary, 8-14.X.1984, 700-900 m. leg. Karsholt, Lamhold & Nielsen (PMSL). Paratype 1♀, same data.

Comments:
The highly unusual combination of characters make the male of this species the most easily recognisable among known members of the genus. The shape of the subgenital plate of the female is also characteristic.

Etymology:
Species is named after the extended hind border of tergum 9.

Figs. (10.1-10.6) *Rhopalopsole prominens.* 10.1. Male terminalia, dorsal aspect, 10.2. Male terminalia, ventral aspect, 10.3. Male terminalia, lateral aspect, 10.4. Lateral process of tergite 10, 10.5. Epiproct, 10.6. Female terminalia, ventral aspect.



The *malayana* Group

This group contains at present five species from Thailand and the Philippines and the particular features in the male are as follows:

- Tergum 9 is unmodified uniformly sclerified (centrally desclerified in one Thai species).

- Tergum 10 with a large rounded central plate (no divisions) covered with macrotrichia; in one species there are traces of ornementation (roughage – transverse wavy lines on the cuticle)) on the hind part. Lateral projections with a more or less distinct basal knob leading to an upward oriented plate terminating in two (rarely one) points.

- Epiproct thick, generally forming a simple (divided) hook.

- Subanal lobes uniting to form a flat, rather short, copulatory structure, with parallel sides.

- Cerci short, roundly triangular in side view, generally with a prominent terminal spine.

Female:

Only one female is presently known; the subgenital plate is barely produced, but bears a prominent unsclerified notch on its hind margin.

11. *Rhopalopsole malayana* (BANKS)
Figs. (11.1-11.6)

Leuctra malayana BANKS 1920: 325. Type series 3♂, 1♀ Luzon, Nueva Vizcaya, Philippines (Harvard Museum of Comparative Zoology, Boston).

The identity of this species is problematic. The type series in the Harvard Museum of Comparative Zoology (Boston) contains four specimens bearing the label »type 10828«, three males and one female; two males are from Imugin and a male and a female from Singapore; the males belong to three different species and the female is unrecognisable. To further complicate matters, the original desription refers only to the female, while the corresponding figure represents a male.

Of the two males from Imugin, the type locality, one belongs to a dark species and the other to a lighter one; we have chosen the darker specimen as lectotype, because Bank's description mentions the dark colouration.

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 sclerified, without ornementation.
- Tergum 10 bearing a central plate covered with macrotrichia, with a few spinules intermingled on the distal end.
- Lateral projections of tergum 10 originating in a somewhat bulbous base and extending upwards and backwards in a tapering plate which terminates in two points, one in the axis of the plate, the other at a downward angle to it.
- Epiproct rather thick forming in side view a regular rounded hook with an attenuated tip; tip in top view quadrate with a short forward tapering extension.
- Subanal lobes short, flat and plate-like, with weak ventral furrows.
- Cerci of medium length slightly upcurved, terminating in a distinct spine.

Female:

- Subgenital plate on sternum 8 produced into a very short broadly triangular lobe, its margin entire and shortly darkened.
- Sternum 9 an irregular transverse bar. Some narrow lateral sclerification.

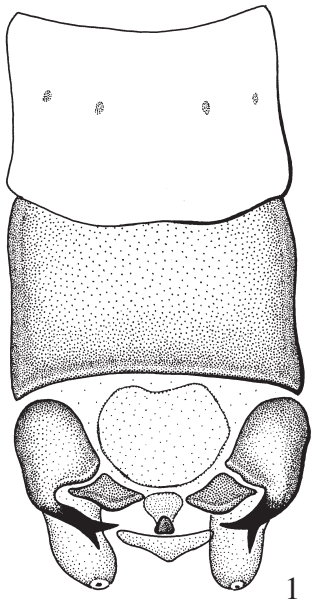
Material examined:

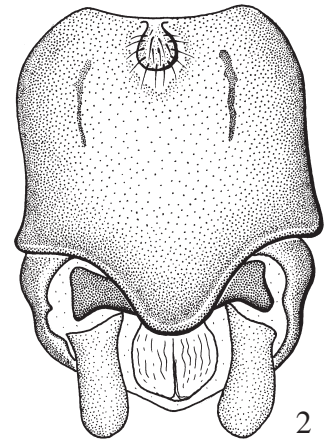
Lectotype ♂ (designated here), PHILIPPINES, (Luzon), N. Viscaya, Imugin, (C.F.) Baker; in Museum of Comparative Zoology (Boston). Paratypes: 1♂, Philippines, Mindanao, Mt. Agtuuganon, 1050 m, 28.V-7.VI.1996, leg. Mey (MNB), 1 ♂, 6 ♀, Philippines, Negros, Patas NR, 20-25.V.1996, leg. W. Mey (MNB).

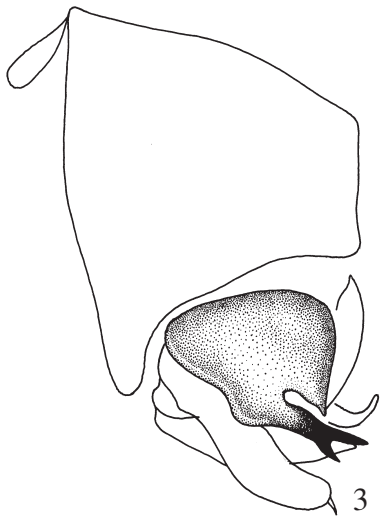
Comments:

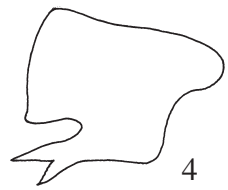
The shape of the lateral projection of tergum 9 in the male, together with the dorsal and lateral aspects of the epiproct should allow recognition of this species. The female is described from the Negros material and its association may be tenuous as it is based on the common occurence of a small series of females with one male. The subgenital plate is distinctive.

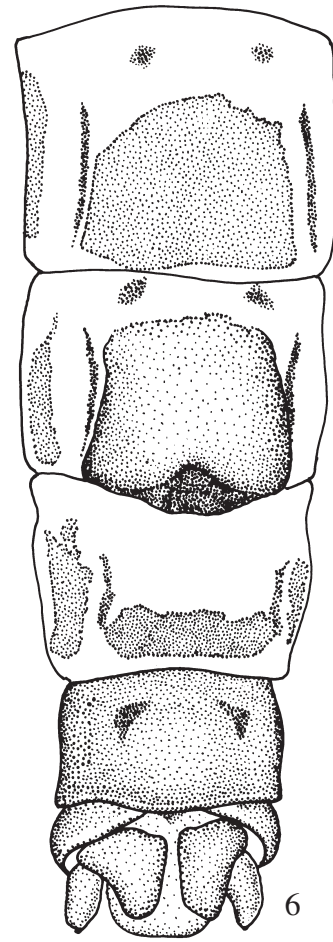
Figs. (11.1-11.6) *Rhopalopsole malayana.* 11.1. Male terminalia, dorsal aspect, 11.2. Male terminalia, ventral aspect, 11.3. Male terminalia, lateral aspect, 11.4. Lateral process of tergite 10, 11.5. Epiproct, 11.6. Female terminalia, ventral aspect.











12. *Rhopalopsole meyi* SIVEC & HARPER, **n. sp.**
Figs. (12.1-12.6)

This species is the second present in the R. malayana type series.

It has a very distinctive colour pattern in comparison to most other species which tend to be uniformly brownish. Pronotum and mesonotum are yellow, the metanotum brown. Pro- and meso-femora yellow, metafemora brownish except distal third which is yellow. First tarsal segment yellowish, others brown.

Length of forewing: 5.5 mm (male), 7 mm (female).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 evenly sclerified, without particular ornementation.
- Tergum 10 bearing a central plate covered with macrotrichia, with a little roughage of cuticular surface at distal end.
- Lateral projections of tergum 10 originating in a poorly defined bulbous base and extending upwards and backwards in a tapering plate which terminates in a main point, with a much smaller subterminal point jutting out from its inferior surface.
- Epiproct rather thick forming in side view a regular rounded hook with a slightly attenuated tip; tip in top view rounded triangular to pentagonal.
- Subanal lobes short, flat and plate-like, with weak ventral furrows.
- Cerci short, rather globular, barely upcurved, without any terminal spine.

Female:

- Subgenital plate on sternum 8 hardly produced, its margin shortly darkened and bearing a significant membranous round excavation in its middle.
- Sternum 9 with a large excavated transverse plate, separated by narrow membranes from lateral sclerites.

Material examined:

Holotype ♂, PHILIPPINES, Mindanao, Mt. Agtuuganon, 1050 m, 28.V-7.VI.1996, leg. Mey (MNB). Paratypes 1♀, same data (MNB). 1♂, PHILIPPINES, (Luzon), N. Viscaya, Imugin, (C.F.) Baker (part of the type series of *Leuctra malayana* Banks in Museum of Comparative Zoology).

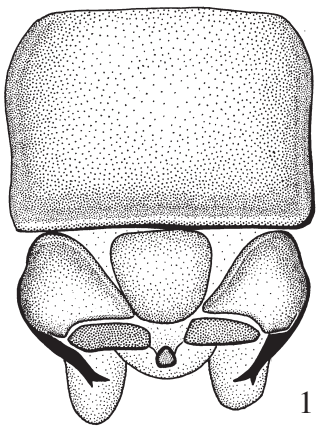
Comments:

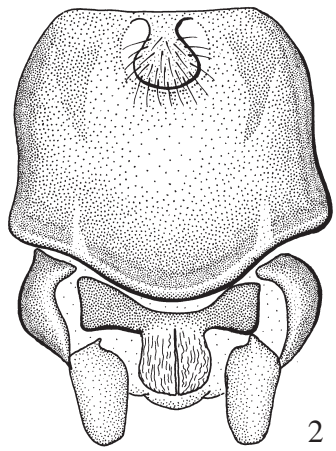
In the male, the shape of the lateral projections of tergum 10, particularly the relative sizes of the two end points, and the shape of the tip of the epiproct in top view are distinctive. In the female, the membranous excavation of the hardly produced subgenital plate is the diagnostic character. In both sexes, the colour pattern will serve to discriminate this species and associate the sexes.

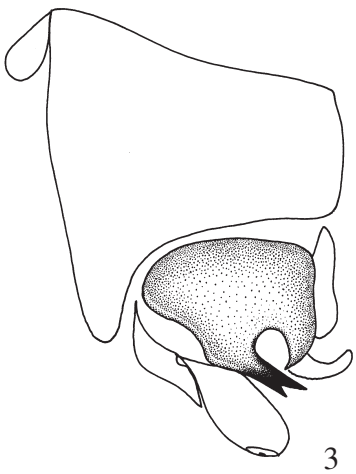
Etymology:

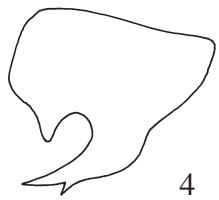
Species is named after Dr. Wolfram Mey from Berlin, who collected the material.

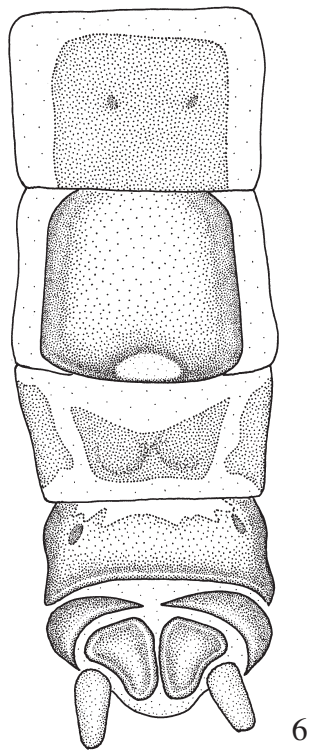
Figs. (12.1-12.6) *Rhopalopsole meyi.* 12.1. Male terminalia, dorsal aspect, 12.2. Male terminalia, ventral aspect, 12.3. Male terminalia, lateral aspect, 12.4. Lateral process of tergite 10, 12.5. Epiproct, 12.6. Female terminalia, ventral aspect.











13. *Rhopalopsole andreae* SIVEC & HARPER, **n. sp**.
Figs. (13.1-13.5)

Length of forewing: 5 mm (male).

Male:
- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 evenly sclerified, without particular ornementation.
- Tergum 10 bearing a central plate covered with macrotrichia, with some scale-like roughage on the cuticular surface of the distal end.
- Lateral projections of tergum 10 extending upwards and backwards in a tapering plate with an rounded lower portion and terminating in a long straight point. No lateral point.
- Epiproct rather thick forming in side view a somewhat irregularly rounded hook with a rapidly attenuated tip; top view of tip rather rounded quadrate with a forward reduction.
- Subanal lobes short, flat and plate-like, with weak ventral furrows.
- Cerci short, rather globular, barely upcurved, with a distinct terminal spine.

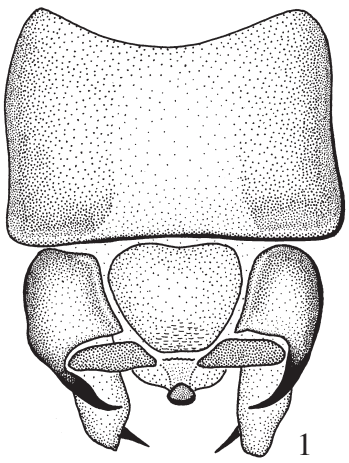
Female: unknown.

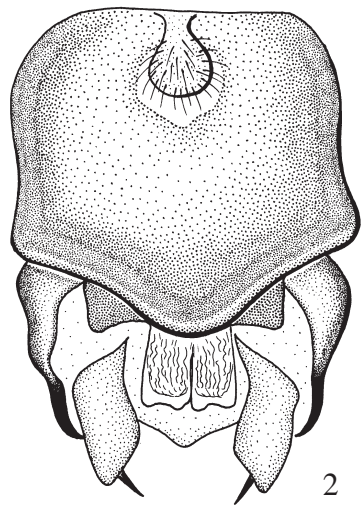
Material examined:
Holotype ♂, PHILIPPINES, Palawan, Estrella Falls, 3.3.1995, light trap, leg. A. Zwick (PZCS).

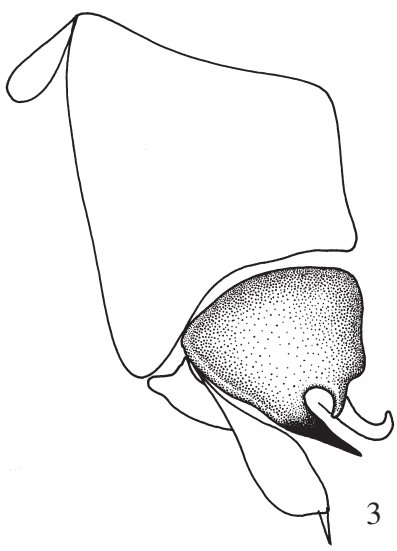
Comments:
The short and flat subanal structure combined with the simple lateral projection on tergum 10, the unmodified tergum 9 and the thick epiproct characterize this species readily.

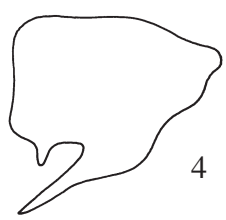
Etymology:
Species is named after Dr. Andreas Zwick the collector of material in Palawan.

Figs. (13.1-13.5) *Rhopalopsole andreae*. 13.1. Male terminalia, dorsal aspect, 13.2. Male terminalia, ventral aspect, 13.3. Male terminalia, lateral aspect, 13.4. Lateral process of tergite 10, 13.5. Epiproct.









14. *Rhopalopsole cayasan* SIVEC & HARPER, **n. sp.**
Figs. (14.1-14.5)

Length of forewing: 4.5 mm (male)

Male:
- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 evenly sclerified, without particular ornementation.
- Tergum 10 bearing a central plate covered with macrotrichia, with extensive roughage (scale-like markings) of cuticular surface at distal end.
- Lateral projections of tergum 10 originating in a poorly defined bulbous base and extending upwards and backwards in a very narrow tapering plate which terminates in a long, sharp, somewhat sinuous point.
- Epiproct rather thick forming in side view a very shallow, but upright rounded hook with a slightly attenuated tip; tip in top view rounded quadrate.
- Subanal lobes short, flat and plate-like, with weak ventral furrows.
- Cerci short, rather globular, barely upcurved, without any terminal spine.

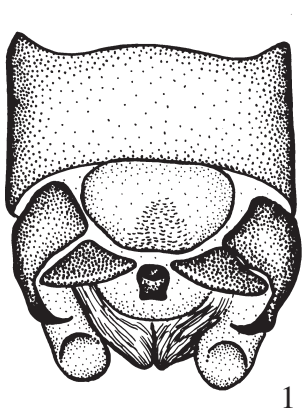
Female: unknown.

Material examined;
Holotype ♂, PHILIPPINES, Palawan, Cayasan, 5-6.IV.1995, Babuyan, LF (lighttrap), leg. W. Mey (NMB).

Comments:
This species ressembles *R. andreae* in general appearance and structure; the distinguishing characteristics are the small size of the insect, the shorter upright epiproct, the narrower and more pointed lateral projections on tergum 10 and the absence of the terminal spine on the cerci.

Etymology:
The species is named after the type locality in Palawan.

Figs. (14.1-14.5) *Rhopalopsole cayasan* 14.1. Male terminalia, dorsal aspect, 14.2. Male terminalia, ventral aspect, 14.3. Male terminalia, lateral aspect, 14.4. Lateral process of tergite 10, 14.5. Epiproct.



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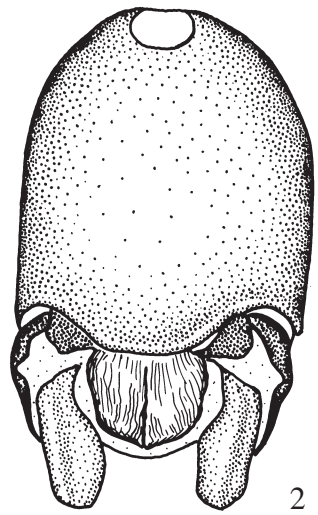

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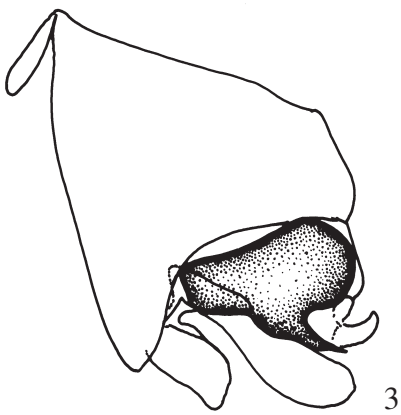

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15. *Rhopalopsole malickyi* SIVEC & HARPER, **n. sp.**
Figs. (15.1-15.5)

Length of forewing: 6 mm (male).

Male:
- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified, with a large central membranous area, with mid-lateral sclerified dots.
- Tergum 10 bearing a central plate covered with macrotrichia, with a little roughage of cuticular surface at distal end.
- Lateral projections of tergum 10 originating in a well-defined bulbous base and extending upwards and backwards in a short plate ending in two scissor-like points.
- Epiproct rather thick and short forming in side view a somewhat flattened hook with a slightly expanded then attenuated tip; tip in top view quadrate.
- Subanal lobes short, flat and plate-like, narrowed posteriorly, with weak ventral furrows.
- Cerci of medium size, upcurved, terminating in a distinct spine.

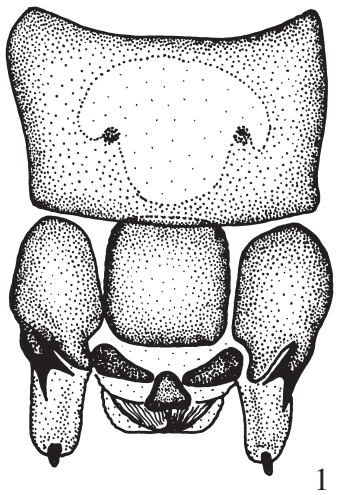
Female: unknown.

Material examined:
Holotype ♂, THAILAND, Khao Kitchakut NP (National Park), 120°50'N 102°07'E, 25.IV.1996, 100 m., leg. Malicky (PMSL).

Comments:
The short lateral projections of tergum 10 in the male with their scissor-like points are quite disctinctive. This is also the only known species of the group to have a modified tergum 9 (by desclerification of the middle part).

Etymology:
The species is named after Prof. Dr. Hans Malicky from Lunz am See who collected much SE Asian stonefly material.

Figs. (15.1-15.5) *Rhopalopsole malickyi.* 15.1. Male terminalia, dorsal aspect, 15.2. Male terminalia, ventral aspect, 15.3. Male terminalia, lateral aspect, 15.4. Lateral process of tergite 10, 15.5. Epiproct.



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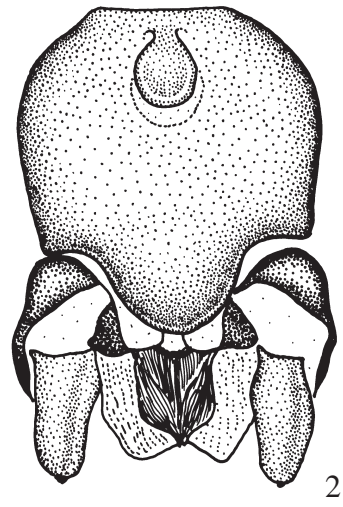

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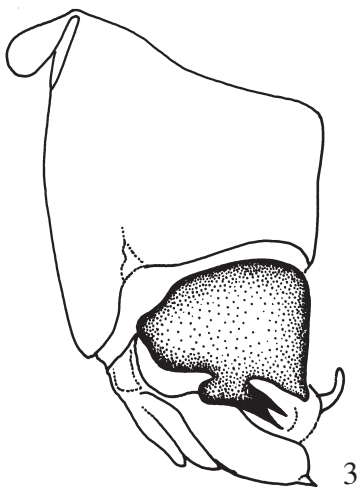

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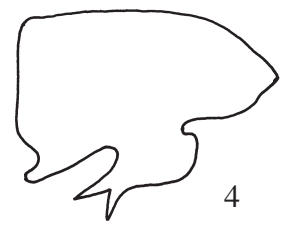

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16. Rhopalopsole *edwardsi* Sivec & Harper, n. sp.
Figs. (16.1-16.6)

Length of forewing: 7 mm (male), 8 mm (female).

Male:
- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified, unmodified.
- Tergum 10 bearing a central plate covered with macrotrichia, with a large central field of cuticular knobs and scales.
- Lateral projections of tergum 10 originating in a well defined bulbous base and extending upwards and backwards in a short plate ending in two scissor-like points of nearly equal size, the lower smaller.
- Epiproct rather thick and short forming in side view a somewhat flattened hook with an attenuated tip; in top view very wide.
- Subanal lobes short, flat and plate-like, rectangular, with weak ventral furrows.
- Cerci of medium size, upcurved, without a terminal spine.

Female:
- Subgenital plate shortly produced into a rounded lobe with a flat and entire margin.
- Sternum 8 a transverse plate with an irregular foremargin.

Material examined:
Holotype ♂, BORNEO, Sabah, Carson Falls, 1800 m., Mt. Kinabalu, September 1998, leg. E. Edwards (PMSL). Paratypes: 1♀, same data, Sabah, Kinabalu National Park, Liwagu river, 1410 m: 11♂, 7♀ 14.4.1999, leg. I. Sivec, 1♂ 10.4.1999, leg. I. Sivec, 7♂, 1♀ Liwagu river 1550 m, 14.4.1999, leg. I. Sivec.

Etymology:
The species is named after E. Edwards who collected the material.

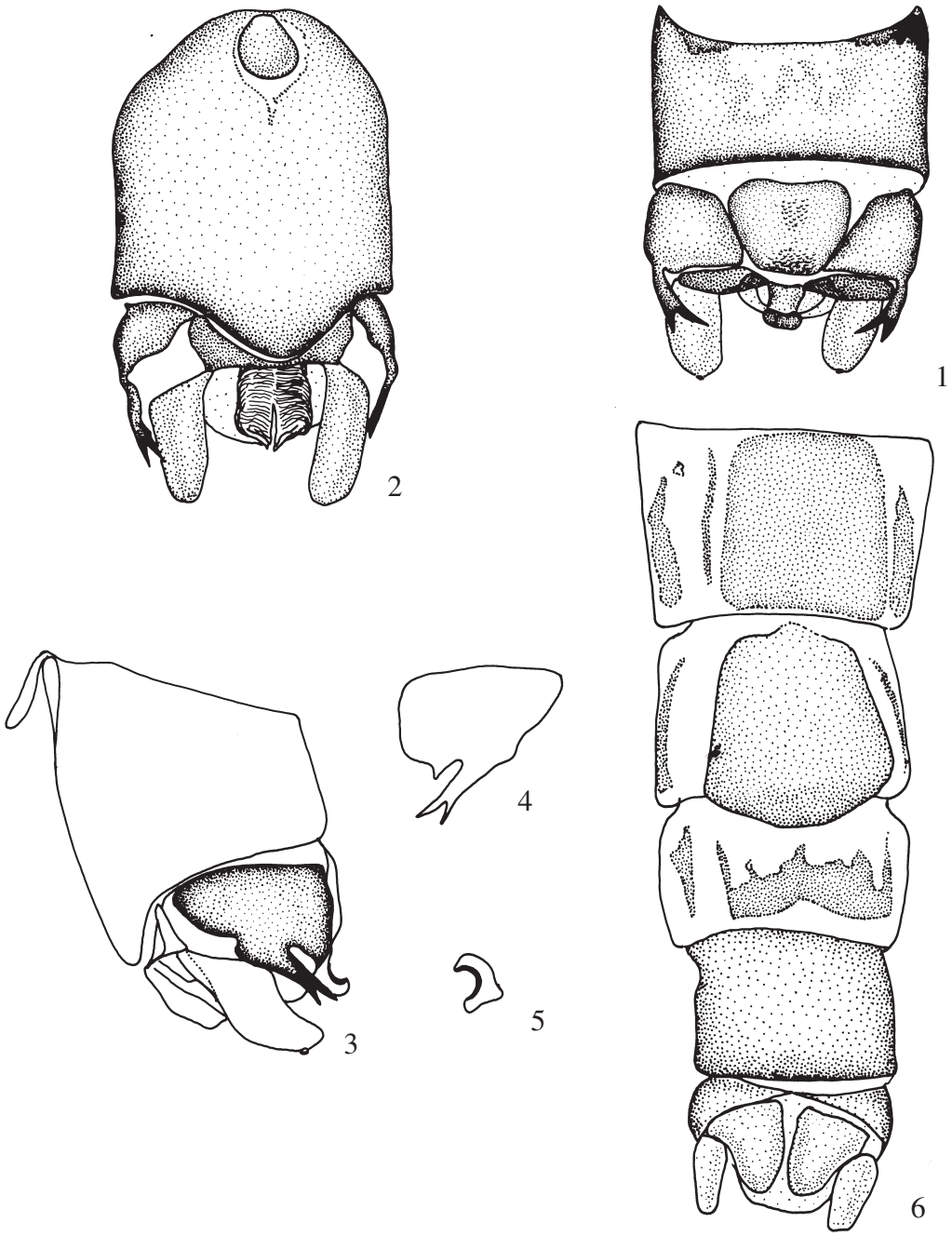
16a. *Rhopalopsole mataikan* Stark & Sivec

Rhopalopsole mataikan Stark & Sivec, (2008): 139, Holotype ♂ Darussalam, Sungai Mata Ikan, Brunei (United States National Museum of Natural History, Washington).

Additional material:
BORNEO, Sabah, Kinabalu National Park: 1♂, 2♀ Silau Silau river, 1500 m, 11.4.1999, leg. I. Sivec, 1♂ Liwagu river, 11.4.1999, leg. I. Sivec, 2♂ Liwagu river, 1410 m, 10.4.1999, leg. I. Sivec, 5♂, 1♀Liwagu river, 1410 m, 12.4.1999, leg. I. Sivec, 1♂, 3♀, Liwagu river,1550 m,14.4.1999, leg. I. Sivec.

Comments:
Recently described species from Brunei was found together with rather similar species *R. edwardsi* also in Sabah. The main difference to separate species is the shape of epiproct. Thick and wide from dosal view in *R. edwardsi*, and thin and narrow in *R. mataikan*.

Figs. (16.1-16.6) *Rhopalopsole edwardsi.* 16.1. Male terminalia, dorsal aspect, 16.2. Male terminalia, ventral aspect, 16.3. Male terminalia, lateral aspect, 16.4. Lateral process of tergite 10, 16.5. Epiproct, 16.6. Female terminalia, ventral aspect.



17. *Rhopalopsole taiwanica* SIVEC & SHIMIZU, **n. sp.**
Figs. (17.1-17.6)

Length of forewing: 7 mm (male), 8 mm (female).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 evenly sclerified, without particular ornementation; a very slight extension on middle of hind margin (no ornementation).
- Tergum 10 bearing a central plate covered with macrotrichia, with no roughage of cuticular surface at distal end.
- Lateral projections of tergum 10 originating in a large and wide rounded base and extending upwards and backwards in a short plate which tapers abruptly into two small points, the upper one slightly larger and lightly angled one to the other.
- Epiproct rather thick forming in side view a regular rounded hook with a slightly attenuated tip; tip in top view wide and bluntly rounded.
- Subanal lobes short, flat and plate-like, tapering regularly, with weak ventral furrows.
- Cerci short, rather globular upcurved, with a terminal spine.

Female:

- Subgenital plate on sternum 8 hardly produced, its margin very shortly darkened and bearing or not a central excavation bordered by rounded lobes. Lip of plate apparently quite variable, ranging from entire to excavated.
- Sternum 9 with a pair of quadrate plates, separated by a large membranous area.

Material examined:

Holotype ♂, TAIWAN, Ilan county, Chilan, 440 m, 19.3.1996, I. Sivec, B. Horvat leg.(PMSL), Paratypes: TAIWAN, Taipei county: 9♂, 7♀ NE Shihting, 300 m, 14.3.1996, I. Sivec, B. Horvat leg., 1♀ S Pinglin, 450 m, 15.3.1996, I. Sivec, B. Horvat leg., 1♂ S Pinglin, 350 m, 31.10.1996, I. Sivec leg., 1♀ Pinglin, Chisichiao, 16.4.1995, L.J. Wang leg., 1♂, 2♀ S Wulai, 330 m, 15.3.1996, I. Sivec, B. Horvat leg., 1♂ Wulai, Shiaoi, 350 m, 8.4.1996, I. Sivec, B. Horvat leg., 8♂, 10♀ Wulai, Shiaoi, 470 m, 8.4.1996, I. Sivec, B. Horvat leg., 2♂, 1♀ Shihpei, 450 m, 7.4.1996, I. Sivec, B. Horvat leg., 1♂ N Shihpei, 435 m, 7.4.1996, I. Sivec, B. Horvat leg., 5♂, 2♀ N Shihpei, 400 m, 7.4.1996, I. Sivec, B. Horvat leg., 2♂, 7♀ N Shihpei, 480 m, 11.10.1996, I. Sivec leg., 1♂ W Shuangchi, 220 m, 14.3.1996, I. Sivec, B. Horvat leg., 1♂ Kungliao, 150 m, 13.3.1996, I. Sivec, B. Horvat leg., 1♀ Kungliao, 200 m, 13.3.1996, I. Sivec, B. Horvat leg., 4♂, 9♀ Fushan bot. garden, 650 m, 2.11.1996, I. Sivec leg., 2♂ NE Shihting, 400 m, 10.10.1996, I. Sivec leg., Taichung county: 1♂ Wulin, Sheipa natural park, 1950 m, 29.10.1996, I. Sivec leg., 1♂ Wushihkang, 1160 m, 18.10.1996, I. Sivec leg.,1♂, 1♀ Szchiau-lin, 1550 m, 19.10.1996, I. Sivec leg., 1♂, 1♀ Mt. Shüchshan, Chika-Shanchuang, 2400 m, 29.6.1989, M. Satô leg., 1♂ Taitung hsien, Kôyô, 2400 m, 12.6.1989, M. Satô leg., Illan county: 17♂, 23 ♀ same data as holotype, 1♀ Chilan, 5.9.1995, L.J. Wang leg., 5♂, 6♀ Chilan, 360 m, 2.11.1996, I. Sivec leg., 4♂ 1,5 km W Minghyr forest rec. Area, 1100 m, 1.10.1996, I. Sivec, leg., 2♂, 4♀ 1,5 km W Minghyr, 1100 m, 1.11.1996, I. Sivec leg., 2♂, 2♀ Chihtuan, 1110 m, 19.3.1996, I. Sivec, B. Horvat leg., 2♂, 3♀ Chihtuan, 1080 m, 1.11.1996, I. Sivec leg., 1♀ E Chihtuan, 1220 m, 2.11.1996, I. Sivec leg., 1♀ W Szuling, 1080 m, 9.4.1996, I. Sivec, B. Horvat leg., 1♂, 6♀ 1,5 km E Fushan bot. garden, 600 m, 2.11.1996, I. Sivec leg., 1♂ S Suchi, 19.3.1996, I. Sivec, B. Horvat leg.,

1♀ N Talichien, 190 m, 13.3.1996, I. Sivec, B. Horvat leg., Taoyuan county: 1♂ Fushing Changh Sin, 18.4.1995, L.J. Wang leg., 6♂, 4♀ N Sulo, 690 m, 9.4.1996, I. Sivec, B. Horvat leg., 6♂, 3♀ S Piyehwa, N Sulo, 760 m, 18.3.1996, I. Sivec, B. Horvat leg., 1♀ Hoping Bridge, 4.7.1988, Kwonk-Ching Wong leg., Pingtung county: 1♀ E Shihtzu, 370 m, 3.4.1996, I. Sivec, B. Horvat leg., 1♀ Lofu, 350 m, 9.4.1996, I. Sivec, B. Horvat leg., Hualien county: 1♂, 3♀ W Loshao, 1180 m, 12.4.1996, I. Sivec, B. Horvat leg., 2♂, 1♀ Anonymus point, 1450 m, 5.4.1996, I. Sivec, B. Horvat leg., 7♂, 10♀ Fenglin, 200 m, 14.4.1996, I. Sivec, B. Horvat leg., Nantou county: 1♂, 1♀ Tungpu, 1300 m, 27.3.1996, I. Sivec, B. Horvat leg., 7♂, 8♀ Tungpu, 1150 m, 21.10.1996, I. Sivec leg., 1♂ W Puli, 880 m, 26.3.1996, I. Sivec, B. Horvat leg., 1♂, 2♀ Lushan, 1120 m, 25.10.1996, I. Sivec leg., 6♂, 7♀ Shihtzutou-hsi, 28.4.1994, T. Shimizu leg., Chiayi county: 1♀ Taiping, 1000 m, 3.5.1996, M.L. Jeng leg., 2♂ N Lianyurn waterfals, 22.10.1996, I. Sivec leg., Hsin Chu county: 4♂, 1♀ S Chienshih, Euro, 920 m, 16.3.1996, I. Sivec, B. Horvat leg., 5♂, 1♀ W Kuaishan, 1350 m, 17.10.1996, I. Sivec leg., 3♂, 6♀ W Kuaishan, 1140 m, 16.10.1996, I. Sivec leg., JAPAN, Ohtomi-rindo, Iriomotejima Is., Okinawa Prefecture, 13-15.III.1993, Y. Okushima leg.

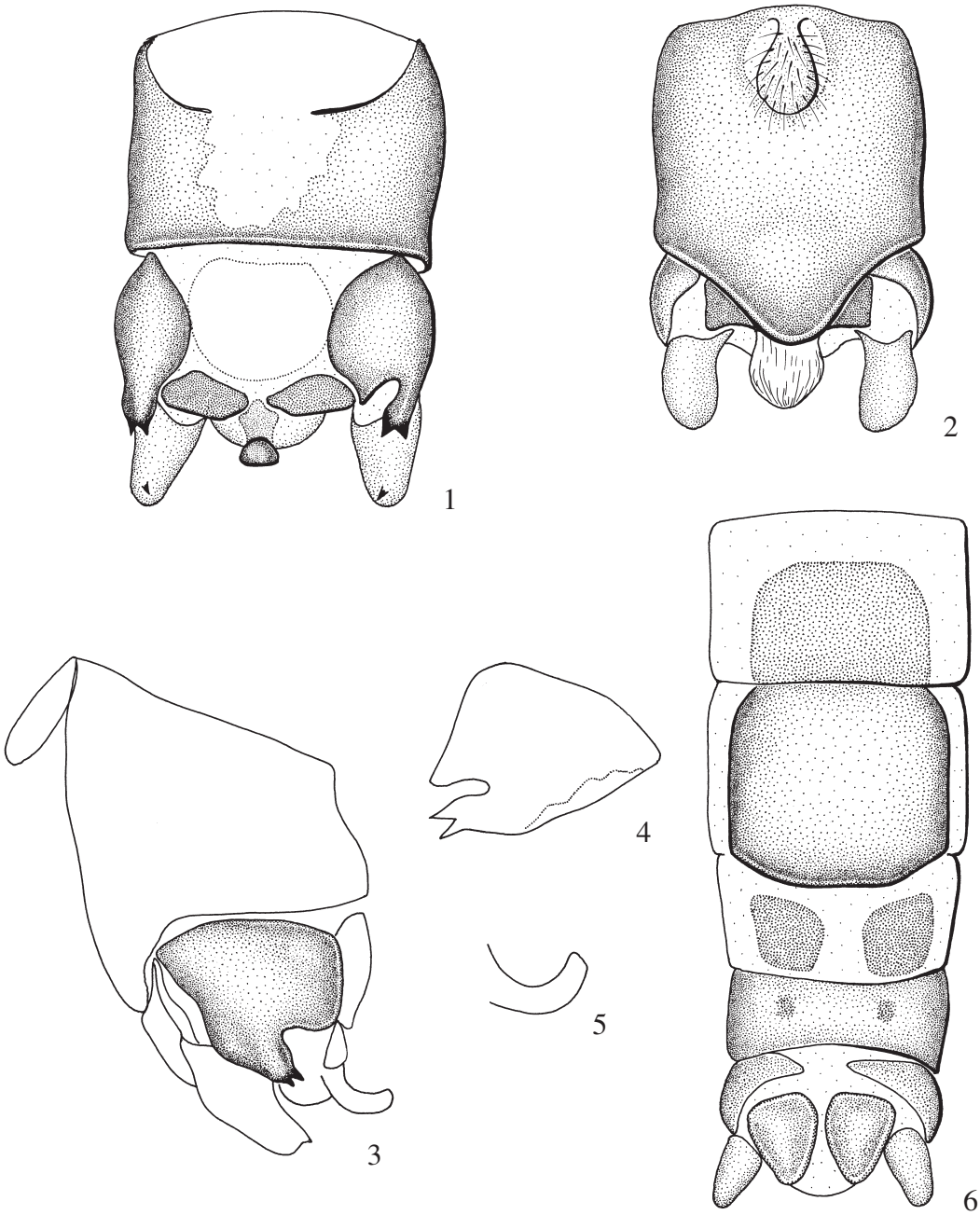
Comments:

This is the most common species in Taiwan and it occurs as well in the Yaeyama Islands in Sakishima Islands [or west end of Ryukyu Islands]. The very short spines on the lateral projections of the male tergum 10 are distinctive, as are the pair of plates on the female sternum 8. We have abundant material from Taiwan which shows some considerable variation in the sizes of the points in males and of the subgenital plate in females.

Etymology:

The most common species of *Rhopalopsole* in Taiwan is named after the island.

Figs. (17.1-17.6) *Rhopalopsole taiwanica.* 17.1. Male terminalia, dorsal aspect, 17.2. Male terminalia, ventral aspect, 17.3. Male terminalia, lateral aspect, 17.4. Lateral process of tergite 10, 17.5. Epiproct, 17.6. Female terminalia, ventral aspect.



18. *Rhopalopsole bifurcata* SIVEC & SHIMIZU, **n. sp.**
Figs. (18.1-18.6)

Length of forewing: 6.5 mm (male), 7.5 mm (female).

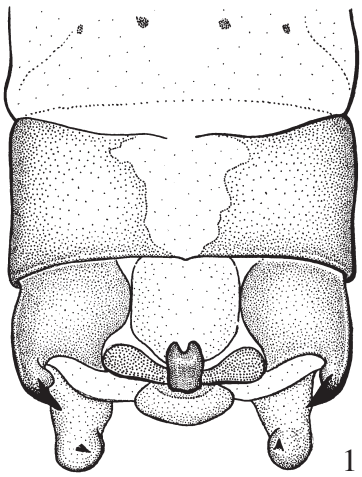
Male:
- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 evenly sclerified, without particular ornementation; lighter sclerified in centre.
- Tergum 10 bearing a central plate covered with macrotrichia, with no roughage of cuticular surface at distal end.
- Lateral projections of tergum 10 originating in a large and wide rounded base (ventral indentation) and extending upwards and backwards in a short plate which tapers abruptly on the dorsal side into a single spine which extends from the ventral surface.
- Epiproct rather thick forming in side view a regular curved hook with a rounded tip; tip in top view wide and somewhat pentagonal with a deep and rounded excavation.
- Subanal lobes short, flat and plate-like, tapering rapidly (triangular), with weak ventral furrows.
- Cerci short, rather globular upcurved, with a small terminal spine.

Female:
- Subgenital plate on sternum 8 shortly produced as a triangular extension, its margin very narrowly darkened.
- Sternum 9 with a pair of quadrate plates, separated by a large membranous area.

Material examined:
Holotype ♂, JAPAN, a tributary of Kawachi-gawa, Uken-son, Amami-oshima, Kagoshima Prefecture, 2.III.1994, T. Shimizu leg. (sweep). Paratypes, 2 ♂, 1 ♀, same data (all material LBM).

Etymology:
The species is named after its peculiar bifurcated tip of the epiproct.

Figs. (18.1-18.6) *Rhopalopsole bifurcata.* 18.1. Male terminalia, dorsal aspect, 18.2. Male terminalia, ventral aspect, 18.3. Male terminalia, lateral aspect, 18.4. Lateral process of tergite 10, 18.5. Epiproct, 18.6. Female terminalia, ventral aspect.



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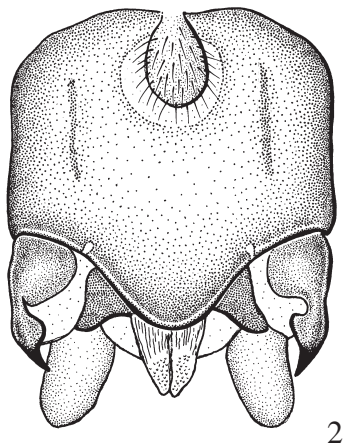

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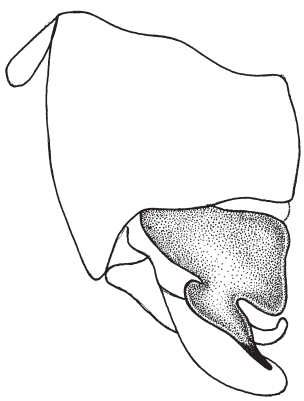

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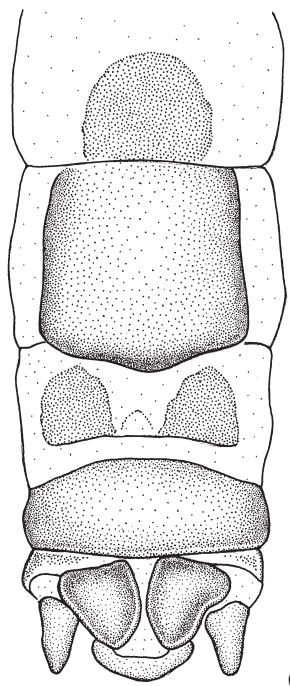

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19. *Rhopalopsole maruyamai* Sivec & Shimizu, **n. sp.**
Figs. (19.1-19.5)

Length of forewing: 5.5 mm (male).

Male:
- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 evenly sclerified, without particular ornementation; lighter sclerification in centre.
- Tergum 10 bearing a central plate covered with macrotrichia, with very little roughage of cuticular surface at distal end. Transverse bars with stouter hairs laterally.
- Lateral projections of tergum 10 originating in a rounded detached base (very shallow ventral indentation) and extending upwards and backwards in a short plate which carries a pair of short points, the lower one slightly smaller.
- Epiproct long ang thin forming in side view a regular curved hook with a attenuated and downcast tip; tip in top view tapering rapidly and rounded.
- Subanal lobes short, flat and plate-like, tapering rapidly (triangular), with weak ventral furrows.
- Cerci short, rather globular upcurved, with a small terminal spine.

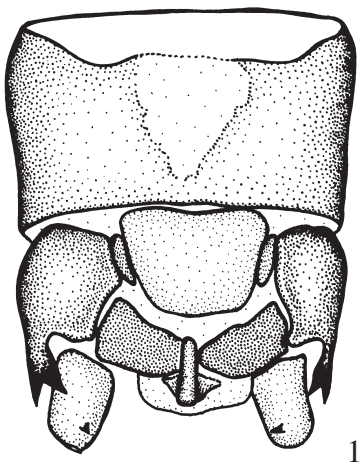
Female: unknown.

Material examined:
Holotype ♂, JAPAN: Suzaka-shi, Kochi Pref., 10.V.1992, leg. H. Maruyama (LBM).

Comments:
The short spines on the lateral projections of tergum 10 and the long thin epiproct will allow recognition of this species.

Etymology:
The species is named after its collector H. Maruyama.

Figs. (19.1-19.5) *Rhopalopsole maruyamai.* 19.1. Male terminalia, dorsal aspect, 19.2. Male terminalia, ventral aspect, 19.3. Male terminalia, lateral aspect, 19.4. Lateral process of tergite 10, 19.5. Epiproct.



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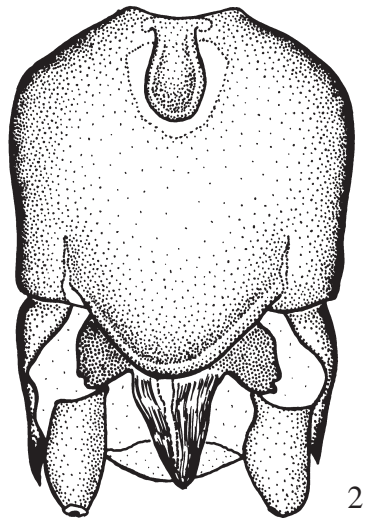

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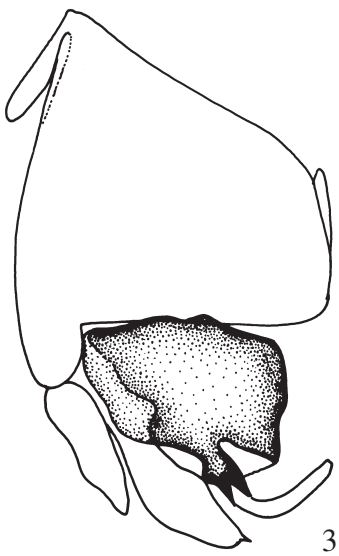

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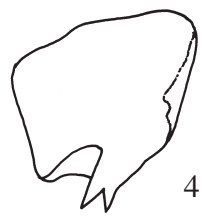

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The vietnamica Group »western assemblage«

This group contain four species (?), the fourth probably a complex. It shares many of the features mentioned for the *malayana* group. It does appear to have a few additional characteristics:

Male:

- Tergum 9 always possesses some kind of ornementation (a small field of knobs) on the mid part of its hind margin.

- Tergum 10 possesses a central plate which is usually without cuticular ornementations, except sometimes some light roughage. Two sclerified bands on each side of the plate.

- Lateral projections of tergum 10 typically ending in a forked process. Inner bulge along the staff, somewhere near the base of the hooks, in some if not all species (at some degree); this bulge is difficult to see in teneral specimens, and quite hidden in some viewing angles.

- Epiproct simple and thick.

- Subanal lobes forming a flat (thicker) process of intermediate size; structure narrow at base, then expanding into a wide rectangular piece; furrows gnerally more prominent than in previous group.

- Cerci long, upturned and somewhat sinuous, terminating in a sharp spine.

Female;

- Subgenital plate moderately produced, (often triangular), with a middle notch.

20. *Rhopalopsole vietnamica* SIVEC & HARPER, **n. sp.**
Figs. (20.1-20.5)

Length of forewing: 4.5 mm (male).

Male:
- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified, with a large central lighter area; on mid hind margin, small triangular field of knobs.
- Tergum 10 bearing a central plate covered with macrotrichia, with a little roughage of cuticular surface at distal end; heavily sclerified lateral bars.
- Lateral projections of tergum 10 originating in a well defined rounded base and extending upwards and backwards in a short plate ending in a large point, with a smaller subterminal point set at angle to the first one.
- Epiproct rather thick and short forming in side view a somewhat flattened hook with an abruptly attenuated tip; tip in top view rounded elongate, slightly expanding towards end.
- Subanal lobes of medium size, flat and plate-like, expanding posteriorly, with well-defined ventral furrows, nipple-like tip ventrally with spinules.
- Cerci long, upcurved, terminating in a distinct spine.

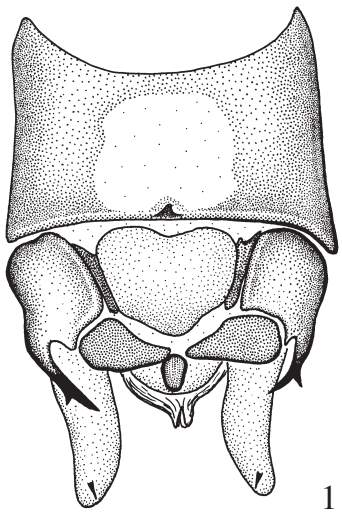
Female: unknown.

Material examined:
Holotype ♂, VIETNAM, 100 km SW of Thinhoa, 24.I.1989, leg. B. Korotjaev (PMSL).

Comments:
The shape of the lateral projections of tergum 10 and of epiproct are distinctive.

Etymology:
The species is named after the country of its distribution.

Figs. (20.1-20.5) *Rhopalopsole vietnamica.* 20.1. Male terminalia, dorsal aspect, 20.2. Male terminalia, ventral aspect, 20.3. Male terminalia, lateral aspect, 20.4. Lateral process of tergite 10, 20.5. Epiproct.



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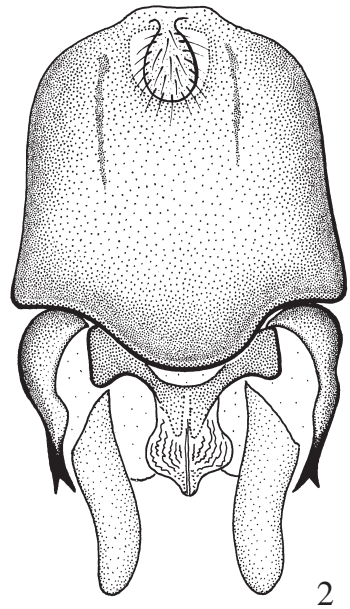

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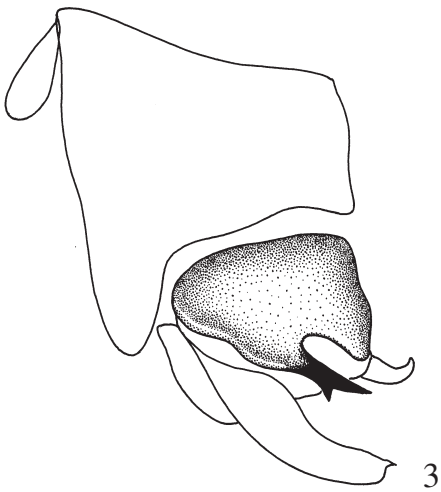

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21. *Rhopalopsole sipirokana* SIVEC & HARPER, **n. sp.**
Figs. (21.1-21.6)

Length of forewing: 5.5 mm (male), 6.5 mm (female).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified, with a large central lighter area; on mid hind margin, small rectangular field of knobs.
- Tergum 10 bearing a central plate covered with macrotrichia, (no roughage of cuticular surface at distal end); no heavily sclerified lateral bars.
- Lateral projections of tergum 10 originating in a weak (ill-defined) rounded base and extending upwards and backwards in a short plate narrowing rapidly and ending in a long narrow point, with a smaller subterminal point set at angle halfway along the plate.
- Epiproct rather thick and short forming in side view a rounded hook with an gradually attenuated tip, with a small ventral subterminal bulge; a few short hairs on distal half; in top view rounded elongate, slightly expanding towards end, tip narrowed.
- Subanal lobes of medium size, flat and plate-like, expanding posteriorly, with well-defined ventral furrows, pointed tip.
- Cerci long, upcurved, terminating in a distinct but rather blunt spine.

Female:

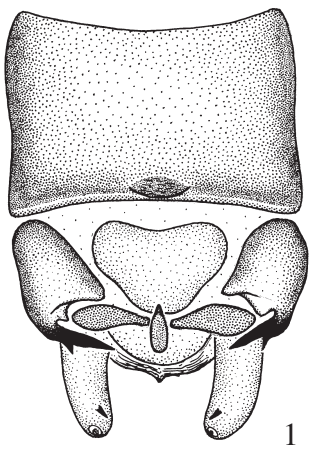
- Subgenital plate produced into a wide but shallow triangular plate with a distinct notch on mid margin.
- Sternum 8 a broad rectangular plate on distal half, medially excavated.

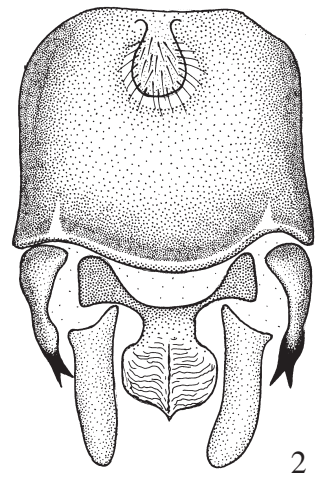
Material examined:
Holotype ♂, INDONESIA, N. Sumatra, E. Sipirok, 1300 m., 1°38'09 N 99°20'24 E, 27.II.1994, leg. I. Sivec (PMSL). Paratypes: 7 ♂, 3 ♀ same data.

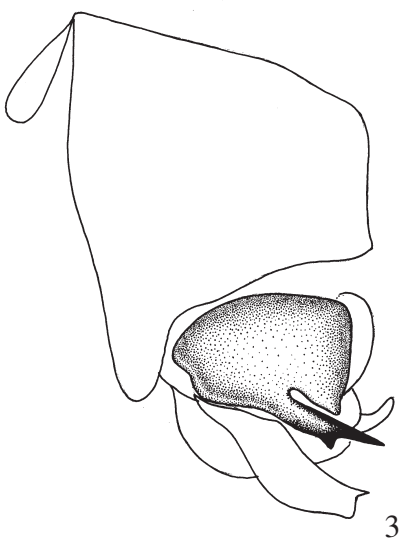
Comments:
The outlines in side view of the male epiproct and lateral projections on tergum 10 are the diagnostic features.

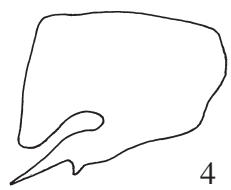
Etymology:
The species is named after type locality Sipirok in Sumatra.

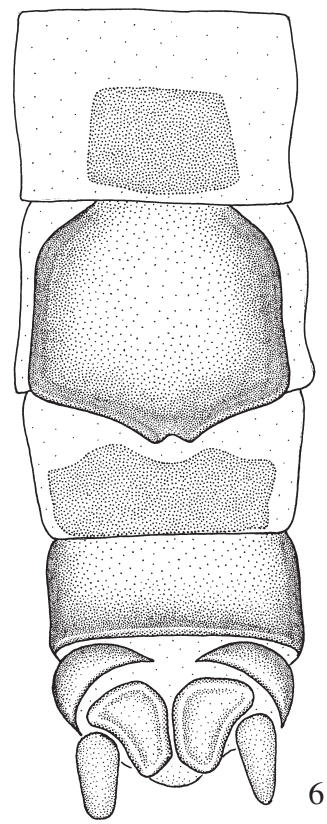
Figs. (21.1-21.6) *Rhopalopsole sipirokana.* 21.1. Male terminalia, dorsal aspect, 21.2. Male terminalia, ventral aspect, 21.3. Male terminalia, lateral aspect, 21.4. Lateral process of tergite 10, 21.5. Epiproct, 21.6. Female terminalia, ventral aspect.











22. *Rhopalopsole assamensis* SIVEC & HARPER, **n. sp.**
Figs. (22.1-22.6)

Male:
- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; on mid hind margin, small transverse field of knobs.
- Tergum 10 bearing a central plate covered with macrotrichia, (no roughage of cuticular surface at distal end); heavily sclerified lateral bars.
- Lateral projections of tergum 10 originating in a weak (ill-defined) rounded base and extending upwards and backwards in a rather stocky and short plate, not narrowing appreciably ending in a short and wide point, with a shorter but wide subterminal point set at angle two thirds along the plate.
- Epiproct rather thick and short forming in side view a flatly rounded hook with a terminally attenuated tip, with a tiny ventral subterminal notch; in top view, rectangular with rounded angles.
- Subanal lobes of medium size, flat and plate-like, expanding posteriorly, with well-defined ventral furrows, pointed tip.
- Cerci long, upcurved, terminating in a distinct spine.

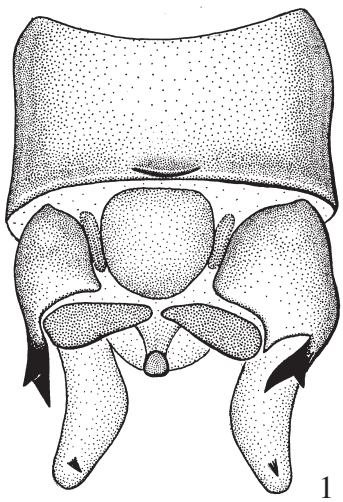
Female:
- Subgenital plate produced into a wide and extended triangular plate with a distinct notch on mid margin.
- Sternum 8 a broad rectangular plate on distal half, with a rounded but narrow median excavation.

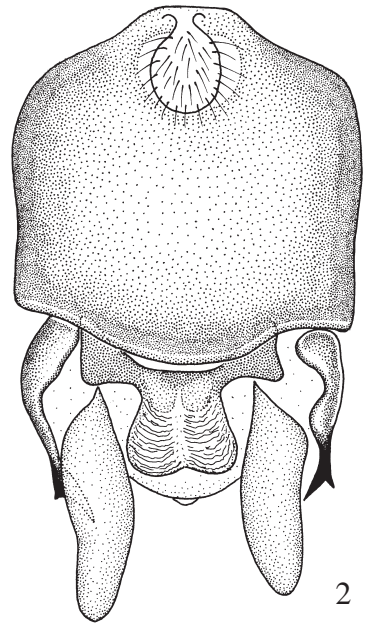
Material examined:
Holotype ♂, ASSAM, Khangairim, 29.VI:1960, leg. F. Schmid (MZL). Paratypes: 1 ♂, 1 ♀, same data; 8 ♂, Assam, Sgutung, 11.IV.1960; 1 ♀, Assam, Hviahu, 3.VII.1960; 1 ♀, Assam, Bokhar, 27.V.1961; 1 ♀, Assam, Longbikhulen, 30.V.1960; 2 ♀, Assam, Poi, 4.VII.1960. All leg. F. Schmid (all dry and pinned material MZL).

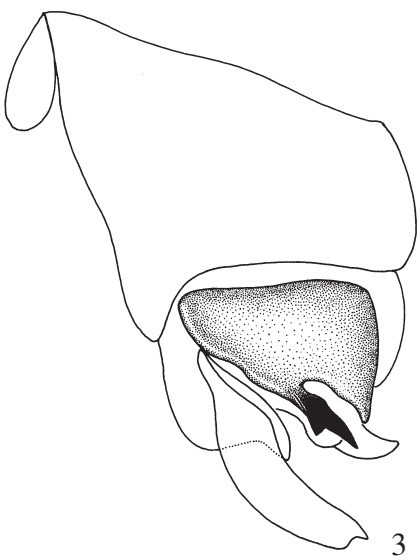
Comments:
Again, the stocky parallel-sided lateral projections of tergum 10 and their wide points are distinctive in the male.

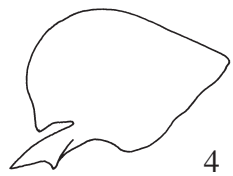
Etymology:
The species is named after Indian province of Assam, type locality of the species.

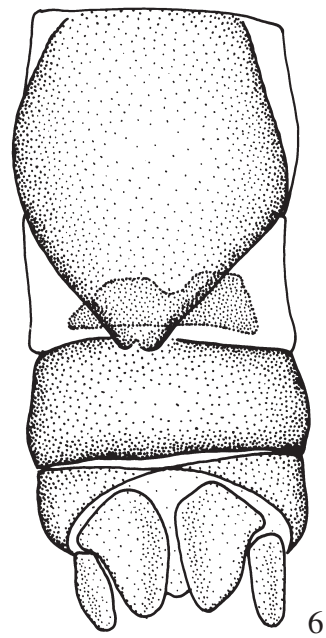
Figs. (22.1-22.6) *Rhopalopsole assamensis.* 22.1. Male terminalia, dorsal aspect, 22.2. Male terminalia, ventral aspect, 22.3. Male terminalia, lateral aspect, 22.4. Lateral process of tergite 10, 22.5. Epiproct, 22.6. Female terminalia, ventral aspect.











23. *Rhopalopsole furcospina* Wu Complex
Figs. (23.1-23.12)

This species or probably complex of species is widespread in China. There have been a number of descriptions pertaining to this group, but some of the older types are lost and we have been unable to study the more recent ones. We have therefore to consider the group as a complex rather than as a widespread, and perhaps variable species, thus avoiding the problem of synonymies and nomenclature. We have chosen as the name of the complex the oldest species, *Rhopalopsole furcospina* (Wu 1973), which probably belongs to this assemblage and for which primary types still exist in the Beijing Zoological Institute of Academy of Sciences.

The more recently described species, *Rhopalopsole sinensis* and *R. furcata* by Yang and Yang (1993, 1994) also belong here, but we are unable to distinguish them from each other, neither from Wu's (1973) species, nor from our own material from Hong Kong and Sichuan.

We will therefore limit ourselves to describing the species we have on hand and leave to others the task of resolving the nomenclatural imbroglio and geographical variation of this assemblage.

Length of forewing: 5-6 mm (male), 7-8 mm (female).

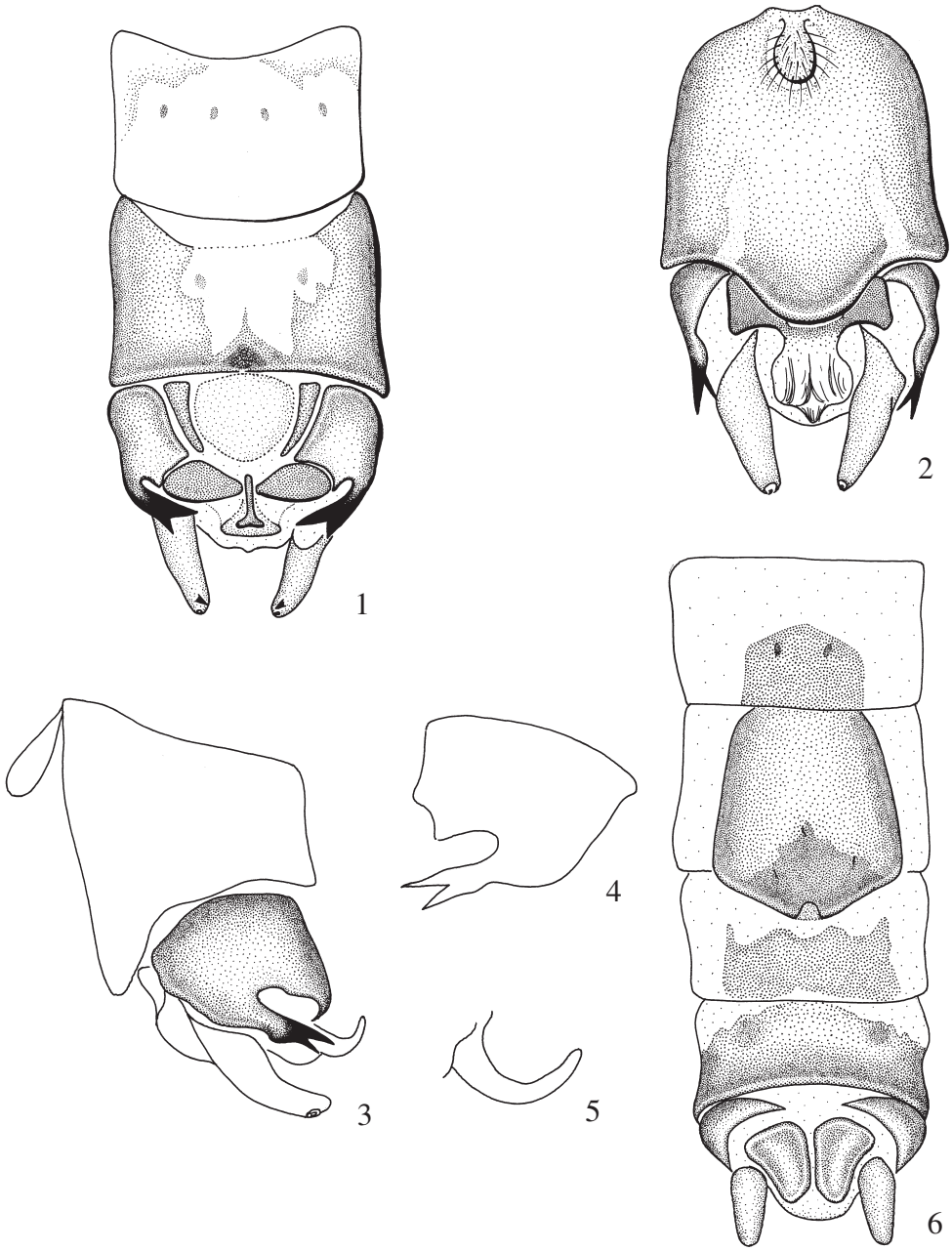
Male:

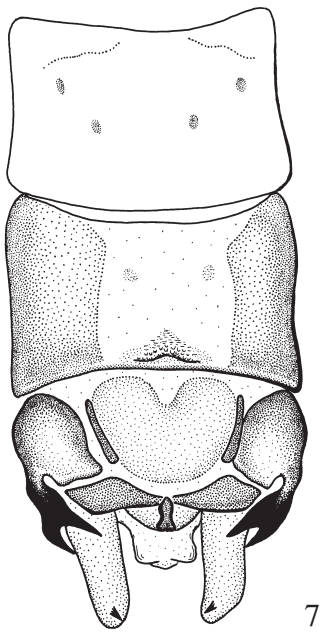
- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified, with a large central lighter area; on mid hind margin, small rectangular field of knobs.
- Tergum 10 bearing a central plate covered with macrotrichia, (no roughage of cuticular surface at distal end); with heavily sclerified lateral bars.
- Lateral projections of tergum 10 originating in a well-defined rounded base, extending upwards and backwards in a short plate with parallel sides and ending in two points, the upper somewhat longer, both oriented more or less in the same general direction. On the inner surface, between the points, there is a distinct bulge, which can be seen in certain orientations of the specimens, but is quite hidden in other views.
- Epiproct somewhat thick and rather long forming in side view a rounded hook with an gradually attenuated tip, with a small terminal constriction; a few short hairs on distal half; in top view elongate, slightly narrowing towards the end.
- Subanal lobes of medium size, flat and plate-like, expanding posteriorly, with well-defined ventral furrows, pointed tip.
- Cerci long, upcurved, terminating in a distinct but rather blunt spine.

Female:

- Subgenital plate produced into a wide but shallow triangular plate with a distinct notch on mid margin.
- Sternum 8 a broad rectangular plate on distal half, medially excavated on the hind margin; fore margin straight to irregular and excavated.
- Real, but inconsistent, differences in the subgenital plates of the females we have may indicate that there are more than one species involved, but we have to few specimens to determine patterns.

Figs. (23.1-23.12) *Rhopalopsole furcospina complex* (Hong Kong). 23.1. Male terminalia, dorsal aspect, 23.2. Male terminalia, ventral aspect, 23.3. Male terminalia, lateral aspect, 23.4. Lateral process of tergite 10, 23.5. Epiproct, 23.6. Female terminalia, ventral aspect. *Rhopalopsole furcospina complex* (China, Sichuan). 23.7. Male terminalia, dorsal aspect, 23.8. Male terminalia, ventral aspect, 23.9. Male terminalia, lateral aspect, 23.10. Lateral process of tergite 10, 23.11. Epiproct, 23.12. Female terminalia, ventral aspect.





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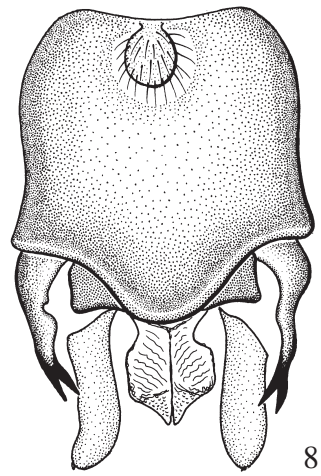

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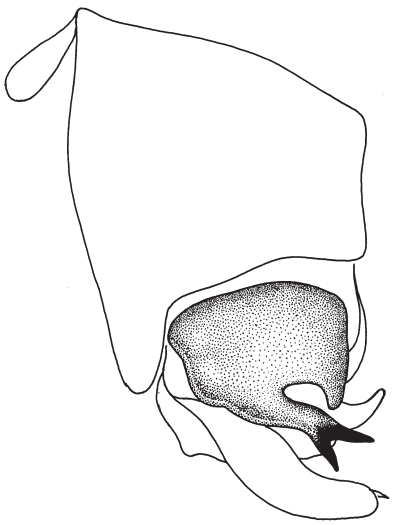

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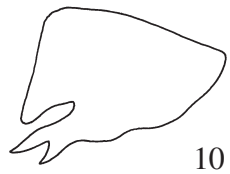

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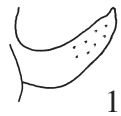

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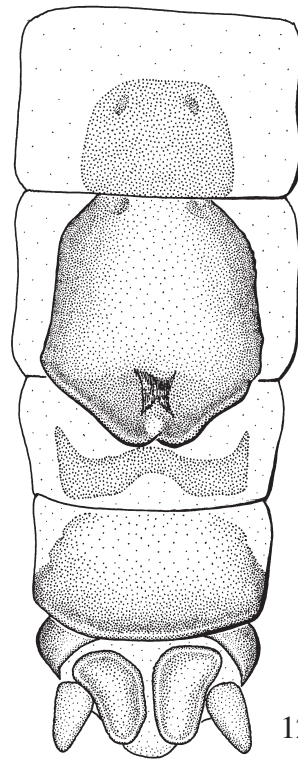

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Material examined:

We have seen material from various Chinese Provinces, Guizhou, Henan, Hubei, Hunan, Shaanxi, Sichuan, as well as Hong Kong. Figs. 23.1-23.5 Hong Kong, Tai-po-kau forest, 1984, leg. D. Dudgeon; Figs. 23.7-23.12 China, Sichuan, Qingyin pavilion, Emei Shan, 800-1000 m, 26.-27. 5. 1991, leg. I. Sivec & B. Horvat (PMSL)

Comments:

This is obviously a group widespread in central and southern China. We have noticed some variation in the shape of the lateral projections of tergum 10, but much seemed to be related to the age or degree of sclerification of the specimens or the angle of observation of the structure. The best diagnostic features appear to be the hooks at the end of the projections which are both oriented upwards in a similar direction (and the inner lobe at their base?) as well as the side view of the epiproct which appears to be remarkably constant.

24. *Rhopalopsole yunnana* SIVEC & HARPER, **n. sp.**
Figs. (24.1-24.6)

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified, with a large central lighter area; on mid hind margin, small transverse roughening.
- Tergum 10 bearing a central plate covered with macrotrichia, (no roughage of cuticular surface at distal end); lateral bars weakly sclerified.
- Lateral projections of tergum 10 originating in a well-defined rounded base, extending upwards and backwards in a somewhat triangular plate and ending in two short and rather blunt points, the upper somewhat bigger, both oriented more or less in the same general direction. On the inner surface, between the points (there is a distinct bulge, which can be seen in certain orientations of the specimens, but is quite hidden in other views).
- Epiproct thin and rather long forming in side view a rounded hook with a fine downcast tip; a few short hairs on distal half on ventral surface; in top view much wider and flat.
- Subanal lobes of medium size, flat and plate-like, expanding posteriorly, with well-defined ventral furrows, rounded tip.
- Cerci long, upcurved, terminating in a distinct spine.

Female:

- Subgenital plate not produced beyond the margin of the segment, except for a small flap which is connected to it by a narrow bridge.
- Sternum 8 a narrow transverse plate posteriorly excavated.

Material examined:

Holotype ♂, CHINA, Mt. Jizu, Binchuan County, Yunnan Province, 2200 m., 7.VIII.1994, leg. Wei Lianmeng. Paratypes:2 ♀, same data (IAEYU).

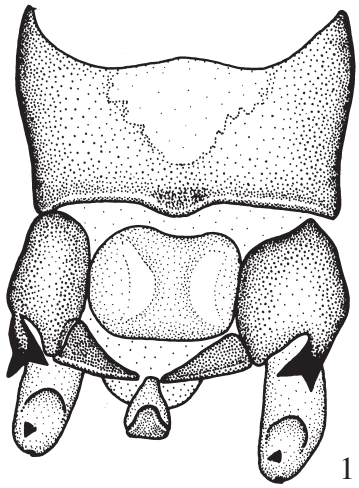
Comments:

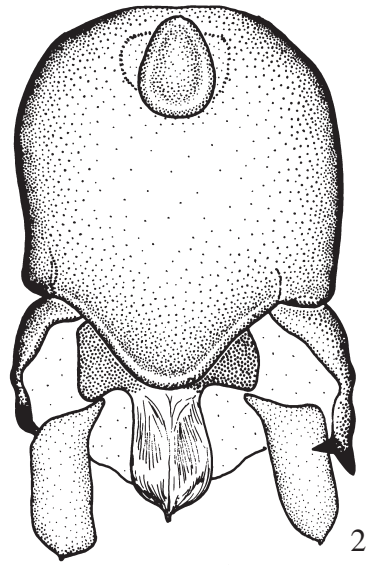
Despite the uncertainty associated with the Chinese species of this group, we have decided to describe this species on the basis of its very short points on the lateral projections of tergum 9 in the male. It is also among one of the largest species known in the genus. The female subgenital plate with its flap is also rather conspicuous.

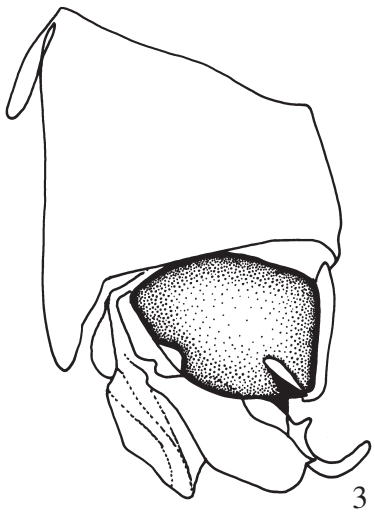
Etymology:

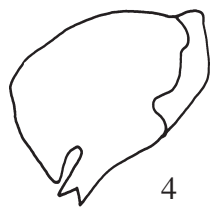
The species is named after Yunnan province, type locality of the species.

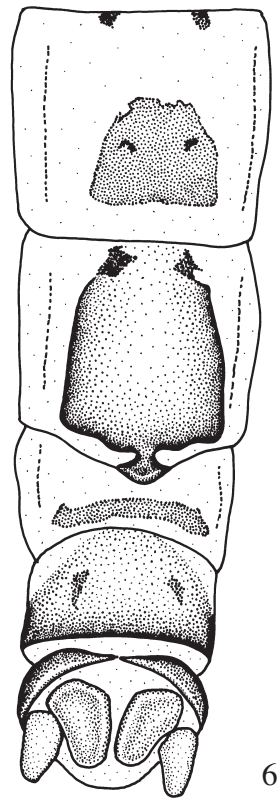
Figs. (24.1-24.6) *Rhopalopsole yunnana.* 24.1. Male terminalia, dorsal aspect, 24.2. Male terminalia, ventral aspect, 24.3. Male terminalia, lateral aspect, 24.4. Lateral process of tergite 10, 24.5. Epiproct, 24.6. Female terminalia, ventral aspect.











25. ***Rhopalopsole amamiensis*** KAWAI
Figs. (25.1-25.12)

Rhopalopsole amamiensis KAWAI, (1967): 47. Holotype ♀ Sinmura, Amiyo-sen, Amamioshima Island, Japan.

Length of forewing: 5 mm (male), 6 mm (female).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified, except im central area which is weaker; on mid hind margin, a small line of roughage.
- Tergum 10 bearing a central plate covered with macrotrichia, scale-like ornementation on hind part: heavily sclerified lateral bars extending on fore half.
- Lateral projections of tergum 10 originating in a well-defined rounded base (with indentation) and extending upwards and backwards in a rather stocky and short plate, narrowing somewhat, ending in three strong points, the central one being the smallest.
- Epiproct rather thick and short forming in side view a well-curved hook with a tip (en biseau); in top view, tip as a pentagon with rounded angles.
- Subanal lobes of medium size, flat and plate-like, expanding posteriorly, with weak ventral furrows, rounded tip.
- Cerci long, upcurved, without a terminal spine.

Female:

- Subgenital plate produced into a long tongue-like plate narrowing distally and with a rounded margin.
- Sternum 8 a transverse rectangular plate on distal half, very broadly excavated anteriorly.

Material examined:

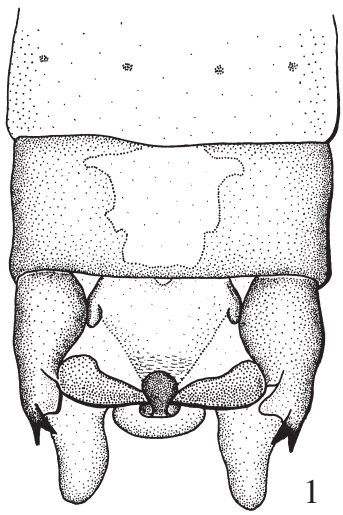
The species was originally described from the female by KAWAI (1967). Although the type in Lake Biwa Museum is seriously damaged (fide Shimitsu), the female we describe here corresponds to the original drawings. The males obtained from the type locality in Amami-ohshima Island in Amami Islands are presumably well associated. (all LBM)

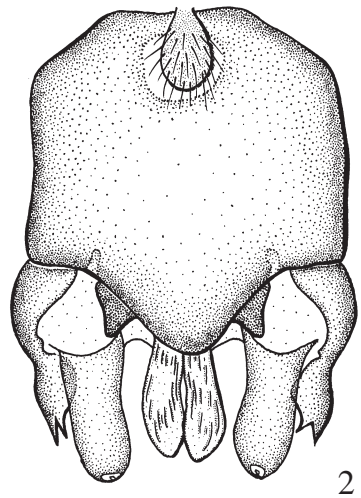
Comments:

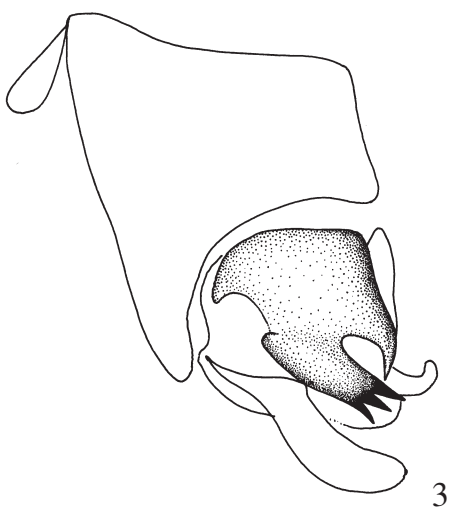
The three pronged lateral projections of tergum 10 in the male and the tongue-like subgenital plate of the female are diagnostic.

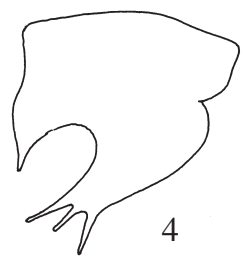
Specimens at our disposal from Kyushu differ from those drawn here: in the male, there is a band of scale-like ornementations on the midline of tergum 9 and the number of points on the lateral projections of tergum 10 are more numerous (4-7). Females, however, are similar in both groups.

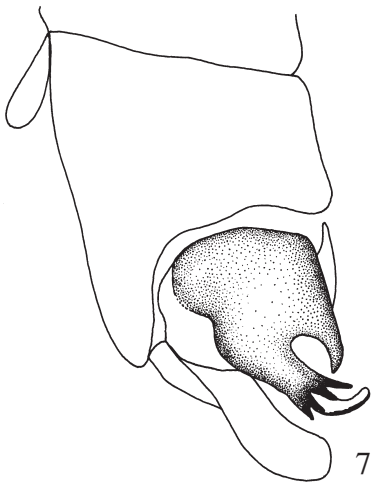
Figs. (25.1-25.12) *Rhopalopsole ammamiensis.* 25.1. Male terminalia, dorsal aspect, 25.2. Male terminalia, ventral aspect, 25.3. Male terminalia, lateral aspect, 25.4. Lateral process of tergite 10, 25.5. Tip of the epiproct, 25.6. Epiproct lateral aspect, 25.7. Male terminalia, lateral aspect, 25.8. Lateral process of tergite 10, 25.9. Tip of the epiproct, 25.10. Epiproct lateral aspect, 25.11. Variation of lateral process, 25.12. Female terminalia, ventral aspect.











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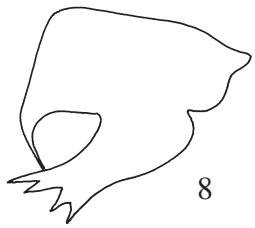

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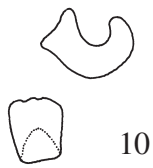

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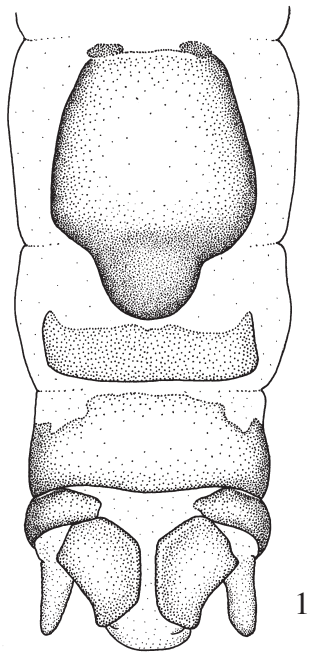

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The vietnamica Group
»Eastern assemblage«

There is an Eastern element in the group, which shares its general characteristics, except the following: the Taiwan and Japanese species have more heavy ornementation on terga 9 and 10; tergum 10 tends to develop high ridges laterally; cerci tend to be more sclerified and sometimes modified.

26. *Rhopalopsole ebinokogen* Sivec & Shimizu, **n. sp.**
Figs. (26.1-26.6)

Length of forewing: 6 mm (male), 6.5 mm (female).

Male:
- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; no ornementation besides clothing hairs.
- Tergum 10 bearing a central plate covered with macrotrichia, a heavy field scale-like ornementation at distal end; poorly sclerified lateral bars. The transverse bars on their outer posterior margin form a distinct ridge covered with tufts of longer hairs.
- Lateral projections of tergum 10 extending upwards and backwards in a rounded and short plate carrying not developing into a point, but rather into a blunt quadrate lobe.
- Epiproct rather thick forming in side view a curved tapering hook, flattened in cross-section; in top view, tip widening into a trapezoidal plate with rounded angles, short dispersed hairs ventrally.
- Subanal lobes of medium size, flat and plate-like, forming an ovoid structure, with well-defined ventral furrows, pointed end.
- Cerci medium-long, upcurved, unarmed.

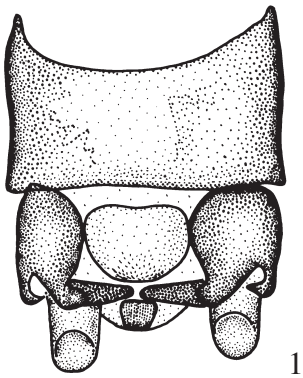
Female:
- Subgenital plate produced into a darkened tongue-like extension.
- Sternum 8 a large rectangular plate covering most of the ventral surface.

Material examined:
Holotype ♂, JAPAN, stream near campsite, 1200m, Ebino-kogen, Ebino-shi, Miyazaki Prefecture, 31.V.1993, leg. T. Shimitzu,. Paratypes, 7 ♂, 3 ♀, same data (all LBM).

Comments:
This species is somewhat intermediary between the two subgroups of the *vietnamica* group: it has no ornementation on tergum 9, but the transverse bars of tergum 10 are developed into high ridges. The aborted point on the lateral projections of tergum 10 in the male, combined with the lack of ornementation on tergum 9 and the presence of heavy ornementation on tergum 10 will permit identification.

Etymology:
The species is named after the type locality Ebino-kogen.

Figs. (26.1-26.6) *Rhopalopsole ebinokogen.* 26.1. Male terminalia, dorsal aspect, 26.2. Male terminalia, ventral aspect, 26.3. Male terminalia, lateral aspect, 26.4. Lateral process of tergite 10, 26.5. Epiproct, 26.6. Female terminalia, ventral aspect.



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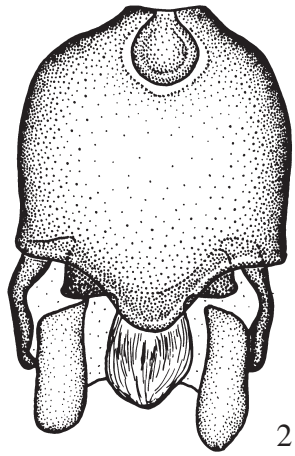

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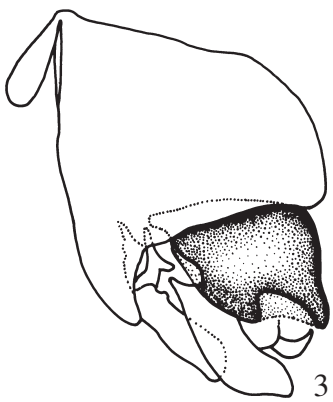

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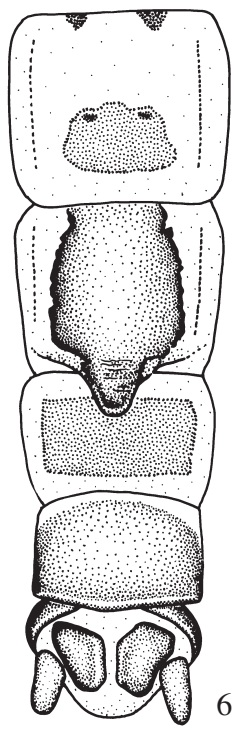

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27. *Rhopalopsole meilan* Sivec & Harper, **n. sp.**
Figs. (27.1-27.6) t.

Length of forewing: 6 mm (male), 7 mm (female).

Male:
- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; before the mid hind margin, small transverse field of knobs forming a button-like structure.
- Tergum 10 bearing a central plate covered with macrotrichia, scale-like ornementation at distal end; heavily sclerified lateral bars. The transverse bars on their outer posterior margin form a distinct ridge covered with short stout spinulae.
- Lateral projections of tergum 10 extending upwards and backwards in a wide, rounded and short plate carrying two subequal points which are slightly curved. On the inner surface a large rounded lobe.
- Epiproct rather thick forming in side view a flatly curved (somewhat quadrate) hook with a terminally attenuated tip, flattened in cross-section; in top view, rectangular with rounded angles.
- Subanal lobes of large size, flat and plate-like, parallel-sided, with well-defined ventral furrows, pointed membranous tips.
- Cerci long, upcurved, somewhat sclerified, terminating in a large subterminal digitation spine.

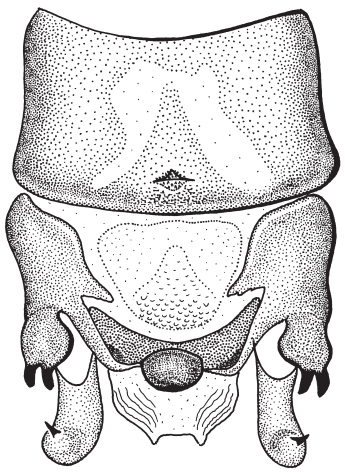
Female:
- Subgenital plate produced into a wide and extended triangular plate with a rounded margin.
- Sternum 8 a narrow rectangular plate on distal half, largely and shallowly excavated on the fore margin.

Material examined:
Holotype ♂, TAIWAN, Kaohsiung County, S Meilan, 23˚13'41 N, 120˚48'50 E, 31.III.1996, leg. I. Sivec & B. Horvat (PMSL). Paratypes: 1 ♀, same data, 1 ♂, TAIWAN, Illzan County, Rian Jer Spring, 570 m., 24˚32'49'' N, 121˚30'25'' E, 12.X.1996, leg. I.Sivec.

Comments:
In the male the cerci are quite distinctive.

Etymology:
The species is named after the type locality Meilan in Kaohsiung County.

Figs. (27.1-27.6) t. *Rhopalopsole meilan.* 27.1. Male terminalia, dorsal aspect, 27.2. Male terminalia, ventral aspect, 27.3. Male terminalia, lateral aspect, 27.4. Lateral process of tergite 10, 27.5. Epiproct, 27.6. Female terminalia, ventral aspec



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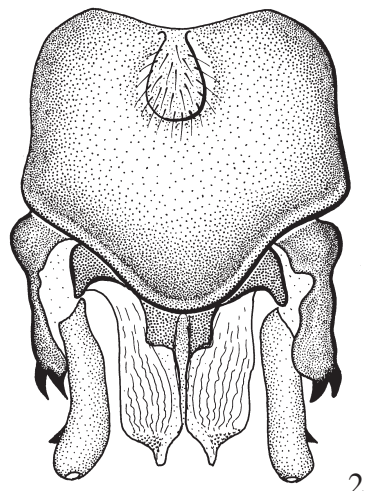

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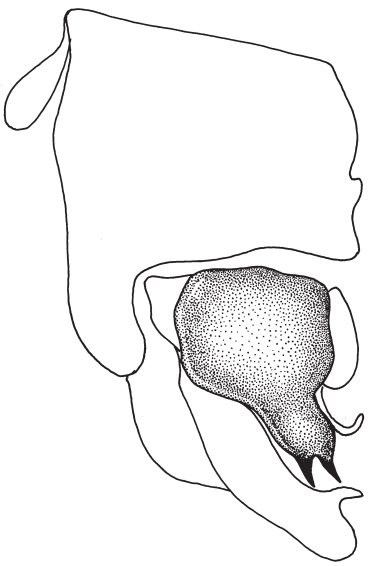

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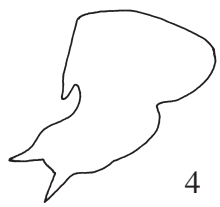

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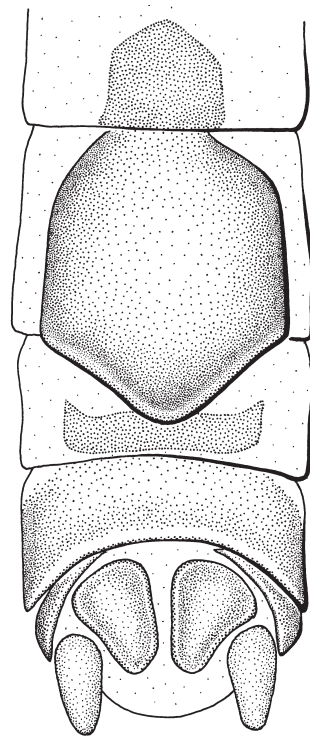

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28. *Rhopalopsole uchidai* Sivec & Shimizu, **n. sp.**
Figs. (28.1-28.6)

Length of forewing: 6-7 mm (male), 8-9 mm (female).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified, except for lighter lambda-like bands isolating a triangular posterior area; on mid hind margin, a large rounded tongue-like projection covered with tiny knobs.
- Tergum 10 bearing a central plate (2 pieces) covered with macrotrichia, scale-like ornementation on end of fore piece and all of hind piece; lightly sclerified lateral bars (oval). The transverse bars on their outer posterior margin form a distinct high ridge covered with short stout spinulae.
- Lateral projections of tergum 10 extending straight backwards in a wide, rounded and rectangular plate carrying two backward pointing points. On the inner surface at base of points a large rounded lobe.
- Epiproct rather thick and long forming in side view a flattened hook with a much attenuated tip, flattened in cross-section; in top view, tip forms an arrowhead like shape.
- Subanal lobes of large size, flat and plate-like, narrow at base, expanding into an oval, with well-defined ventral furrows.
- Cerci long, lightly upcurved, somewhat sclerified, terminating in a very large subterminal triangular extension culminating in a small spine.

Female:

- Subgenital plate produced into a broad and rounded plate which extends over most of sternum 8.
- Sternum 8 a narrow rectangular plate on distal half, briefly and deeply excavated on the middle fore margin.

Material examined:

Holotype ♂, JAPAN, Shiga, Kutsuki-Mura, Chigohara, Mukaijo, 210 m., 27.V.1996, Leg. T. Shimizu & S. Uchida. Paratypes: 8 ♂, 14 ♀, same data (all LBM).

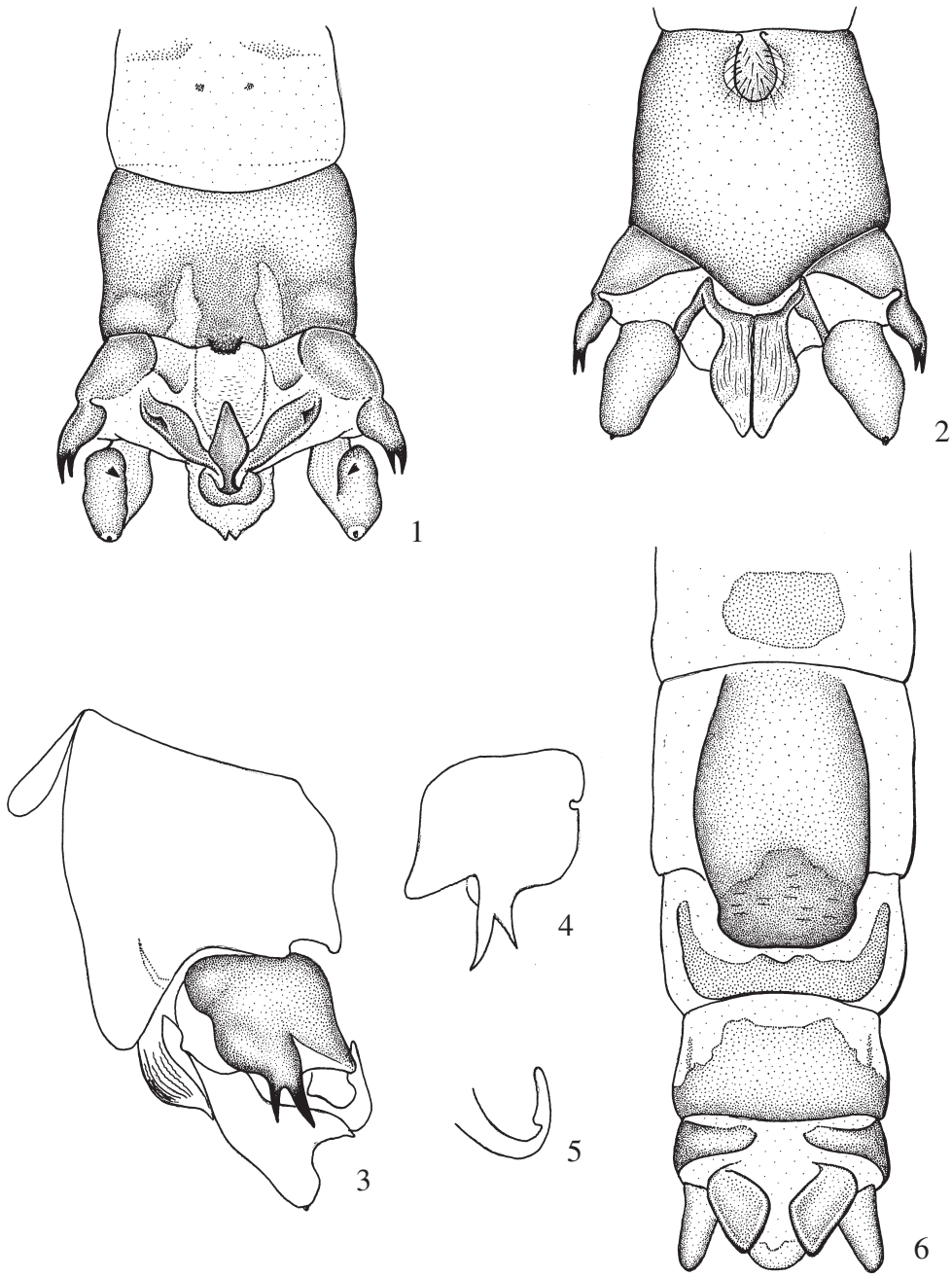
Comments:

The peculiar epiproct and cerci will render the males immediately recognisable. The large female subgenital plate may also prove useful.

Etymology:

The species is named after Dr. Shigekazu Uchida who collected many Japanese stonefly material.

Figs. (28.1-28.6) *Rhopalopsole uchidai.* 28.1. Male terminalia, dorsal aspect, 28.2. Male terminalia, ventral aspect, 28.3. Male terminalia, lateral aspect, 28.4. Lateral process of tergite 10, 28.5. Epiproct, 28.6. Female terminalia, ventral aspect.



29. *Rhopalopsole bulbifera* Sivec & Shimizu, **n. sp.**
Figs. (29.1-29.6)

Length of forewing: 6 mm (male), 7-7.5 mm (female).

Male:
- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; middle field somewhat lighter with tiny knobs interspersed between the clothing hair.
- Tergum 10 bearing a central plate covered with macrotrichia, scale-like ornementation at distal end. The transverse bars on their outer posterior margin raised up to form a distinct ridge covered with short stout spinulae.
- Lateral projections of tergum 10 extending upwards and backwards in a wide, rounded and upturned plate carrying two subequal points which are directed outwards. On the inner surface a large rounded lobe near the base of the points.
- Epiproct rather thick forming in side view a flatly angled-curved hook with a terminally attenuated tip; in top view, tip expands into a widened triangle with a rounded irregular margin, covered with small setae.
- Subanal lobes of large size, flat and plate-like, expanded distally, with poorly-defined ventral furrows, and short pointed membranous tips.
- Cerci long, upcurved, sinuous, and somewhat sclerified, without a terminal spine.

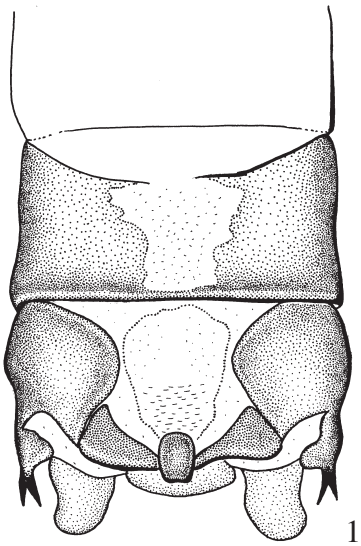
Female:
- Subgenital plate produced into a long tongue extending from a wide rounded base.
- Sternum 8 a transverse rectangular plate on distal half, widely and deeply excavated on the fore margin.

Material examined:
Holotype ♂, JAPAN, Tokyo Itsukaichi-machi, Kami-yosawa, 29.VI.¸1992, leg. T. Shimitzu. Paratypes: 13 ♂, 19 ♀, same data (all LBM).

Comments:
In the male, the epiproct is characteristic. In female, the long tongue-like subgenital plate.

Etymology:
The species name refers to the characteristic shape of lateral projections.

Figs. (29.1-29.6) *Rhopalopsole bulbifera.* 29.1. Male terminalia, dorsal aspect, 29.2. Male terminalia, ventral aspect, 29.3. Male terminalia, lateral aspect, 29.4. Lateral process of tergite 10, 29.5. Epiproct, 29.6. Female terminalia, ventral aspect.



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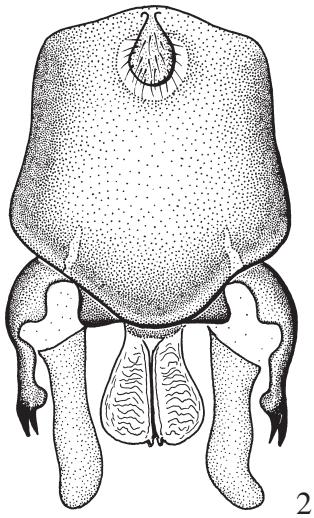

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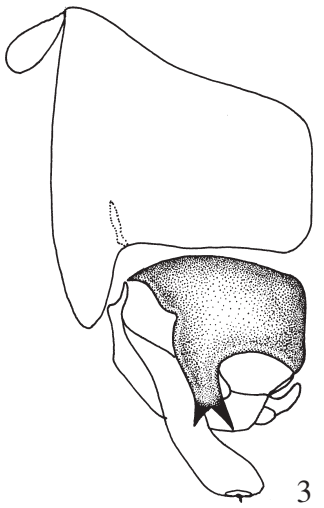

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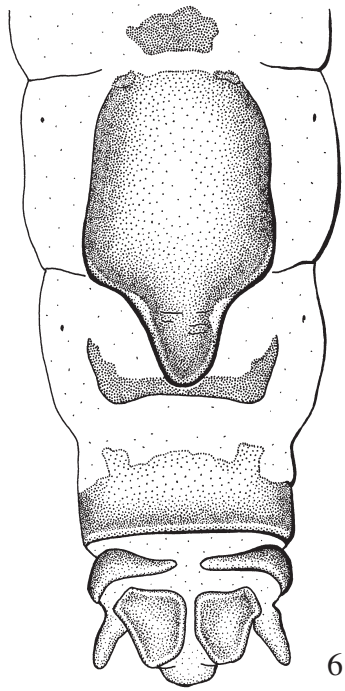

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30. *Rhopalopsole longiepiprocta* SIVEC & SHIMIZU, **n. sp.**
Figs. (30.1-30.6)

Length of forewing: 5.5 mm (male), 6.5 mm (female).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less sclerotized medially except for a large dark triangle on posterior border, within this triangle a short band of scale-like ornementations.
- Tergum 10 bearing a central plate covered with macrotrichia, scale-like ornementation at distal end; lightly sclerified lateral bars. The transverse bars on their outer posterior margin form a distinct ridge covered with short stout spinulae.
- Lateral projections of tergum 10 extending upwards and backwards in a bottle-like plate carrying two subequal points (ventral one slightly smaller). On the inner surface a large rounded lobe near the level of origin of the points.
- Epiproct rather thick forming in side view a long sinuous hook with a gently attenuated tip, round in cross-section; in top view, long rectangular with outstanding front corners.
- Subanal lobes of large size, flat and plate-likeovoid, with well-defined ventral furrows.
- Cerci long, upcurved, somewhat sclerified, terminating in a curious bird-like digitation terminating in a small spine.

Female:

- Subgenital plate produced into a wide trapezoidal extension which most of sternum 8, this extension fitted on its margin with a semicircular membranous area border by a darkly sclerified horseshoe-like band.
- Sternum 8 a wide rectangular plate on distal half, widely and deeply excavated on the fore margin.

Material examined:

Holotype ♂, JAPAN, Hanajio-kawa, Nago-shi, Okina-Jima, Okinawa Pref., 23.II.1994, leg. T. Shimitsu. Paratypes: 2 ♂, 2 ♀, same data (all LBM).

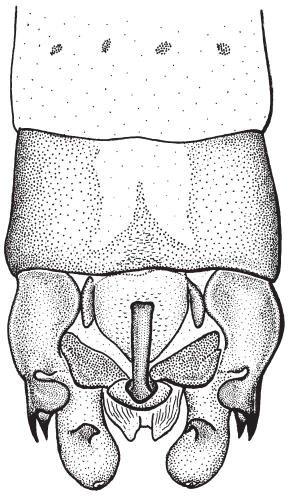
Comments:

Because of its unusual cerci, the male of this species will not be confused with any other. A similar situation exist in the female with its characteristic subgenital plate.

Etymology:

The species name refers to the exceptionally long epiproct.

Figs. (30.1-30.6) *Rhopalopsole longiepiprocta.*30.1. Male terminalia, dorsal aspect, 30.2. Male terminalia, ventral aspect, 30.3. Male terminalia, lateral aspect, 30.4. Lateral process of tergite 10, 30.5. Epiproct, 30.6. Female terminalia, ventral aspect.



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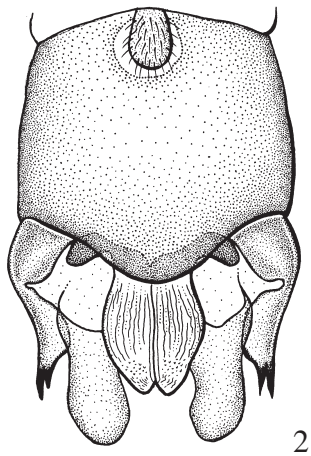

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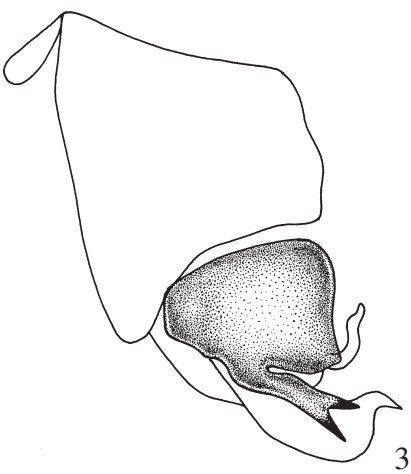

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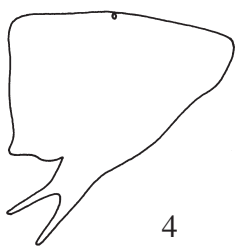

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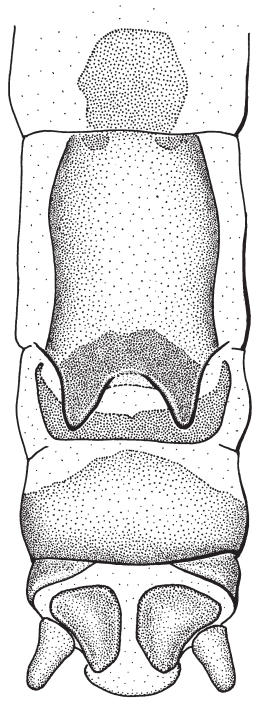

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31. *Rhopalopsole shigae* Sivec & Shimizu, **n. sp.**
Figs. (31.1-31.6)

Length of forewing: 5 mm (male), 6.5 mm (female).

Male:
- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less sclerotized medially; hind margin with a wart-like project on the middle.
- Tergum 10 bearing a central plate covered with macrotrichia, scale-like ornementation at distal part; lightly sclerified lateral bars. The transverse bars on their outer posterior margin form a distinct elongated-rounded ridge covered with short stout spinulae.
- Lateral projections of tergum 10 extending upwards and backwards in a sinuous plate carrying two recurved points (ventral one larger). On the inner surface a large rounded lobe near the level of origin of the points.
- Epiproct rather thick forming in side view a regularly rounded hook ending abruptly in a somewhat jagged tip, rounded squarish in cross-section; in top view, squarrish with rounded angles and an irregular fore margin.
- Subanal lobes of large size, flat (less-so than previous species) and plate-like, ovoid, with well-defined ventral furrows, very dark pattern at ventral base extending along mid-line.
- Cerci long, upcurved, somewhat sclerified, terminating in a small spine.

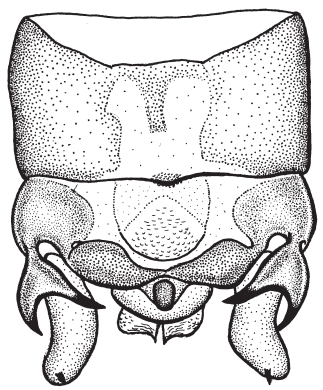
Female:
- Subgenital plate produced into a median rounded tongue, which is darkened.
- Sternum 8 a pair of roughly triangular plates separated by a narrow membranous area.

Material examined:
Holotype ♂, JAPAN, Shiga, Kutsuki-mura, Fureai-nosato, Hidasanshouono-tani, 22.V.1996, leg. T. Shimitzu & S. Uchida. Paratypes: 1 ♂, 2 ♀, same data (al LBM).

Comments:
In the male the lateral projections of tergum 10 are quite distinctive, but shared with the following species (the epiprocts are however quite different). The female subgenital plate is the distinguishing mark (not from next species).

Etymology:
The species is named after the type locality.

Figs. (31.1-31.6) *Rhopalopsole shigae*. 31.1. Male terminalia, dorsal aspect, 31.2. Male terminalia, ventral aspect, 31.3. Male terminalia, lateral aspect, 31.4. Lateral process of tergite 10, 31.5. Epiproct, 31.6. Female terminalia, ventral aspect.



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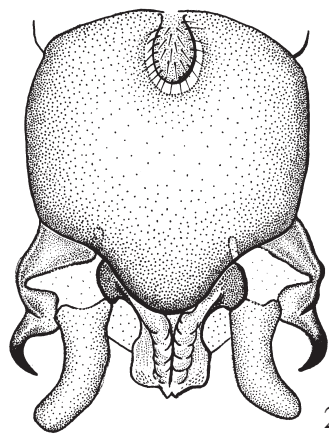

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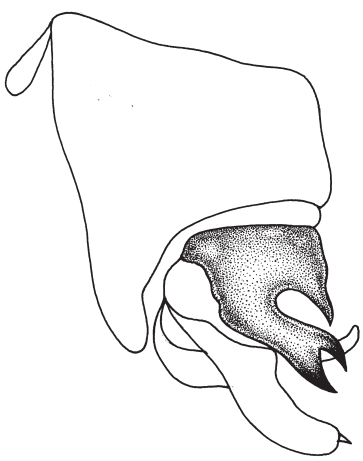

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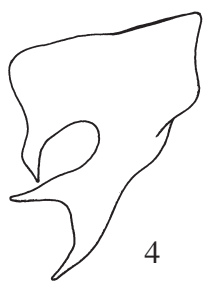

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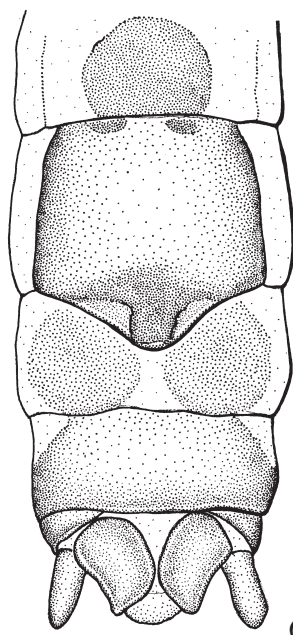

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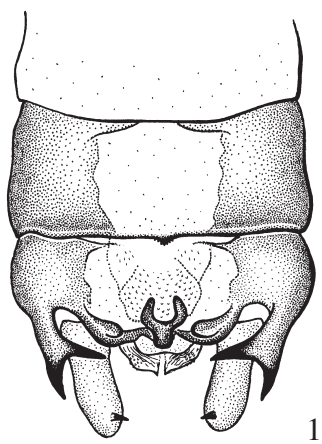
32. *Rhopalopsole pseudoshigae* Sivec & Shimizu, **n. sp.**
Figs. (32.1-32.2)

Length of forewing: 6-6.5 mm (male), 7.5 mm (female).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less sclerotized medially; hind margin with a wart-like project on the middle.
- Tergum 10 bearing a central plate covered with macrotrichia, scale-like ornementation at distal part; lightly sclerified lateral bars. The transverse bars on their outer posterior margin form a distinct ridge (upturned and angular on its inner corner) covered with short stout spinulae.
- Lateral projections of tergum 10 extending upwards and backwards in a sinuous plate carrying two recurved points (ventral one larger). On the inner surface a large rounded lobe near the level of origin of the points.
- Epiproct rather thick forming in side view a regularly rounded hook ending in a pair of strong prongs.
- Subanal lobes of large size, flat (less-so than previous species) and plate-like, ovoid, with well-defined ventral furrows, very dark pattern at ventral base extending along mid-line.
- Cerci long, upcurved, somewhat sclerified, terminating in a small spine.

Figs. (32.1-32.2) *Rhopalopsole pseudoshigae.* 32.1. Male terminalia, dorsal aspect, 32.6. Female terminalia, ventral aspect.



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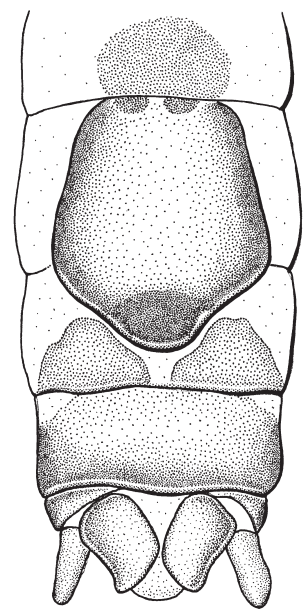

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Female:

- Subgenital plate produced into a median rounded tongue, which is darkened.
- Sternum 8 a pair of roughly triangular plates separated by a narrow membranous area.

Material examined:

Holotype ♂, JAPAN, near Shirasa-Toge, Omogo-Mura, Ehime-Ken, 6.VI:1993, leg. T. Shimizu. Paratypes, 3 ♂, 1 ♀, same data (all LBM).

Comments:

This species corresponds in all particulars with the preceding one, except in the structure of the male epiproct (the ridge is more angular in this species, more rounded in the other). Since the specimens we have come from different islands (this species from Shikoku, the other from Honshu), and since the epiprocts are so significantly different, we have opted to considered them as different species. They are obviously a pair of sister-species which the rather unusual lateral projections of the male tergum 10. The females are indistinguishable.

Etymology.

The species name refers to a great similarity to *Rhopalopsole shigae*.

The *shaanxiensis* Group

- Tergum 9 with ornementation.

- Tergum 10 with narrow central plate generally bare (a few setae, some roughage), flanked by bulging lateral hairy lobes (some knobby on medial margin) – hence tri-partite. Transverse bars inflated forming a rounded ridge, uplifted mesally.

- Lateral projection (variable); obsolescent?

- Epiproct simple, thick.

- Subanal lobes large, with dark inner structure (folded spine fields), detachable ventral and dorsal sections, - rectangular basal plate in segment 9.

- Cerci short, upturned (L-shaped), unarmed.

33. *Rhopalopsole horvati* Sivec & Harper, **n. sp.**
Figs. (33.1-33.6)

Length of forewing: 6.5-7 mm (male), 8 mm (female).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less sclerotized on each side of a heavy median band, which is covered with transverse lines and posteriorly with tiny knobs. Hind margin with a bulge.
- Tergum 10 bearing a narrow central plate covered with a few macrotrichia; no lateral bars, rather large lateral lobes. The transverse bars somewhat inflated.
- Lateral projections of tergum 10 extending upwards and backwards carrying in the usual manner, but with a curious back-pointing long and thin appendage.
- Epiproct rather thick evenly tapering, pointed.
- Subanal lobes of large size, in lateral view clearly with a basal ventral lobe and an upper distal lobe; dark inner structures (folded spine fields?) visible through the cuticule.
- Cerci short, upturned, no spine.

Female:

- Subgenital plate, heavily sclerified, produced into a long wide triangular extension, much darkened.
- Sternum 8 a pair of irregular plates united posteriorly by a narrow sclerified bridge.

Material examined:

Holotype ♂, CHINA, Sichuan, Qingyin Pavillion, Emei Shan, 800-1000 m., 26-27.V.1991, leg. I.Sivec & B. Horvat. Paratypes, 3 ♀, same data, Sichuan, Pitiao river, Wolong, Balang Shan pass, 2700-4000 m, 1.-4.6.1991, leg. I. Sivec & B. Horvat (all PMSL).

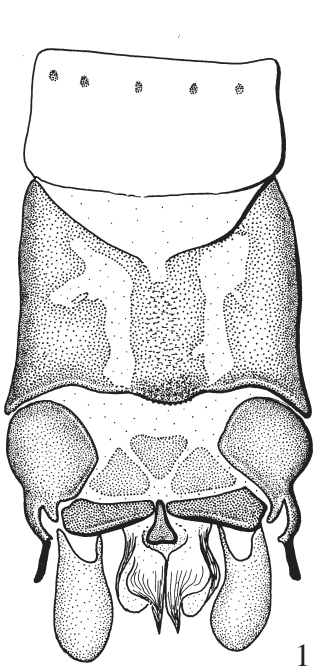
Comments:

The curious appendage on lateral projections of tergum 10 is distinctive in the male, genital plate in female.

Etymology:

The species is named after Dr. Bogdan Horvat who had collected the material.

Figs. (33.1-33.6) *Rhopalopsole horvati.* 33.1. Male terminalia, dorsal aspect, 33.2. Male terminalia, ventral aspect, 33.3. Male terminalia, lateral aspect, 33.4. Lateral process of tergite 10, 33.5. Epiproct, 33.6. Female terminalia, ventral aspect.



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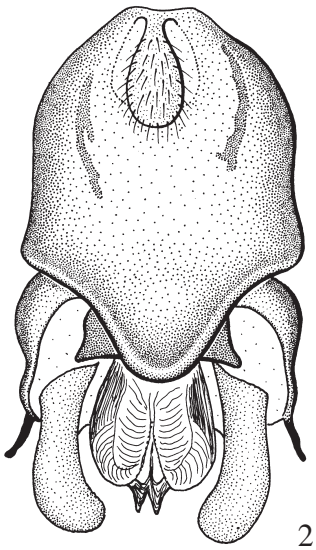

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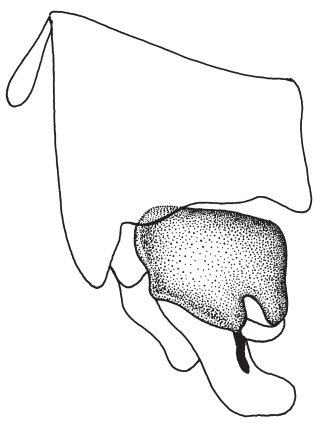

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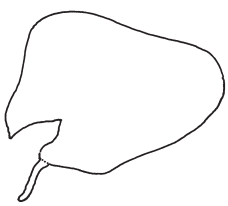

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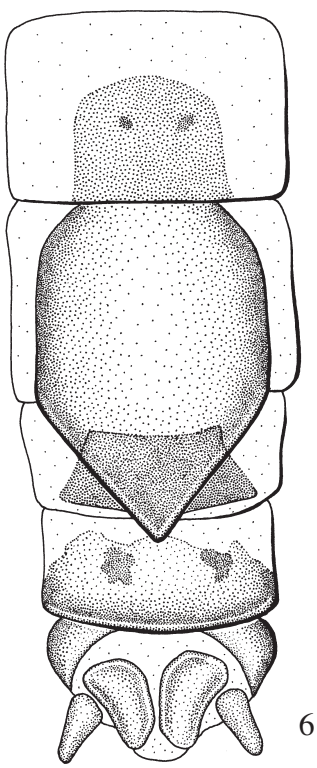

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34. *Rhopalopsole qinlinga* SIVEC & HARPER, **n. sp.**
Figs. (34.1-34.5)

Male:
- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less sclerotized on each side of a wide heavy median band, which is covered with transverse lines and posteriorly with tiny knobs.
- Tergum 10 bearing a narrow central plate covered with very few macrotrichia; no lateral bars, rather large lateral bulging lobes. The transverse bars somewhat inflated.
- Lateral projections of tergum 10 extending upwards and backwards in the usual manner, terminating in a long upward/backward oriented long and acute point.
- Epiproct rather thick, rapidly tapering, and pointed in side view. Much flattened in top view, giving a roundly expanding pentagonal plate.
- Subanal lobes of large size, in lateral view clearly separable in a a basal ventral lobe and an upper distal lobe, each with strong dark hook and projections; dark inner structures (folded spine fields?) visible through the cuticule.
- Cerci short, sharply upturned, no spine.

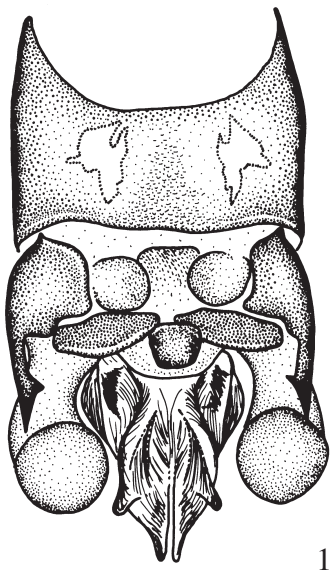
Female: unknown.

Material examined:
Holotype ♂, CHINA, Miaotaizi (Zhangliang Temple), Liuba County, Qinling Mountain Range, Shaanxi Province, 1400 m., 8.Vi.1998, leg. Du Yuzhou.Paratypes, 2 ♂, same data (all IAEYU).

Comments:
The combination of complex subanal structure and single point on the lateral projections should allow recognition.

Etymology.
The species is named after Qinling Mountains in Shaanxi Province.

Figs. (34.1-34.5) *Rhopalopsole qinlinga.* 34.1. Male terminalia, dorsal aspect, 34.2. Male terminalia, ventral aspect, 34.3. Male terminalia, lateral aspect, 34.4. Lateral process of tergite 10, 34.5. Epiproct.



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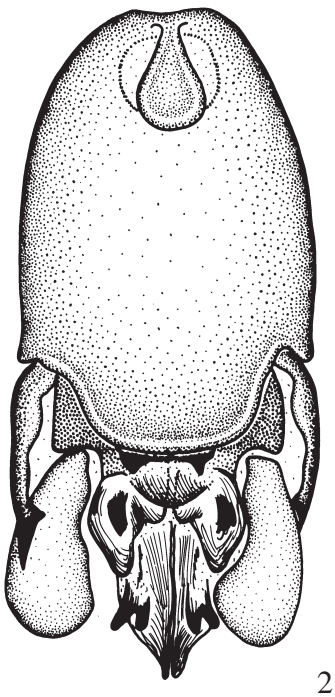

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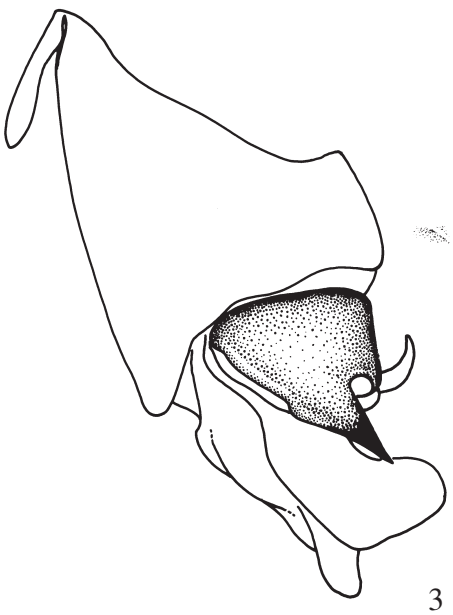

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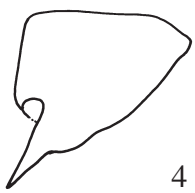

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35. *Rhopalopsole shaanxiensis* YANG and YANG
Figs. (35.1-35.6)

Yang and Yang, (1994): 189. Holotype ♂ Ningshaan Xian, Shaanxi Province, China (DECAU, Beijing)

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less sclerotized on each side of a heavy median band, which is covered with transverse lines and posteriorly with tiny knobs. Hind margin with a wide bilobed bulge.
- Tergum 10 bearing a narrow central plate covered with few macrotrichia flanked with rather large bulging lateral hairy lobes. The transverse bars somewhat inflated.
- Lateral projections of tergum 10 extending upwards and backwards in a wide plate carrying in the usual manner (ventral indentation), topped with a very short darkened point.
- Epiproct rather thick tapering, elongate, endind in side view in a bulbous tip leading to a ventral beak; in top view, evenly tapering.
- Subanal lobes of large size, in lateral view flattened, but clearly bipartite with a basal ventral pair of lobe and an upper distal lobe; dark inner structures in upper lobe (folded spine fields?) visible through the cuticule.
- Cerci short, upturned, no spine.

Female:

- Subgenital plate, heavily sclerified, produced into a tongue-like extension with a rouned tip, much darkened.
- Sternum 8 a pair of triangular plates separated by membranous area.

Material examined:

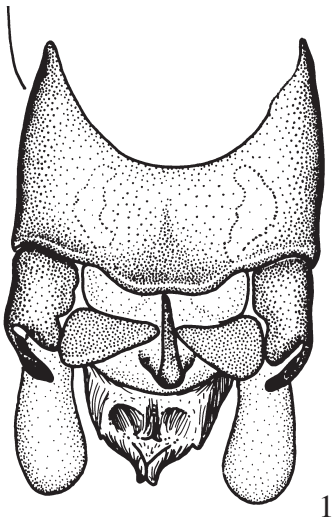
♂, CHINA, Miaotaizi (Zhangliang Temple), Liuba County, Qinling Mountain Range, Shaanxi Province, 1400 m., 8.Vi.1998, leg. Du Yuzhou (IAEYU).

Comments:

This species has been recently described by Yang and Yang (1994) from Shaanxi and our material from the same province agrees with their figures.

In Male, long lateral processes of subanal lobes as well very short point on lateral projections of tergum 10 distinctive.

Figs. (35.1-35.6) *Rhopalopsole shaanxiensis.* 35.1. Male terminalia, dorsal aspect, 35.2. Male terminalia, ventral aspect, 35.3. Male terminalia, lateral aspect, 35.4. Lateral process of tergite 10, 35.5. Epiproct, 35.6. Female terminalia, ventral aspect.



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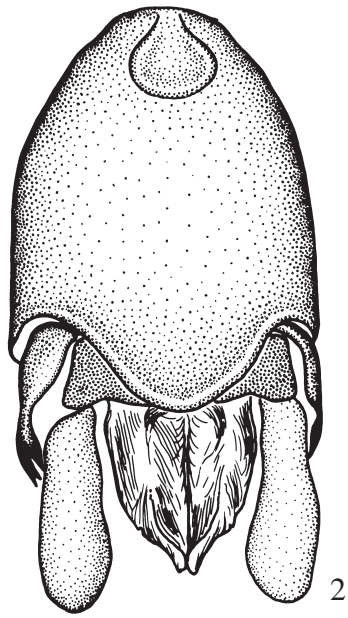

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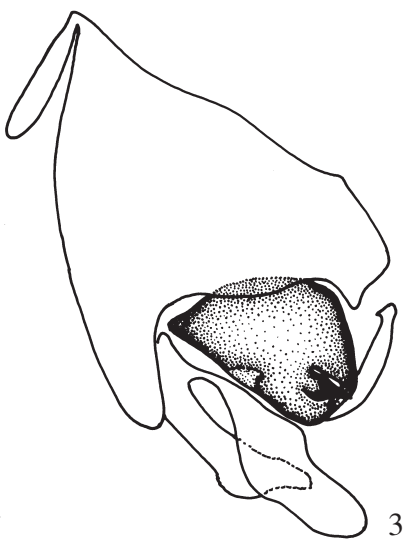

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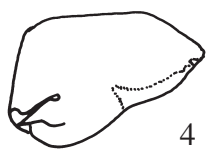

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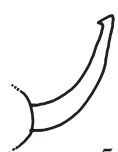

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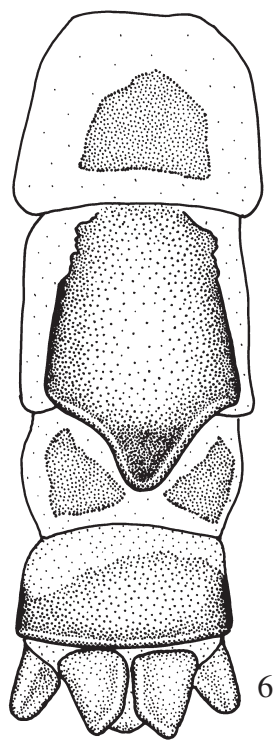

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36. *Rhopalopsole hongpingana* Sivec & Harper, **n. sp.**
Figs. (36.1-36.5)

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less sclerotized on each side of a heavy median band, which is covered with transverse lines and posteriorly with tiny knobs. Hind margin with a wide bilobed bulge.
- Tergum 10 bearing a narrow central plate flanked with rather large bulging lateral hairy lobes. The transverse bars somewhat inflated.
- Lateral projections of tergum 10 extending upwards and backwards in a wide plate carrying in the usual manner (ventral indentation weak if any), topped with a medium-sized acute darkened point.
- Epiproct rather slender tapering, elongate, ending in side view in a reflexed tip leading to a small; in top view, evenly tapering.
- Subanal lobes of large size, in lateral view flattened at base, expanding distally, but clearly bipartite with a basal ventral pair of lobes and an upper central lobe; dark inner structures in upper lobe (folded spine fields?) visible through the cuticule.
- Cerci short, upturned (L-shaped), no spine.

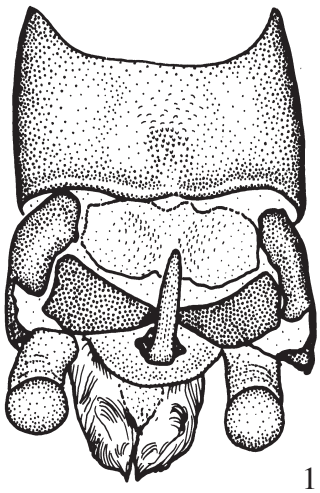
Female: unknown.

Material examined:
Holotype ♂, CHINA, Hongping, Mt. Shennongjia, Hubei Province, 1800 m., 19.VII.1997, leg. Du Yuzhou (IAEYU).

Comments:
The combination of long epiproct and medium-sized point on lateral projections of male tergum 10 are diagnostic.

Etymology:
The species is named after type locality in Hongping.

Figs. (36.1-36.5) *Rhopalopsole hongpingana.* 36.1. Male terminalia, dorsal aspect, 36.2. Male terminalia, ventral aspect, 36.3. Male terminalia, lateral aspect, 36.4. Lateral process of tergite 10, 36.5. Epiproct.



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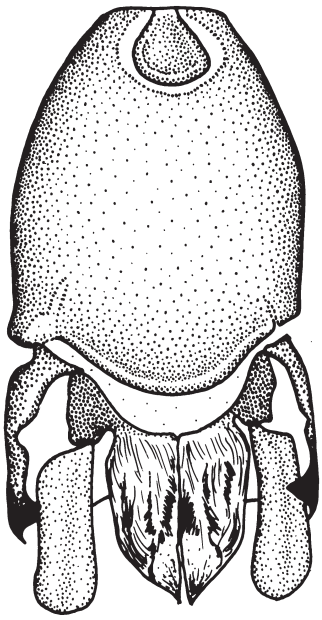

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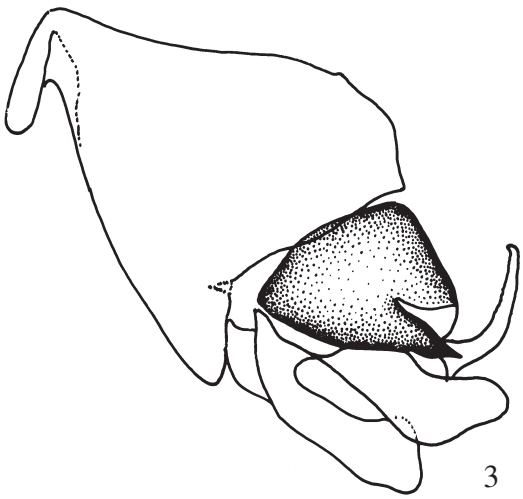

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37. *Rhopalopsole jialingensis* Sivec & Harper, **n. sp.**
Figs. (37.1-37.6)

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less sclerotized on each side (towards hind margin) of a heavy median triangular area, which is covered with transverse lines and a field of tiny knobs. Mid hind margin bared, but with two submedian dark (heavily sclerified) areas on each side.
- Tergum 10 bearing a narrow central plate (with some roughage) flanked with rather large bulging lateral hairy lobes (some knobs at median margin). The transverse bars somewhat inflated, upturned mesally, tips darkened.
- Lateral projections of tergum 10 extending upwards and backwards in a short plate without any sclerified point or appendage, the tip turning shortly to form a small rounded lobe.
- Epiproct rather thick tapering, elongate, ending in side view in a pointed downturned beak which overhangs the continuing ventral part; in top view, parallel-sided ending in a rounded tip.
- Subanal lobes of large size, in lateral view flattened, but clearly bipartite with a basal ventral pair of lobes and an upper distal pair; lower lobe containing a long sclerified flat bar ending in a slightly curved hook; lower lobe ending in a point, dark inner structures in upper lobe (folded spine fields?) visible through the cuticule.
- Cerci short, slightly upturned, no spine.

Female:

- Subgenital plate, heavily sclerified, produced into a short rounded projection overhanging a semicircular heavily sclerified plate at border of sternum.
- Sternum 8 a pair of quadrate plates separated by membranous area, but joined shortly by a narrow sclerified bridge; darkened fore margin irregular, with a »knob« like extension in mesal corner.

Material examined:

Holotype ♂, CHINA, south tributary of source of Jialing River, Mt. Tiantai, Qinling Mountain Range, Shaanxi Province, 1800 m., 10.VI.1998, leg. Du Yuzhou. Paratypes: 8♂, 3♀ same data (all IAEYU).

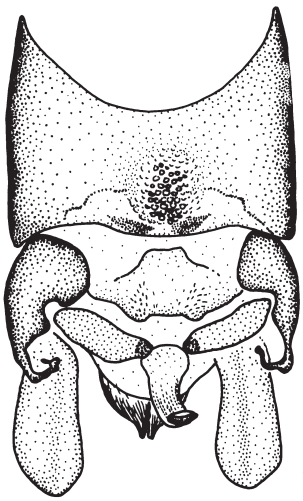
Comments:

The absence of a point on the lateral projections of tergum 10, the peculiar tip of the epiproct and the setails of the subanal structure are all characteristic. The female subgenital plate with its inferior plate is unique.

Etymology:

The species is named after type locality in the source of Jialing river.

Figs. (37.1-37.6) *Rhopalopsole jialingensis.* 37.1. Male terminalia, dorsal aspect, 37.2. Male terminalia, ventral aspect, 37.3. Male terminalia, lateral aspect, 37.4. Lateral process of tergite 10, 37.5. Epiproct, 37.6. Female terminalia, ventral aspect.



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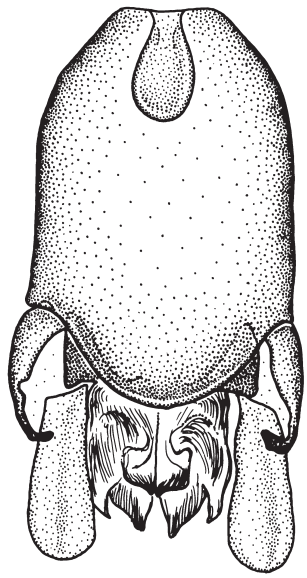

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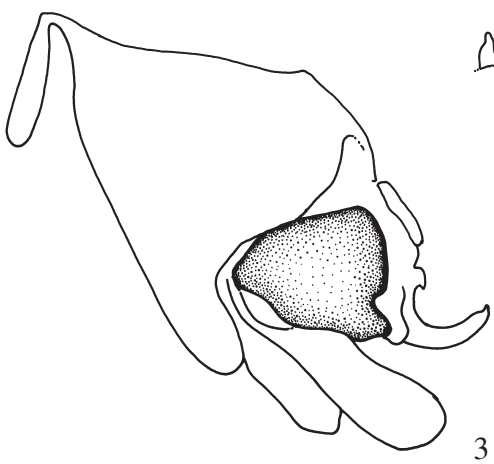

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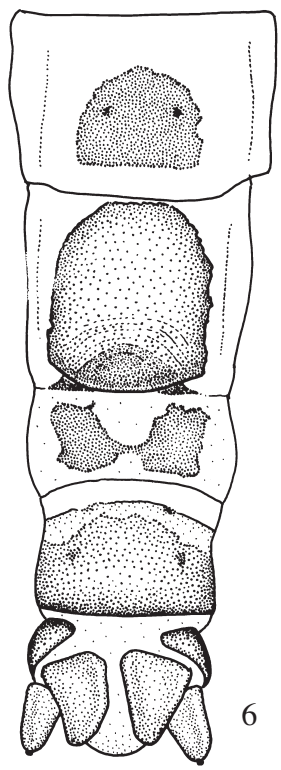

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38. *Rhopalopsole apicispina* YANG and YANG
YANG and YANG, (1991): 369. Holotype ♂ Hubei: Shennongjia, China (DECAU, Beijing).

We have seen no material of this species, but it certainly belongs here. A number of characters illustrate in the original figures associate it with this group: the individualised central area of tergum 9, the two bulgy lobes on tergum 10 flanking a narrow central area, the L-shaped cerci, the undeveloped lateral projection on tergum 10, and especially the structure of the subanal lobes (the rectangular basal plate, the division of the subanal process into a pair of lower pieces bearing strongly recurved hooks and the upper pieces ending in a sharp point).

Lacking details on the lateral projections, the best diagnostic characters are the details of the subanal apparatus. It much ressembles the preceding species (*Rhopalopsole jialingensis*).

The species was described from Shennongjia, Hubei Province.

39. *Rhopalopsole damrakae* SIVEC & HARPER, **n. sp.**
Figs. (39.1-39.6)

Length of forewing: 7.5-8 mm (male), 9 mm (female).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less so on an irregular median area: on mid foremargin, a dark triangular area with roughened cuticle; on posterior margin, a median rounded lobe covered with tiny knob-like cuticular ornementations.
- Tergum 10 bearing a narrow central plate (with some roughage) flanked with rather large bulging lateral hairy lobes (some knobs at median margin). The transverse bars somewhat inflated, upturned mesally, tips darkened.
- Lateral projections of tergum 10 extending backwards in a quadrate plate with rounded angles (small basal indentation) without any sclerified point or appendage (actually a very small vestige of a point).
- Epiproct rather thick tapering, elongate, forming a semicircular hook in side view, ending in a small downcast point, dorsally tapering slightly to a rounded tip.
- Subanal lobes of medium size, in lateral view somewhat flattened, but clearly bipartite with a basal ventral pair of lobes and an upper distal pair, both pairs rather compact (closed?); dark inner structures in both lobes (folded spine fields?) visible through the cuticule.
- Cerci short, upturned, no spine.

Female:

- Subgenital plate, sclerified, produced into a very short rounded appendage barely projecting over the end of the segment, medially with a rectangular shallow notch.
- Sternum 8 a tranverse plate with rounded front corners and a deep median excavation on the foremargin.

Material examined:

Holotype ♂, THAILAND, Chiang Mai Province, Doi Inthanon, 2250 m., 1.V.1996, leg. K. Matsumoto (PMSL). Paratypes: 2 ♂, 1 ♀, same data.

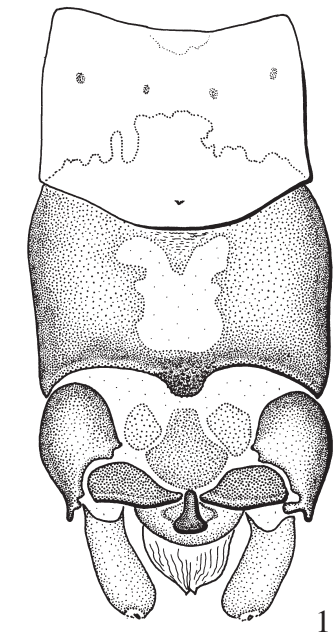
Comments:

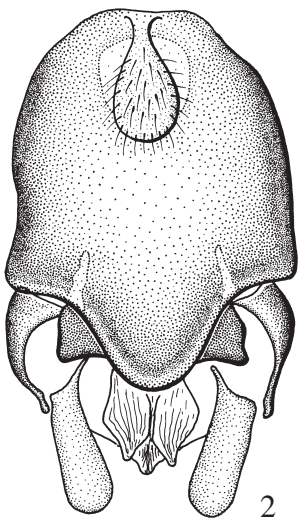
Notice large size. The lobe on tergum 9 and the obsolete lobe on the projections of tergum 10 appear to be good diagnostic characters.

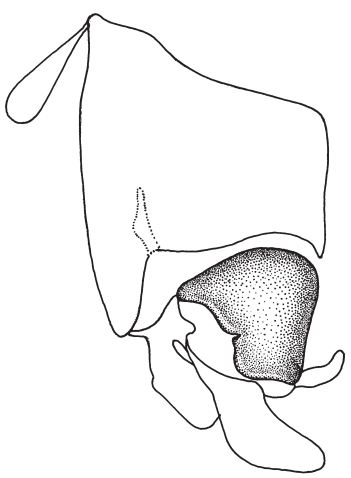
Etymology:

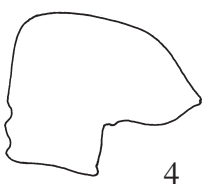
The species is named after master's student Korrakot Damrak from Kasetsart University in Bangkok.

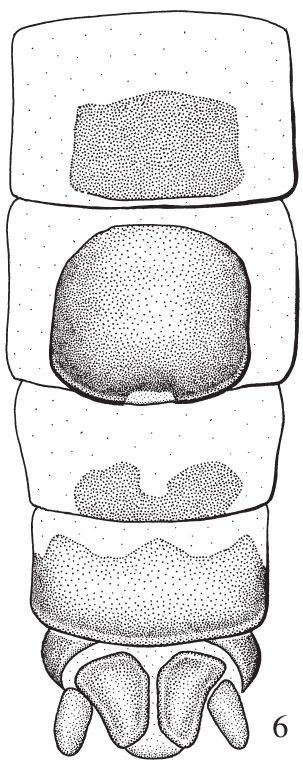
Figs. (39.1-39.6) *Rhopalopsole damrakae.* 39.1. Male terminalia, dorsal aspect, 39.2. Male terminalia, ventral aspect, 39.3. Male terminalia, lateral aspect, 39.4. Lateral process of tergite 10, 39.5. Epiproct, 39.6. Female terminalia, ventral aspect.











40. *Rhopalopsole sipang* Sivec & Harper, **n. sp.**
Figs. (40.1-40.6)

Unplaced Species

This species is placed here very tentatively, since it shares only some of the characteristics of the group, and differs considerably in others. The field of dark inner spines folded into the subanal lobes – yet there is little evidence that there are two lobes as in previous species.

Length of forewing: 6 mm (male), 8 mm (female).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less so on an irregular anterior median area; on posterior margin, a flat median triangular lobe covered with tiny knob-like cuticular ornementations and darkened.
- Tergum 10 bearing a large central plate heavily covered with knob-like cuticular ornementation, flanked with rather small and weakly sclerified lateral plates. The transverse bars wide, tapering towards median, their tips darkened (not forming a ridge).
- Lateral projections of tergum 10 extending backwards in a rectangular plate with rounded angles (basal indentation) without any sclerified point or appendage (actually a very small sclerification at upper corner).
- Epiproct rather thick cylindrical, forming a flattened semicircular hook in side view, ending in a small downcast point, dorsally tapering to the acute tip. Small hairs dispersed on outer half.
- Subanal lobes of medium size, in lateral view somewhat flattened dorsally, rounded ventrally; the upper lobe enclosed in lower? dark inner structures in lower lobe (folded spine fields?) visible through the cuticule, upper lobe terminating in narrow lobes with rounded tips.
- Cerci medium-sized, upturned, somewhat triangular, no spine.

Female:

- Subgenital plate, sclerified, produced into a pair of triangular projections separated by a triangular notch.
- Sternum 8 a tranverse plate with rounded front margin, with a rounded median excavation.

Material examined:

Holotype ♂, VIETNAM, Sa Pa Fan, Si Pang Mountains, 25-30.III.1995, leg. W. Mey. Paratypes, 3 ♀, same data. 2♀ Sa Pa, Okui-Ho, 1100 m, 24.-25.3.1995, leg. W. Mey (all MNB).

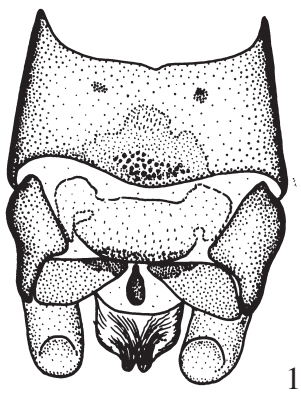
Comments:

A large species. The presence of folded spinefields in the subanal lobes has lead to placement in this group; however, there are a number of discrepancies: the division of the subanal lobes into a ventral and a dorsal member is not very clear and the tergum 10 does not fit the pattern found in other species of the group (a narrow and bare middle plate, flanked by hairy inflated side plates.

The structure of the subanal lobes is perhaps diagnostic (at least in its closed form). The combination of characters (complex subanal structure, absence of lateral point, ornamented terga 9 and 10) will however single out this species from others described here.

Etymology:
The species is named after type locality in the Si Pang Mountains.

Figs. (40.1-40.6) *Rhopalopsole sipang*. 40.1. Male terminalia, dorsal aspect, 40.2. Male terminalia, ventral aspect, 40.3. Male terminalia, lateral aspect, 40.4. Lateral process of tergite 10, 40.5. Epiproct, 40.6. Female terminalia, ventral aspect.



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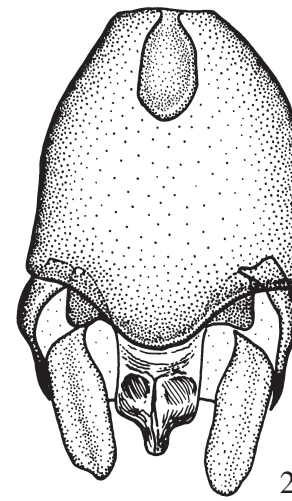

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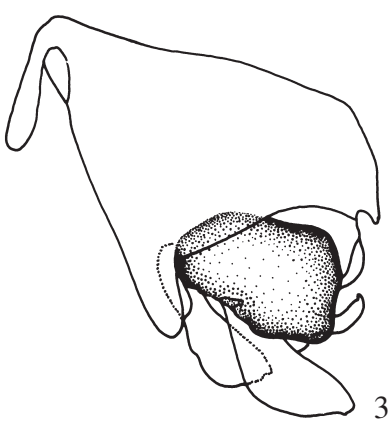

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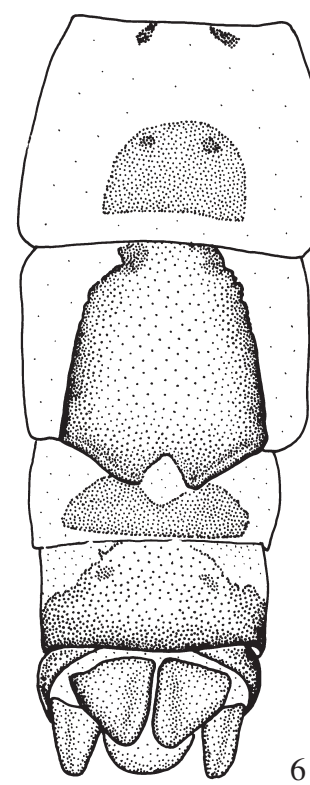

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41. The ***Rhopalopsole longicercia*** Complex Sivec & Shimizu, **n.sp.**
Figs. (41.1-41.8)

Length of forewing: 6.5 mm (male), 7.5 mm (female).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less so on two submedian areas on each side of a dark central band; Just before the posterior margin, an uplifted transverse ridge is heavy sclerified and covered with tiny knobs.
- Tergum 10 bearing a large central plate covered with macrotricia, in the distal part interspersed with cuticular ornementations (wrinkles).
- Lateral projections of tergum 10 extending backwards in a very narrow plate with rounded angles (basal indentation) leading to a backward directed small point on the upper caudal corner.
- Epiproct thick, cylindrical, lightly tapering, ending in an abrupt point.
- Subanal lobes of large size, complex, consisting of both upper and lower lobes enclosing sclerified plates and hooks as well as dark folded spine fields.
- Cerci remarkably long, sinous, bent one towards the other at their tip and ending in strond inward directed spine.

Female:

At least two types of female are associated with this complex, one with a barely produced subgenital plate with a wide shallow median excavation, the other rather similar except that the middle of the excavation is connected by a narrow bridge to a small flap-like extension. In both cases, sternum 8 is largely entire.

Material examined:

JAPAN: 3♂, 3♀, Oyana-gawa, 800 m., Kaji Zawa-cho, Yamanasi, 29.V.1993, T. Hattari leg (LBM). 6♂, 5♀, Shizuoka Prefecture, Kiyozasa Pass, 24.V.1986, leg. M. Satô (coll. P.Zwick). 4♂, Shizuoka Pref., Haruno-San, 26.V.1986 leg. M. Satô (coll. P.Zwick). 8♂, 2♀, Kanagawa, Yamakita-machi, Yoki-zawa, small tributary, 10.V.1996, leg. T. Shimitzu (LBM).

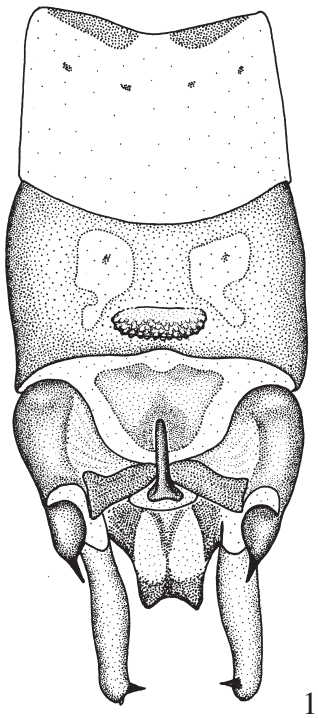
Comments:

The complex described here is not defined further for lack of material; there are good indications in the limited material that is at hand that more than one species is involved, although all the specimens are superficially similar. The species are quite spectacular with their long sinuous cerci and will be easily told appart from other congeners. There are nonetheless differences in size, female associations and details of the structure of the subanal apparatus, which strongly suggest a mixed assemblage. Special attention needs to be given to the subanal structure, which will probably require not only fresh material but specimens in which the structure as been expanded.

Etymology:

Name of complex refers to long cerci.

Figs. (41.1-41.8) *Rhopalopsole longicercia Complex.* 41.1. Male terminalia, dorsal aspect, 41.2. Male terminalia, ventral aspect, 41.3. Male terminalia, dorsal aspect, 41.4. Male terminalia, ventral aspect, 41.5. Male terminalia, lateral aspect, 41.6. Lateral process of tergite 10, 41.7. Epiproct, 41.8. Female terminalia, ventral aspect.



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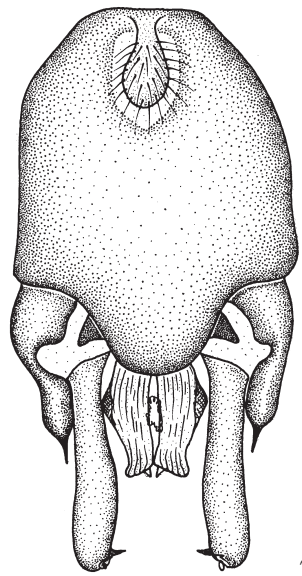

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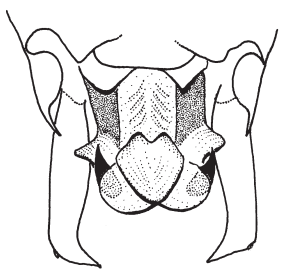

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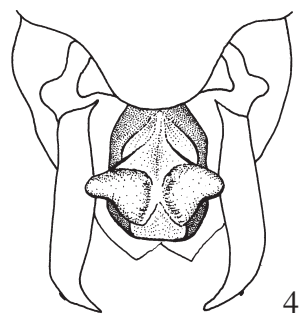

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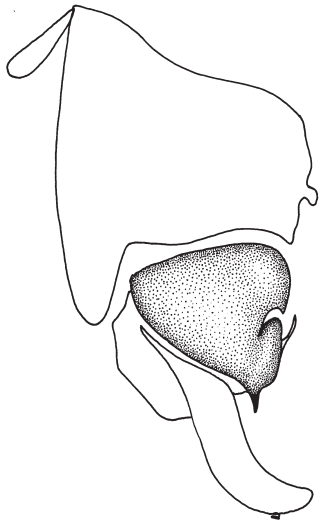

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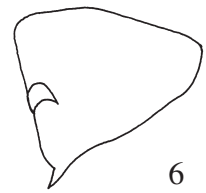

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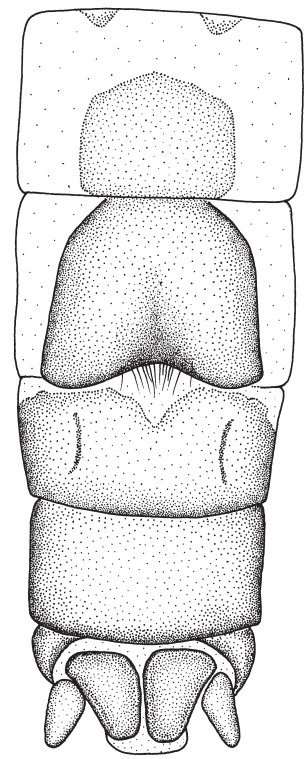


8

The *dentata* Group

The *dentata* group is characterised by the following combination of characters:

Male:

- Tergum 9 with an upraised sclerified process on or just before mid margin.

- Tergum 10 with a central plate covered with a field of scales and/or knobs.

- Epiproct long, heavily sclerified, tip flanged or otherwise modified.

- Lateral projections on tergum 10 long to very long, sinuous (arising relatively low on sides?).

- Subanal lobes large, flat, oval, furrows well-defined.

- Cerci of medium size, upturned, generally without a terminal spine.

Female:

- Subgenital plate little produced, straight or slightly rounded, entire(?), sometimes with internal sclerifications (?).

- Since species of this group occur in mixed assemblages in the same stream it is not possible to associate females, (except in a few cases?).

- Example: Sternum 7 forming a sclerified plate which does not extend over width of segment, extending halfway over sternum 8 into a tongue like subgenital plate which is abruptly narrowed at about mid-length. Internal vaginal sclerifications visible through base of plate and hind part of sternum. Sternum 8 a narrow transverse plate with a triangular front margin. This type of female seems to co-occur with a female with a simple plate in both Taiwan and Japan.

42. *Rhopalopsole dentata* KLAPÁLEK
Figs. (42.1-42.3)

Rhopalopsole dentata KLAPÁLEK, (1912): 349. Holotype ♂ Taihorin, Formosa (DEI).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less so on median area before and next to a quadrate sclerified plate on hind margin; this plate bears near its front an upturned button-like process (cuticle roughened and wrinkled).
- Tergum 10 bearing a large central plate covered laterally with macrotrichia, in the middle, a band of wrinkles (in front) turning into a field of knobs (no elevation seen on type – double elevation on fresh material, knobs not appreciably weaker or less sclerified in depression between elevated areas). Transverse plates triangular with rounded angles.
- Lateral projections of tergum 10 thin, extending backwards in a quadrate plate with a long narrow and sinuous process arising at its upper corner (large excavation above). The process reaching about mid-line of segment (meeting the corresponding process from the other side).
- Epiproct thick at base, tapering rapidly, ending in a flattened slightly expanded plate with rounded corners, somewhat downturned lip.
- Subanal lobes of large size, narrow at base expanding distally, then abruptly constricted (over a rounded corner) to form a acute extremity (not on type). Well-marked furrows.
- Cerci of medium size, bent upwards at midlength, no spine (type has a minuscule (vestigial) spine).

Female: unknown.

Material examined:

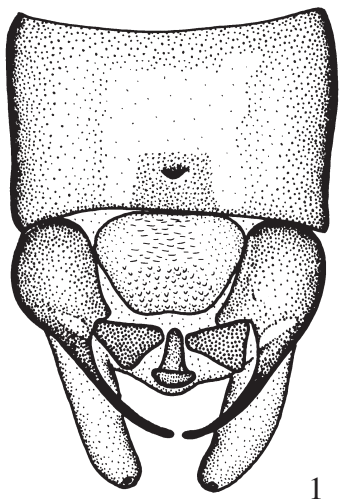
Holotype ♂ (on slide, DEI).Additional material: 2♂, 2♀ TAIWAN, Hsinchu County, E. Wufeng, 480 m., 24˚38'36 N 121˚08'49 E, 17.III.1996, leg. I. Sivec & B. Horvat (PMSL).

Comments:

Together with the lateral processes relatively short (meeting on midline), the flattened tip of epiproct is diagnostic.

Some (but not all) of the Okinawa material has a more pronounced downturned corners on the epiproct. In side view this gives the impression of a (2) subterminal points. Probably within the variation of the species; further collecting over a wider area in Japan will indicate if there are further species to be expected.

Figs. (42.1-42.3) *Rhopalopsole dentata.* 42.1. Male terminalia, dorsal aspect, 42.2. Epiproct, 42.3. Male terminalia, dorsal aspect – detail from holotype slide preparation.



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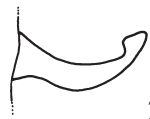

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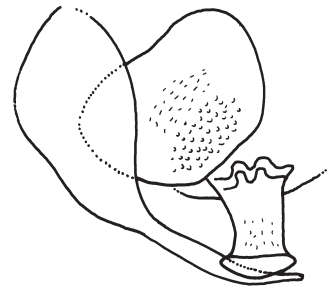

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43. *Rhopalopsole pseudodentata* SIVEC & SHIMIZU, **n. sp.**
Figs. (43.1-43.5)

Length of forewing: 5 mm (male).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less so on median area; on hind margin, a small elevated process, this plate bears near its front an upturned curved ridge, behind which is a small field of cuticular knobs.
- Tergum 10 bearing a large central plate covered laterally with macrotrichia, in the middle, a band of wrinkles (in front) turning into a field of knobs. This field forming a single rounded elevated area. Transverse plates roughly triangular with rounded angles.
- Lateral projections of tergum 10 thin, extending backwards in a quadrate plate with a long narrow and sinuous process arising at its upper corner (excavation above). The process reaching about mid-line of segment (meeting the corresponding process from the other side).
- Epiproct thick at base, tapering rapidly, ending in a flattened plate with projecting and downcast outside corners (triangular in hind view), main stalk ending in a point above the corners.
- Subanal lobes of large size, narrow at base expanding distally to run more or less parallel, then abruptly constricted to form a acute extremity.
- Cerci of medium size, bent upwards at midlength, no spine.

Female: unknown.

Material examined:

Holotype ♂ TAIWAN, Nantou-Hsian, Hohwan-Hsi near Lishan, 30.IV.1994, sweep, leg. T. Shimitzu (PMSL). Paratypes: 6♂, 1♀, same data, 2♂ TAIWAN: Taipei County, S Pinglin, 450 m, 15.3.1996, leg. I. Sivec & B. Horvat (PMSL), 1♂, 1♀ JAPAN, stream near Omoto Tunnel, Ishigaki-shi, Ishigaki-jima Is., 21.II.1994, leg. T. Shimizu (LBM).

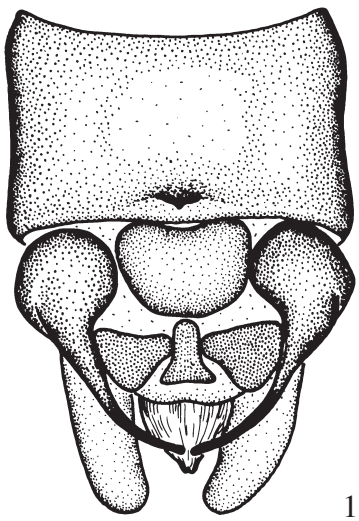
Comments:

The lateral processes meeting on mid-line and the triangular tip of epiproct are the diagnostic characters.

Etymology:

The species name refers to great similarity to *Rhopalopsole dentata* species.

Figs. (43.1-43.5) *Rhopalopsole pseudodentata.* 43.1. Male terminalia, dorsal aspect, 43.2. Male terminalia, ventral aspect, 43.3. Male terminalia, lateral aspect, 43.4. Lateral process of tergite 10, 43.5. Epiproct.



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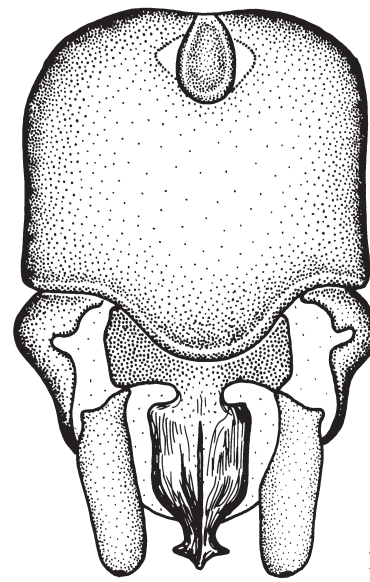

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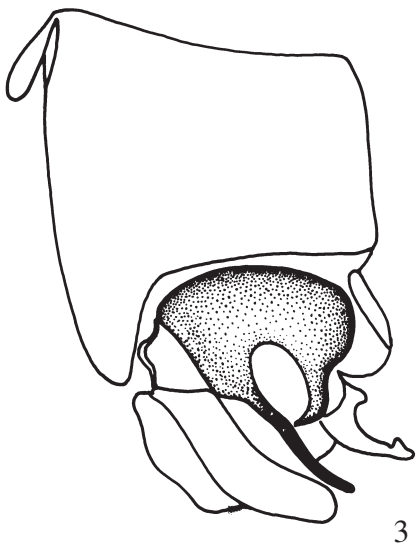

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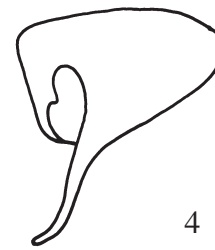

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44. *Rhopalopsole wulingensis* Sivec & Shimizu, **n. sp.**
Figs. (44.1-44.5)

Length of forewing: 7.5-8 mm (male).

Male:
- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less so on median area before and next to a bottle-shaped sclerified plate on hind margin; this plate bears near its front an upturned arched rib (relatively wide) barely projecting beyond the margin (cuticle wrinkled with field of tiny knobs).
- Tergum 10 bearing a large central plate covered laterally with macrotrichia, in the middle, a band of scale-like cuticular ornementations. This band elevated into a pair of heavily sclerified rounded bumps with a narrow (and less sclerified) depression between them. Transverse plates triangular-semicircular with rounded angles, inner angle darkened.
- Lateral projections of tergum 10 thin, extending backwards in a quadrate plate with a long narrow and sinuous process arising at its upper corner (large excavation above). The process reaching much beyond the mid-line of segment, thus overcrossing the corresponding process from the other side.
- Epiproct thick at base, shaft not tapering appreciably along its course in side view, expandind in top view, ending in a shallow trilobed process.
- Subanal lobes of large size, narrow at base expanding distally on a straight line, then abruptly constricted to form (again on a straight line) a pointed extremity.
- Cerci rather long, bent upwards at midlength, no spine.

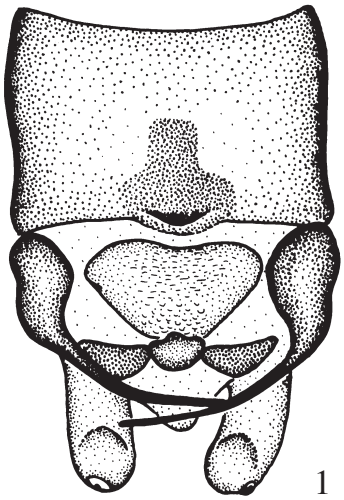
Female: unknown.

Material examined:
Holotype ♂ TAIWAN, Taichung-Hsin, Wuling Farm, Sueisan-Hsi, 1.V.1994, sweep, leg. T. Shimizu (PMSL). Paratypes: 3♂, 7♀ same data, TAIWAN: 1♀ Nantou Hsian, Nanshan-His, 25.4.1994, leg. T. Shimizu, 1♀ Taipei County, Kungliao, 200 m, 13.3.1996, leg. I. Sivec & B. Horvat, 1♂ Illan County, E Chihtuan, 1300 m, 19.3.1996, leg. I. Sivec & B. Horvat, 1♂ Taipei County, Pinglin, Chisichiao, 19.12.1994, leg. L.J. Wang, 45♂, 6♀ Hsinchu County, S Chienshih, Euro, 920 m, 16.3.1996, leg. I. Sivec & B. Horvat, 1♂ Illan County, Taipingshan, 2000 m, 10.4.1996, leg. I. Sivec & B. Horvat.

Comments:
The long lateral processes on tergum 10 together with the tri-lobed tip of epiproct readily allow recognition of the male.

Etymology:
The species is named after the type locality Wuling.

Figs. (44.1-44.5) *Rhopalopsole wulingensis.* 44.1. Male terminalia, dorsal aspect, 44.2. Male terminalia, ventral aspect, 44.3. Male terminalia, lateral aspect, 44.4. Lateral process of tergite 10, 44.5. Epiproct.



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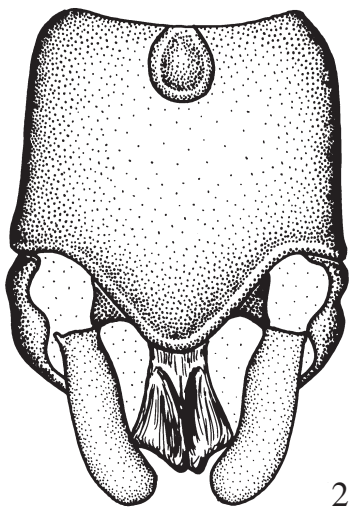

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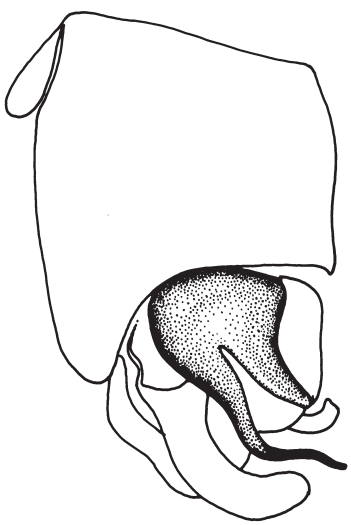

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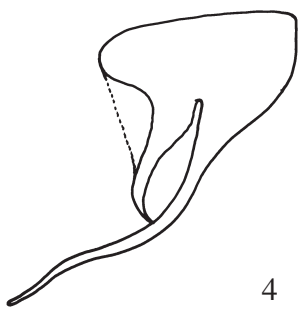

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45. *Rhopalopsole subnigra* OKAMOTO (*fide* SHIMIZU)
Figs. (45.1-45.6)

R. dentata, *nec* KLAPÁLEK in KAWAI (1967).

Length of forewing: 5.5-6.5 mm (male), 7 mm (female).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less so on median area before and next to a semicircular sclerified plate on hind margin; this plate bears near its front an upturned button-like process (cuticle roughened and wrinkled).
- Tergum 10 bearing a large central plate covered laterally with macrotrichia, in the middle a band of wrinkles (in front) turning into a field of knobs, somewhat elevated with a shallow groove in middle (knobs not appreciably weaker or less sclerified in depression between elevated areas). Transverse plates triangular with rounded angles, inner angles darkened.
- Lateral projections of tergum 10 thin, extending backwards in a rounded (quadrate?) plate with a long narrow and sinuous process arising at its upper corner (large excavation above). The process reaching barely about mid-line of segment (just meeting the corresponding process from the other side).
- Epiproct thick at base, not tapering appreciably along its course (roundish in cross-section), ending in a downcast point (below a rounded top), giving a triangular cross-section in frontal view.
- Subanal lobes of large size, narrow at base expanding distally, to form an ovoid structure. Well-marked furrows.
- Cerci of medium size, bent upwards at midlength, distal spine.

Female:

- Sternum 7 sclerified produced into a subgenital plate which barely protrudes over end of segment, margin variable, from rounded entire to lightly incised.
- Sternum 8 a narrow transverse band on hind part of sergment.

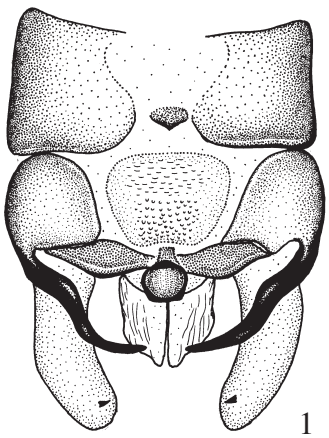
Material examined:

17♂, 25♀ JAPAN, 1200 m. Ebino-kogen, Ebino-shi, Miyazaki-ken, 31.V.1993, leg. T. Shimizu (LBM).

Comments:

This species is very close to *R. dentata* from Taiwan, differing mainly by the cross-section of the epiproct (roundish instead of flattened ovoid) at the outline of its tip in frontal view (triangular rather than flattened ovoid).

Figs. (45.1-45.6) *Rhopalopsole subnigra.* 45.1. Male terminalia, dorsal aspect, 45.2. Male terminalia, ventral aspect, 45.3. Male terminalia, lateral aspect, 45.4. Lateral process of tergite 10, 45.5. Epiproct, 45.6. Female terminalia, ventral aspect.



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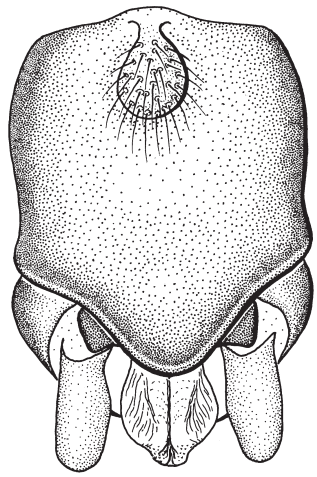

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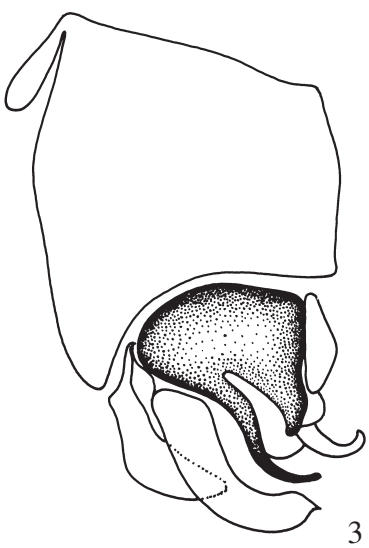

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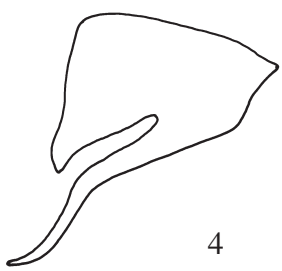

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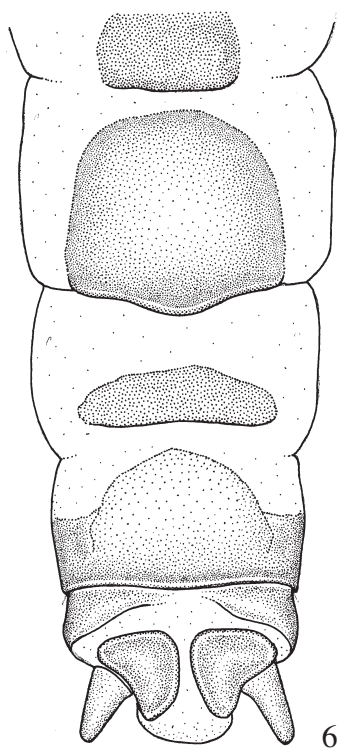

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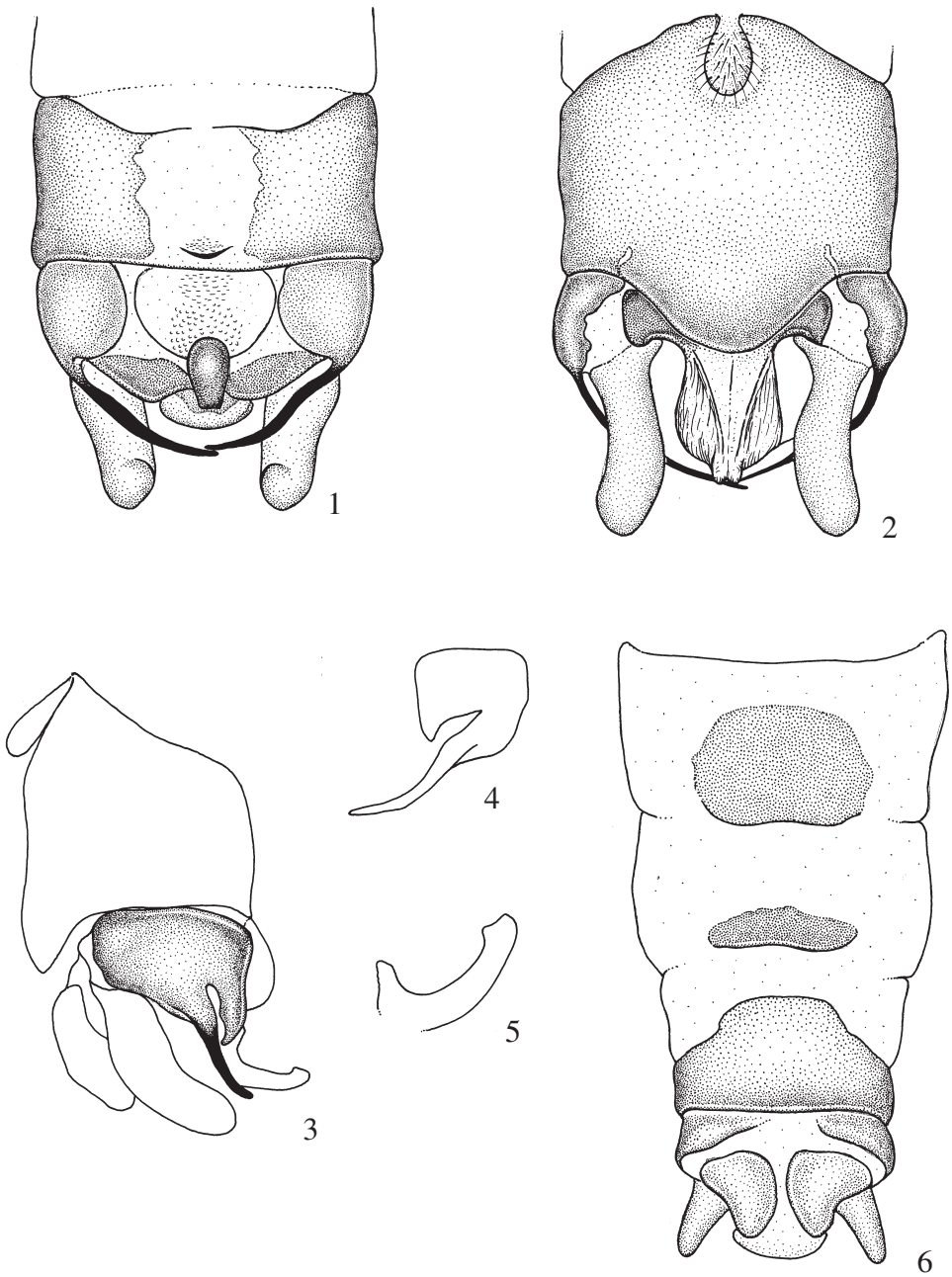
46. *Rhopalopsole longicercia* KAWAI
Figs. (46.1-46.6)

Rhopalopsole longicercia KAWAI (1968): 234. Holotype ♂ Karayama, Ishigaki Islands (Bishop Museum, Hawaii).

Material examined:
2♂, 5♀ JAPAN: Ishigaki-jima, Okinawa, 20.2.1994, leg. T. Shimizu (LBM).

Comments:
Species very close to *R. dentata* and could be synonym of this species.

Figs. (46.1-46.6) *Rhopalopsole longicercia.* 46.1. Male terminalia, dorsal aspect, 46.2. Male terminalia, ventral aspect, 46.3. Male terminalia, lateral aspect, 46.4. Lateral process of tergite 10, 46.5. Epiproct, 46.6. Female terminalia, ventral aspect.



47. *Rhopalopsole tianmuana* SIVEC & HARPER, **n. sp.**
Figs. (47.1-47.6)

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less so on median area before and next to a pear-shaped sclerified plate on hind margin; this plate bears near its (hind quarter) a small upturned arched rib strongly projecting upwards (spine in side view) (cuticle wrinkled with field of tiny knobs). Tufts of setae on latero-posterior corners.
- Tergum 10 bearing a large central plate covered laterally with macrotrichia, in the middle, a band of scale-like cuticular ornementations, each side of a neat slit (membranous). This band elevated into a pair of heavily sclerified rounded bumps. Transverse plates reniform, with external hairy bulgess, inner angle darkened.
- Lateral projections of tergum 10 thin, extending backwards in a semicircular plate with a very long narrow and elegantly sinuous process arising at its upper corner (large excavation above). The process reaching much beyond the mid-line of segment, thus overcrossing the corresponding process from the other side and then leading upwards.
- Epiproct thick at base, shaft not tapering appreciably along its course in side view, tip rounded in top view, ending in a small downcast point.
- Subanal lobes of large size, narrow at base expanding rapidly, parallel on most of their length, tapering to a broad point
- Cerci unusually long, bent upwards before midlength, a small spine.

Female:

- Sternum 7 mostly sclerified, the subgenital plate projecting shortly as a trapezoidal plate with rounded corners, the plate darkened in a flattened trefoil pattern.
- Sternum 8 a reniform plate, with an irregular indentation on the front margin, covering latter half of the segment.

Material examined:

Holotype ♂ CHINA: 200 m site from Kaishanlaodian to Xianrending, West Mt. Tianmu, Linan City, Zhejiang Province, 1200 m. 10.V.1998, leg. Du Yuzhou. Paratypes: 3♂, 8♀, same data (all IAEYU).

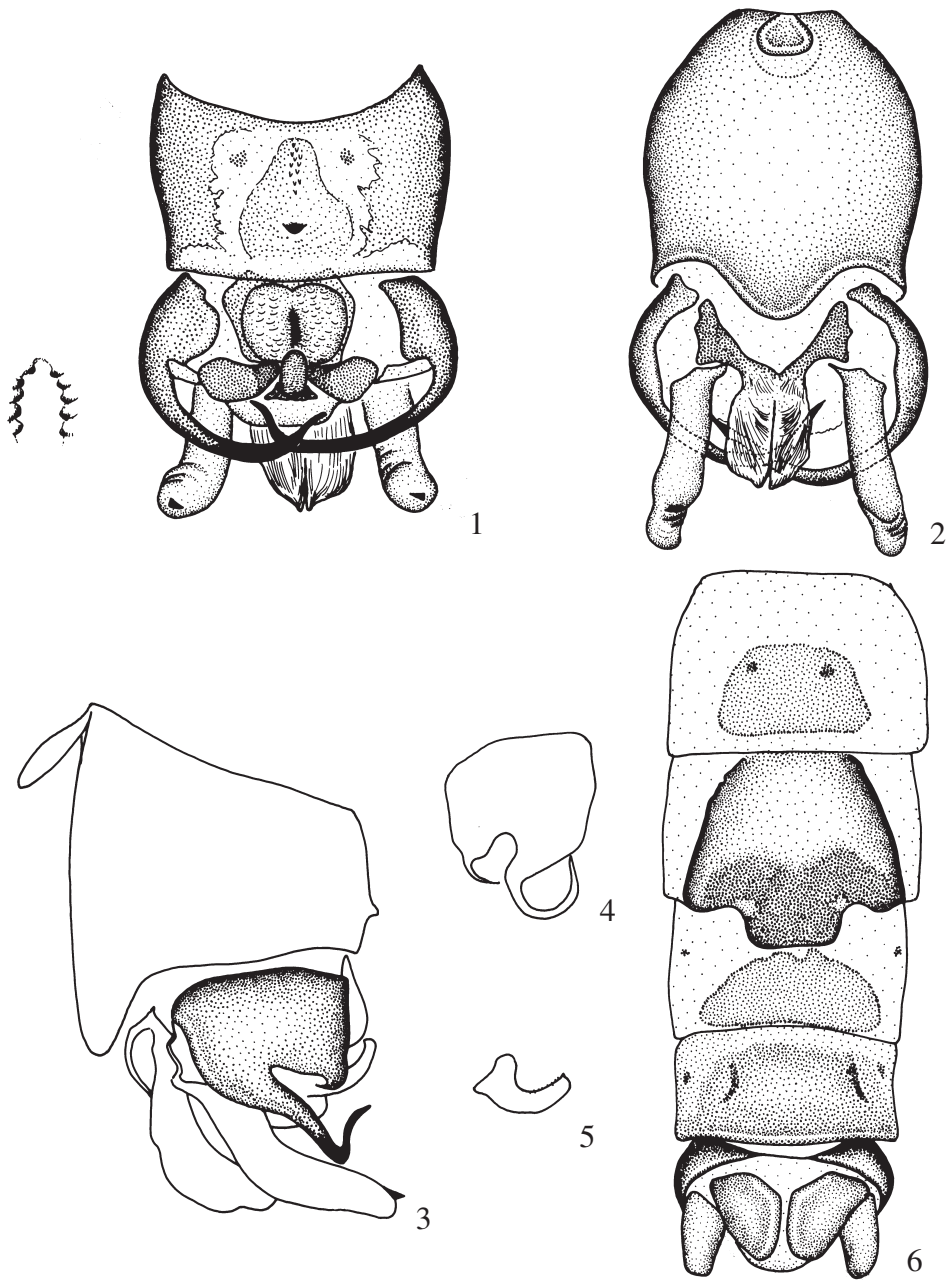
Comments:

We hesitate in naming this species as new, but the types not being available to us, we prefer the risk of adding to the future synonymy than to the confusion by a mistaken identity. The species obviously resembles *R. basinigra* Yang and Yang and we thought it might be it; however, examination of the original drawings indicates the following differences: the cerci are much longer in our species and they are terminated with a spine; the middle plate of tergum 10 has a prominent central membranous slit, the cuticular ornementation being distributed differently; finally, the transverse plates of tergum 10 are veloped in rounded bulges laterally.

There is also the possibility that our species may in fact be *Rhopalopsole recurvispina* (Wu 1949), but the original decription mentions a flat epiproct (our specimen's is cylindrical) and the cercal spine is not indicated; the drawing is too sketchy to be of much use.

Etymology:
The species is named after the type locality Tianmu mountains.

Figs. (47.1-47.6) *Rhopalopsole tianmuana.* 47.1. Male terminalia, dorsal aspect, 47.2. Male terminalia, ventral aspect, 47.3. Male terminalia, lateral aspect, 47.4. Lateral process of tergite 10, 47.5. Epiproct, 47.6. Female terminalia, ventral aspect.



48. *Rhopalopsole flata* YANG and YANG 1995
Figs. (48.1-48.6)

YANG and YANG, (1995): 61. Holotype ♂ Mt. Baishanzu, Zhejiang Province, China (DECAU).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified; somewhat less so on anterior median area (some roughening in the middle of this); a small semicircular process juts out just before the mid hind margin (cuticle wrinkled with field of tiny knobs).
- Tergum 10 bearing a large central plate covered laterally with macrotrichia, in the middle, a band of scale-like cuticular ornementations. This band elevated somewhat with a very shallow median depression. Transverse plates triangular-semicircular with rounded angles, inner angle darkened.
- Lateral projections of tergum 10 thin, extending backwards in a quadrate plate with a long narrow and sinuous process arising at its upper corner (large excavation above), this process wider than in most species. The process reaching just beyond the mid-line of segment, thus reaching the corresponding process from the other side.
- Epiproct much flattened, hook-like, terminating in a squared tip with rounded angles.
- Subanal lobes of large size, narrow at base expanding regularly on a straight line, then abruptly constricted to form (again on a straight line) a pointed extremity. Lateral parts more membranous.
- Cerci rather long, bent upwards at midlength, no spine.

Female:

- Sternum 7 a wide trapezoidal sclerite developping into a short wide subgenital plate, with rounded and shallowly incided lip, marginally darkened.
- Sternum 8 a short transverse plate with convex anterior border and hind part of segment.

Material examined:

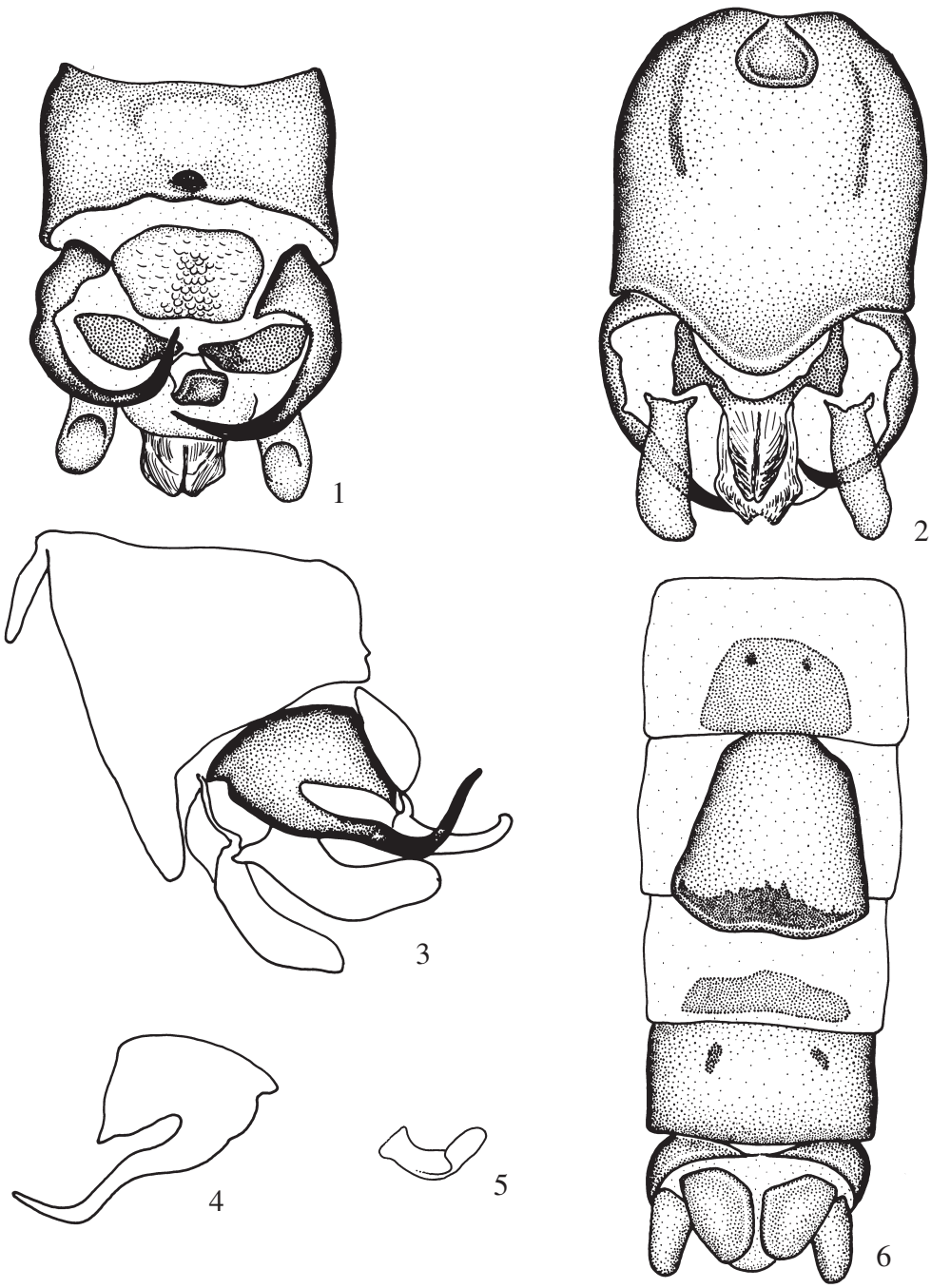
1 ♂, 1 ♀, CHINA, 200 m site from Kaishanlaodian to Xianrending, West Mt. Tianmu, Linan City, Zhejiang Province, 1200 m. 10.V.1998, leg. Du Yuzhou (IAEYU).

Comments:

We feel somewhat confident that we were able to identify this species correctly from Yang and Yang‘s figures. The wide but relatively short lateral appendages on tergum 10, the wide and very flat epiproct and the peculiar outline of the subanal apparatus are characteristic.

Rhopalopsole gutianensis Yang and Yang (1995b) probably also belongs to this group, but we are unable to separate the two since they seem to share all characteristics which are usually diagnostic.

Figs. (48.1-48.6) *Rhopalopsole flata.* 48.1. Male terminalia, dorsal aspect, 48.2. Male terminalia, ventral aspect, 48.3. Male terminalia, lateral aspect, 48.4. Lateral process of tergite 10, 48.5. Epiproct, 48.6. Female terminalia, ventral aspect.



49. *Rhopalopsole zhejiangensis* YANG and YANG
Figs. (49.1-49.6)

Rhopalopsole zhejiangensis YANG and YANG, (1995): 21. Holotype ♂ Mt. Gutian, Kaihua Co., Zhejiang Prov., China (DECAU, Beijing).

Length of forewing: 4.6-5 mm (male), 5.8-6.2 mm (female).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 poorly sclerified; a small semicircular process juts out some distance before the mid hind margin (cuticle wrinkled with field of tiny knobs).
- Tergum 10 bearing a large central plate covered laterally with macrotrichia, in the middle, a band of weak scale-like cuticular ornementations. This band elevated somewhat with a very shallow median depression. Transverse plates triangular-semicircular with rounded angles.
- Lateral projections of tergum 10 thin, extending backwards in an elongate with a long narrow and sinuous process arising at its upper corner (large excavation above). The process reaching beyond the mid-line of segment, thus over-crossing the corresponding process from the other side.
- Epiproct much flattened, yet thick, hook-like, terminating in a squared tip which is gradually attenuated; tip extended ventrally into a point, giving frontal view a triangular aspect; underside of last half of epiproct with strong setae.
- Subanal lobes of large size, narrow at base expanding very little, then narrowing to the end.
- Cerci of medium length, bent upwards at midlength, no spine.

Female:

- Sternum 7 a wide nearly quadrangular sclerite developping into a short triangular subgenital plate, marginally darkened.
- Sternum 8 a short transverse plate with slightly invaginated anterior border.

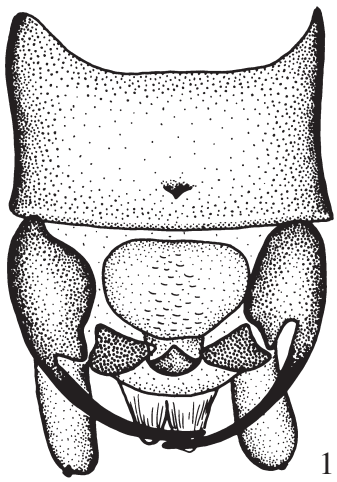
Material examined:

1♂ CHINA: branch of Hougou, Houzhenzi, Zhouzhi County, Qinling Mountain Range, Shaanxi Province, 1300 m., 3.VI.1998, leg. Du Yuzhou, 1♂, 2♀ CHINA, Mount Lu, Jiangxi Province, 21.V.1996, leg. Wang Jianguo (all IAEYU).

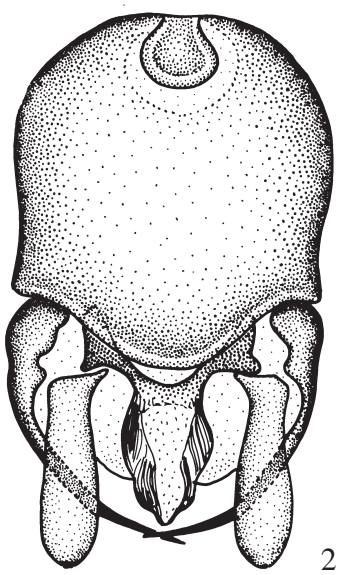
Comments:

We are reasonably confident in our identification, on the basis of the characters mentioned in the original description and represented in the figures: the weakly sclerified tergum 9 and its small midline projection, the wide tapering epiproct, the narrow subanal probe, the long upcurved cerci witout any spine, the weakly marked central plate on tergum 10, and the long narrow lateral processes.

Figs. (49.1-49.6) *Rhopalopsole zhejiangensis*. 49.1. Male terminalia, dorsal aspect, 49.2. Male terminalia, ventral aspect, 49.3. Male terminalia, lateral aspect, 49.4. Lateral process of tergite 10, 49.5. Epiproct, 49.6. Female terminalia, ventral aspect.



1



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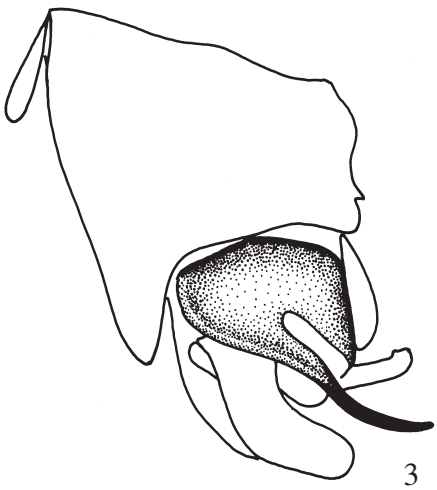

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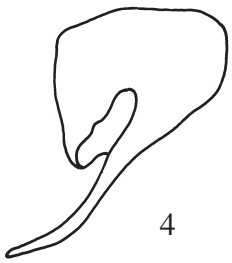

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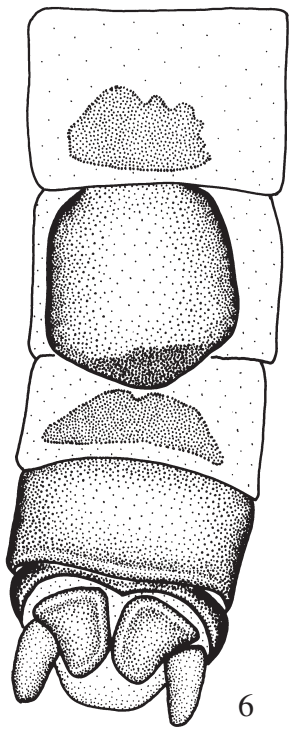


6

50. Rhopalopsole yangdingi Sivec & Harper, **n. sp.**
Figs. (50.1-50.5)

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly sclerified laterally; somewhat less so on anterior median area; a small semicircular ridge juts out just before the mid hind margin on a roughly triangular plate (cuticle wrinkled with field of tiny knobs).
- Tergum 10 bearing a large central plate covered laterally with macrotrichia, in the middle, a band of scale-like cuticular ornementations on the hind part. This band elevated somewhat. Transverse plates triangular-semicircular with rounded angles, inner angles darkened.
- Lateral projections of tergum 10 thin, extending backwards in a triangular plate with a long narrow and sinuous process arising at its upper corner (large excavation above). The process reaching just beyond the mid-line of segment, thus crossing over the corresponding process from the other side.
- Epiproct stocky, hook-like, terminating in a trilobed tip with rounded angles, middle lobe a downcast spine just before the tip, 2 other lobes are corners of epiproct; short dispersed hairs on ventral surface of distal half.
- Subanal lobes of large size, narrow at base expanding regularly into parallel sides, then abruptly constricted to form a rounded extremity.
- Cerci of medium size, bent upwards at midlength, no spine.

Female: unknown.

Material examined:

Holotype ♂, CHINA, Mount Dayue, Jiangxi Province, 22.V.1996, leg. Wang Jianguo. Paratypes: 4♀, same data (all IAEYU).

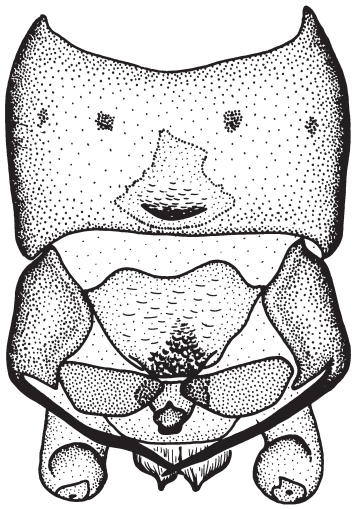
Comments:

This species and the next one are very similar (cf. also *R. basinigra*), they can be distinguished by details of the ornementation of terga 9 and 10, but more easily by the outlines of the epiprocts in side and top views (ventral point closer to tip and narrower width in this species). The structure of end of the epiproct is the best diagnostic character.

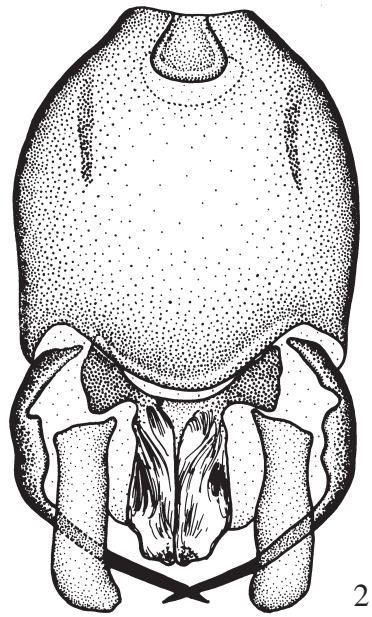
Etymology:

Species is named after Prof. Dr. Yang Ding , stonefly specialist from Beijing.

Figs. (50.1-50.5) *Rhopalopsole yangdingi.* 50.1. Male terminalia, dorsal aspect, 50.2. Male terminalia, ventral aspect, 50.3. Male terminalia, lateral aspect, 50.4. Lateral process of tergite 10, 50.5. Epiproct.



1



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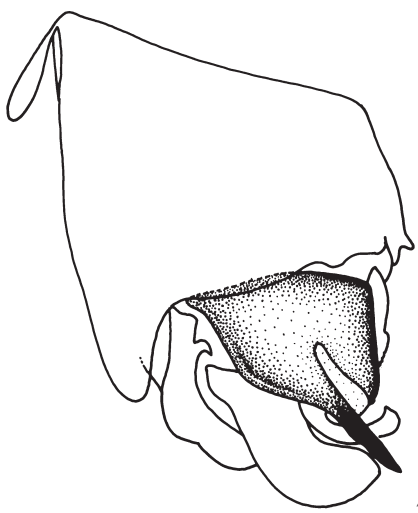

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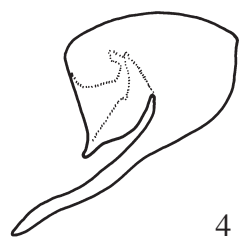


4

5

51. *Rhopalopsole duyuzhoui* Sivec & Harper, **n. sp.**
Figs. (51.1-51.5)

Length of forewing: 5 mm (male).

Male:

- The ventral lamella present and normal on base of sternum 9.
- Tergum 9 mostly unsclerified; a small semicircular ridge juts out just before the mid hind margin on a roughly quadrate plate (cuticle wrinkled with field of tiny knobs).
- Tergum 10 bearing a large central plate covered laterally with macrotrichia, in the middle, a band of scale-like cuticular ornementations. This band markedly elevated. Transverse plates triangular-semicircular with rounded angles, inner angles darkened.
- Lateral projections of tergum 10 thin, extending backwards in a small triangular plate with a long narrow and sinuous process arising at its upper corner (large excavation above). The process reaching just beyond the mid-line of segment, thus crossing over the tip of the corresponding process from the other side.
- Epiproct stocky, hook-like, upper section elongated, flattened (wide in top view), terminating in a trilobed tip with rounded angles, middle lobe a downcast spine a short distance before the tip, 2 other lobes are corners of epiproct.
- Subanal lobes of large size, narrow at base expanding regularly into parallel sides, then abruptly constricted to form a bluntly pointed extremity.
- Cerci of medium size, bent upwards at midlength, no spine.

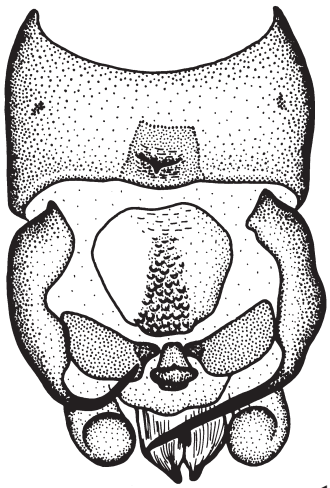
Female: unknown.

Material examined:
Holotype ♂, CHINA, Mt. Baishanzu, Zhejiang Province (?) (IAEYU).

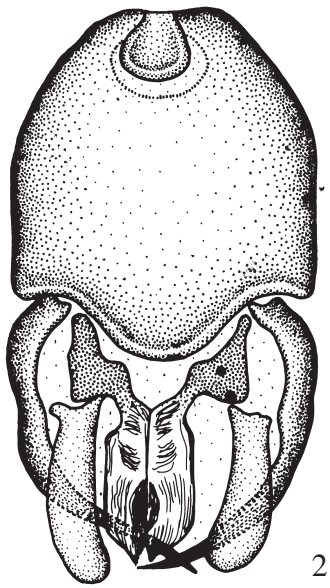
Comments:
See preceding species.

Etymology:
Species is named after Prof. Dr. Du Yuzhou , stonefly specialist from Jangzhou.

Figs. (51.1-51.5) *Rhopalopsole duyuzhoui.* 51.1. Male terminalia, dorsal aspect, 51.2. Male terminalia, ventral aspect, 51.3. Male terminalia, lateral aspect, 51.4. Lateral process of tergite 10, 51.5. Epiproct.



1



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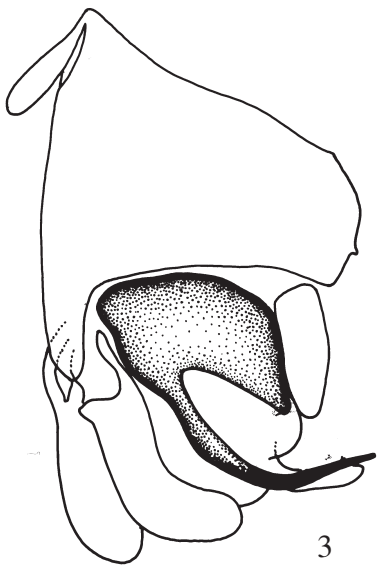

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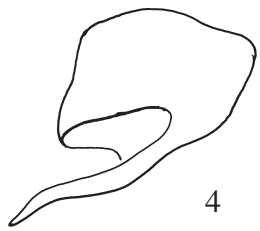


4

5

Other species in the *dentata* group:

Rhopalopsole gutianensis YANG and YANG (1995a).

Rhopalopsole hamata YANG and YANG (1995b). Distinctive species of the *dentata* group with wide processes on tergum 10 of the male. Epiproct and subanal probe narrow in side view, no process on tergum 9. Type in the Insect Collection of the Beijing Agricultural University. Not available to us.

Rhopalopsole spiniplatta (WU 1949). A curious species with a subanal probe bordered with black spines and short processes on lateral projections. Probably belongd to the *dentata* group. Female has a characteristic long pointed subgenital plate.

Females are not readily associated in this group because of the usual cohabitation of many species at any one time in the same habitat. Species described from the female only must remain unrecognisable until they are properly associated. We have therefore taken no account of them and the name may eventually resurface when they have been linked to a particular male.

Other species:

Rhopalopsole alobata HARRISON & STARK (2008): 76. Recently described species from Vietnam is peculiar in lacking vesicle on male sternum 9.

Rhopalopsole shimentaiensis YANG, LI & ZHU (2004): 279. Recently described species from Guangdong, China.

Rhopalopsole xui YANG, LI & ZHU (2004): 280. Recently described species from Guangdong, China.

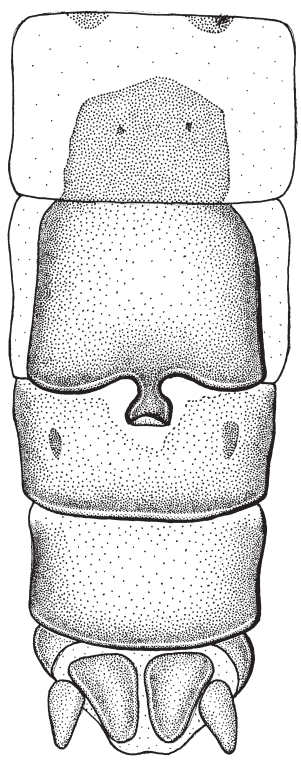
Rhopalopsole baishanzuensis YANG & LI (2006): 433. Recently described species from Zhejiang, China.

Rhopalopsole sp. (females)

To awoid more confusion in the *Rhopalopsole* taxonomy we did not want to describe unassociated females from different regions. Therefore we present only illustrations and localities of some females that could prove in the future as females of already described species or females of new and undescribed species.

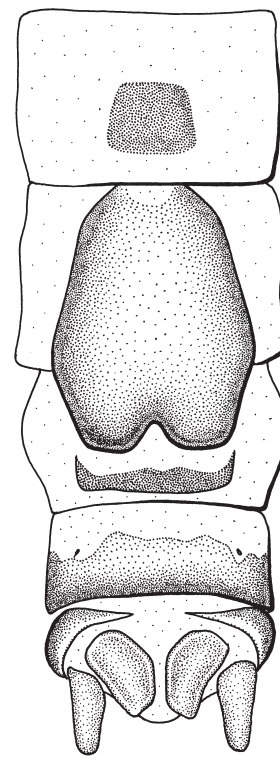
Figs. (52.1-52.5) *Rhopalopsole* sp. (female). 52.1 *Rhopalopsole* sp. 1. Female terminalia, dorsal aspect. 52.2 *Rhopalopsole* sp. 2. Female terminalia, ventral aspect. 52.3 *Rhopalopsole* sp. 3. Female terminalia, ventral aspect. 52.4 *Rhopalopsole* sp. 4. Female terminalia, ventral aspect. 52.5 *Rhopalopsole* sp. 5. Female terminalia, ventral aspect. 52.6 *Rhopalopsole* sp. 6. Female terminalia, ventral aspect. 52.7 *Rhopalopsole* sp. 7. Female terminalia, ventral aspect. 52.8 *Rhopalopsole* sp. 8. Female terminalia, ventral aspect. 52.9 *Rhopalopsole* sp. 9. Female terminalia, ventral aspect.

Rhopalopsole sp. 1
Fig. 52.1



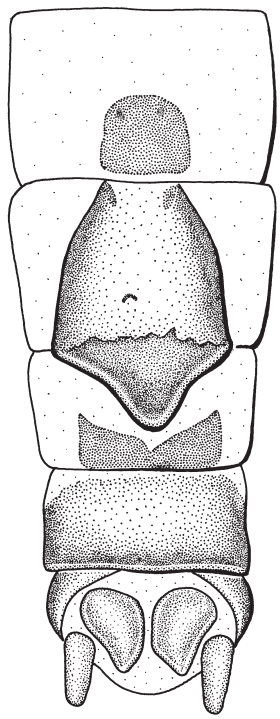
Material examined:
JAPAN: Kanagawa, Yamakita-machi, Yôki-zava, small tributary, 10.5.1996, leg. T. Shimizu.

Rhopalopsole sp. 2
Fig. 52.2



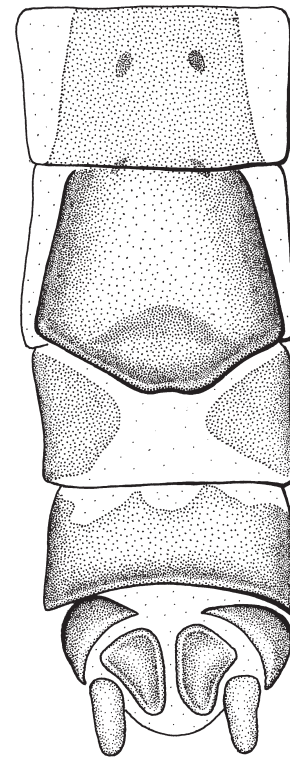
Material examined:
TAIWAN: Taipei County, Kungliao, 200 m, 13.3.1996, leg. I. Sivec & B. Horvat.

Rhopalopsole sp. 3
Fig. 52.3



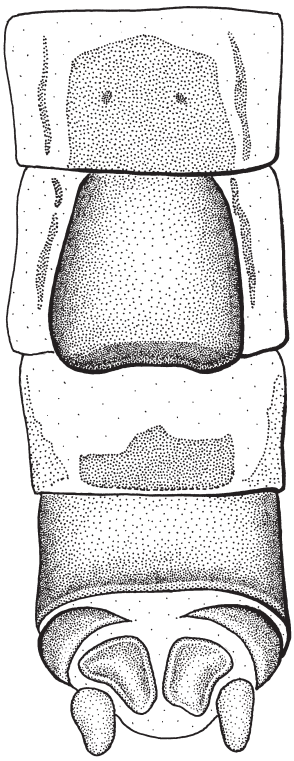
Material examined:
TAIWAN: Nantou County, Nanshan-His, 25.4.1994, leg. T. Shimizu.

Rhopalopsole sp. 4
Fig. 52.4



Material examined:
PHILIPPINES: Palawan, San Rafael, Ulan Guan Batac village, 10.3.1996, leg. A. Zwick.

Rhopalopsole sp. 5
Fig. 52.5

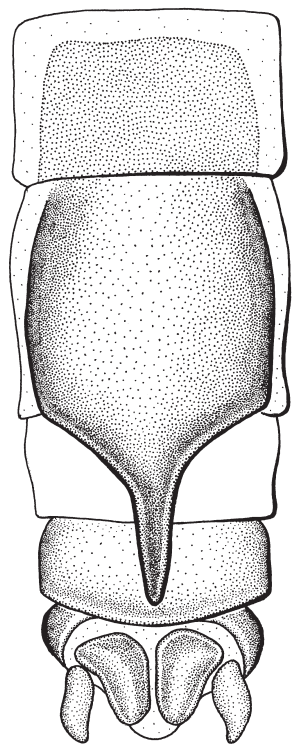


Material examined:

PHILIPPINES: Palawan, San Rafael, Ulan Guan Batac village, 10.3.1996, leg. A. Zwick.

This female is very close to ?type specimen of aparently undescribed species from DEI *Leuctra boettcheria* Navas.

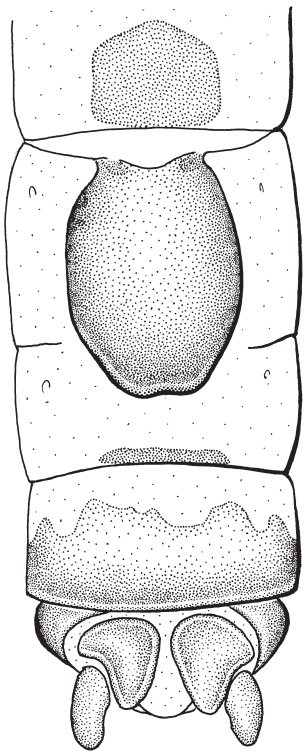
Rhopalopsole sp. 6
Fig. 52.6



Material examined:

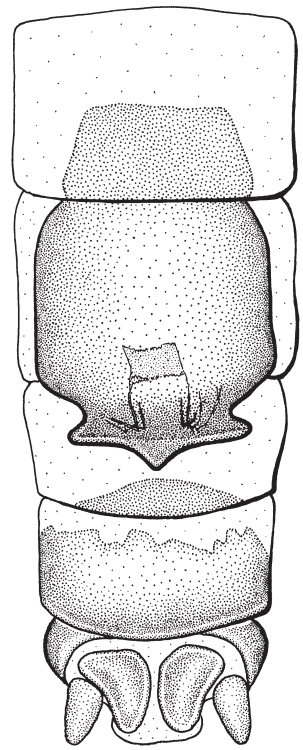
THAILAND: Chiang Mai, Doi Suthep, 14.1.1990 leg Shan Son.

Rhopalopsole sp. 7
Fig. 52.7



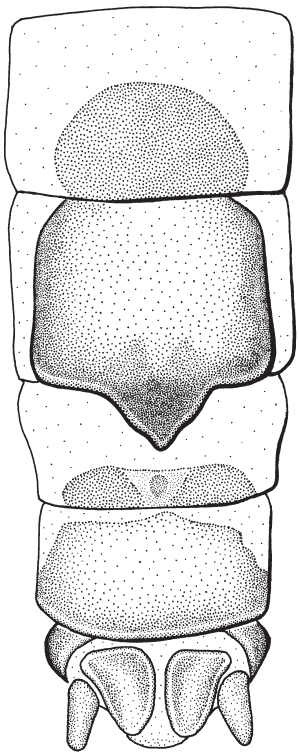
Material examined:
MALAYSIA: Perak, Gunung Jasab, Cameron Highlands, 11.3.1994, leg. H. Sato.

Rhopalopsole sp. 8
Fig. 52.8



Material examined:
CHINA: Hainan Island, Wuzhi Shan, Jan. 1996 leg. Jäch.

Rhopalopsole sp. 9
Fig. 52.9



Material examined:
CHINA: Hainan Island, Wuzhi Shan, Jan. 1996 leg. Jäch.

Rhopalopsole bakeri JEWETT 1975. Described from Singapore and Malaysia. This short plate with an incised border is a very common pattern in the genus. Presently unrecognisable and unassignable to a group. Must await unmistakable association with a male.

Rhopalopsole bicornuta JEWETT 1975. Described from Malaysia. Genital plate resembles that of *Amphinemura*. No other known species of *Rhopalopsole* with this arrangement.

Rhopalopsole elongata (KAWAI 1967) SHIMIZU (2000) transferred *Paraleuctra elongata* to *Rhopalopsole*. Though the types are deposited in Lake Biwa Museum, they are strongly damaged and difficult to observe their features. Nomen nudum.

Rhopalopsole femina KAWAI 1969. A female from the Philippines. The subgenital plate is of a not uncommon type in the genus; needs to await positive association before the name is used.

Rhopalopsole insularis ZHILTZOVA 1975. This is a species of *Perlomyia* (ZHILTZOVA 1995).

Rhopalopsole japonica OKAMOTO 1922. Types losts (fide SHIMIZU) unrecognisable from the description = nomen nudum?

Rhopalopsole levanidovae ZHILTZOVA 1975. This is a species of *Perlomyia* (ZHILTZOVA 1995).

Rhopalopsole mahunkai ZWICK 1973. This a species of *Perlomyia* (ZHILTZOVA 1995).

Rhopalopsole martynovi ZHILTZOVA 1975. This is a species of Perlomyia (ZHILTZOVA 1995).

Rhopalopsole okamotoa CLAASSEN 1940 (new name for *Leuctra abdominalis* OKAMOTO 1922). Placed in *Rhopalopsole* by Kawai who erroneously associated it with a female of *Rhopalopsole*; it is a species of *Paraleuctra*

Rhopalopsole palawana (JEWETT 1958). A female originally described from the Philippines, later reported from Malaysia. A common *Rhopalopsole* type, needs precise association.

Rhopalopsole parva KAWAI 1967. A species of *Perlomyia* (new combination).

Rhopalopsole smithae (NELSON and HANSON 1973) Transferred from *Perlomyia* to *Rhopalopsole* by ZHILTZOVA (1975). This is a species of *Perlomyia*.

Leuctra boettcheria NAVAS. Labelled as type in the DEI (Eberswalde, Berlin) (PETERSEN and GAEDIKE 1968), a female of *Rhopalopsole*, apparently never described or paper not yet traced.

Leuctra dentiloba WU 1973. This could possibly prove to be a species of *Rhopalopsole* of the *shaanxiensis* Group in which the lobes of the subanal probe are opened; only examination of the type will tell.

Leuctra furcospina WU 1973. A species with a two-pointed later projection on tergum 10 of the male. Cannot be assigned to a group presently.

ACKNOWLEDGMENTS

A number of museums and individuals made the material available for this study. They are: P. & A. Zwick (Limnologische Flussstation Schlitz), M. Sartori (Musée Zoologique, Lausanne), Field Museum of Natural History, Chicago, Naturhistorisches Museum, Basel, The Science Museum, California Academy of Sciences, San Francisco, G.N. Nishida (Bernice P. Bishop Museum, Honolulu), W. Mey, Museum für Naturkunde, Berlin, H. Malicky, Lunz am See, Institut für Pflanzenschutzforschung, Eberswalde-Finow (former Deutsches Entomologisches Institut), A.L. Zhiltzova, St. Peterburg, Y. Isobe, Nara, S. Uchida (Lake Biva Museum), D. Dudgeon (University of Hong Kong), P. Chantaramongkol (University Chiang Mai), J.Chanpaiseng (Kasetsart University, Bangkok), K. Damrak, Bangkok, Zoological Institut, Academia Sinica, Beijing, D. Yang (Beijing Agricultural University, Beijing), Y. Du (Agricultural College, Yangzhou University, Yangzhou), B.P. Stark (Mississippi College, Clinton Miss.), I. McLellan, Westport C. Nelson (The Unversity of Tennessee at Chattanooga), P-S. Yang (National Taiwan University, Taipei).

We thanks them all.

POVZETEK

Rod *Rhopalopsole* sodi med številčno skromnejše predstavnike družine Leuctridae med vrbnicami Plecoptera. Rod *Rhopalopsole* je prvi opisal Klápalek s Formoze leta 1912. Pozneje je bilo opisanih še nekaj vrst tega rodu iz različnih različnih območij Orientalne regije kot so Japonska, Filipini, Malezija, Himalaja in Kitajska. V katalogu Illiesa (1966) je navedenih 13 vrst, ki so razširjene predvsem v jugovzhodni Aziji. Kawai (1967) je podal sodobno definicijo rodu in ključ za japonske vrste. Nadaljnja raziskovanja so omejila razširjenost rodu le na Orientalno regijo, medtem ko se je za vzhodnopalearktične vrste izkazalo, da pripadajo sorodnemu rodu *Perlomyia*. Največje število vrst je bilo opisano na Kitajskem. V zadnjih dveh desetletjih se je tam število vrst povečalo še za 12. Na žalost so tako starejši kot novi opisi kitajskih vrst zelo problematični. So izjemno skopi, ilustracije pa marsikdaj več kot shematične, kar ne omogoča zanesljive identifikacije vrste. Poleg tega je tipski material starejšega datuma uničen oziroma izgubljen, medtem ko je tipski material novejših vrst nedostopen. Tudi po večkratnem obisku Kitajske nam tipski oziroma komparativni material ni bil na voljo, tako da smo se pri opisu opirali le na lastni material. Tako ni bilo mogoče narediti celovite revizije rodu, vendar smo se, da bi se izognili še večji zmedi, odločili, da kitajske vrste, ki smo jih preučili, vseeno poimenujemo. Prihodnje študije obsežnejšega materiala, materiala s tipskih lokalitet in preverjanje tipskega material bodo omogočili vzpostaviti red med kitajskimi imeni ter določiti sinonimijo večkrat opisanih istih vrst.

V ostalem materialu je opisanih 8 novih vrst z Japonske, 4 s Tajvana, 2 iz Malezije, 4 s Tajske, 3 iz Vietnama, 1 iz Indonezije,3 s Filipinov in 1 nova vrsta iz Indije. Predstavljene so ilustracije moških in ženskih genitalij posameznih vrst. Poleg imenovanih vrst smo dodali še ilustracije 8 vrst samic z različnih območij, ki predstavljajo samice nekaterih že opisanih vrst ali pa sodijo med do sedaj še ne poznane nove vrste. Dodali smo tudi komentar nekaterih imen vrst, ki jih v naši študiji nismo imeli na voljo oziroma so njihovi opisi nezadostni za uspešno identifikacijo vrste.

61 vrst vsekakor ni končno število vrst tega rodu. Študij dodatnega materiala in predvsem tipskega materiala s Kitajske bo brez dvoma še povečal število vrst in utrdil imena v tem orientalnem rodu vrbnic.

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