

Australian marsh beetles (Coleoptera: Scirtidae).

5. New species of the genera *Cyphon* (s. str.) and *Papuacyphon* n. gen. from New Guinea

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Abstract

Several North Australian species of genus *Cyphon* belong to the Australasian *erythrinus*-subgroup and are closely related to *C. pavens* Klausnitzer, 1980 and *C. scabridus* Klausnitzer, 1980 from New Guinea. Five new species of the same subgroup are described from Irian Jaya (West New Guinea): *Cyphon alexriedeli* n. sp., *C. curvispina* n. sp., *C. gladifer* n. sp., *C. longelobatus* n. sp., *C. pugionifer* n. sp.

The new genus *Papuacyphon* n. gen. is proposed and distinguished from other *Cyphon*-like genera. It is presently known only from New Guinea. The type species is *P. globulus* n. sp. The other included species are: *P. erectus* n. sp., *P. felix* (Klausnitzer, 1980) n. comb., *P. horribilis* n. sp., *P. klausnitzeri* n. sp., *P. lazarus* n. sp., *P. minax* (Klausnitzer, 1980) n. comb., and *P. mordax* n. sp. A single distinct female is informally described as *Papuacyphon* sp. A. A key to the *Papuacyphon* species is presented.

Key words: Coleoptera, Scirtidae, *Cyphon*, *Papuacyphon*, Irian Jaya, taxonomy, new genus, new species, new combinations..

Zusammenfassung

Mehrere nordaustralische *Cyphon*-Arten gehören zur *erythrinus*-Untergruppe und sind enge Verwandte von *C. pavens* Klausnitzer, 1980 und *C. scabridus* Klausnitzer, 1980. Aus Irian Jaya (West Neu Guinea) werden fünf neue Arten der selben Untergruppe beschrieben: *Cyphon alexriedeli* n. sp., *C. curvispina* n. sp., *C. gladifer* n. sp., *C. longelobatus* n. sp., *C. pugionifer* n. sp.

Die neue Gattung *Papuacyphon* n. gen. wird eingeführt und von anderen *Cyphon*-ähnlichen Gattungen unterschieden. Sie ist gegenwärtig nur aus New Guinea bekannt. Die typische Art ist *P. globulus* n. sp. Die übrigen eingeschlossenen Arten sind: *P. erectus* n. sp., *P. felix* (Klausnitzer, 1980) n. comb., *P. horribilis* n. sp., *P. klausnitzeri* n. sp., *P. lazarus* n. sp., *P. minax* (Klausnitzer, 1980) n. comb. und *P. mordax* n. sp. Ein charakteristisches einzelnes Weibchen wird informell als *Papuacyphon* sp. A beschrieben. Ein Bestimmungsschlüssel für die *Papuacyphon*-Arten wird vorgelegt.

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1 Introduction

There are several studies on marsh beetles from New Guinea but new species turn up every time additional material becomes available. The present study is based on specimens collected by ALEXANDER RIEDEL in Irian Jaya, the Indonesian western part of the island. The paper deals with taxa resembling species of genus *Cyphon* (s. l.) in habitus.

The traditional vague concept of *Cyphon* (s. l.) accommodates a variety of phyletic lines in a poly- or paraphyletic assemblage. In the present study, new species of *Cyphon* in the recently restricted sense (ZWICK 2013a) are described. They belong in the *C. erythrinus*-subgroup of KLAUSNITZER (2005, 2009, 2012) and are close relatives of *Cyphon pavens* Klausnitzer, 1980 and *C. scabridus* Klausnitzer, 1980 (detailed redescription in KLAUSNITZER 2012),

both also from New Guinea. *Cyphon mobula* Zwick, 2013 and relatives from Australia and New Guinea also share important characters with the new species but seem to be more distantly related.

A new genus, *Papuacyphon*, is established for a group of *Cyphon*-like taxa which is presently known only from New Guinea. The new genus includes two species previously described under *Cyphon*, plus six new species herein described. Only adults are known.

Acknowledgements

W. SCHAWALLER (SMNS) is sincerely thanked for the loan of the interesting material. A. RIEDEL (Karlsruhe) is thanked for helpful information on the material which he once collected. B. KLAUSNITZER (Dresden) kindly lent me a paratype slide of *P. minax* and made helpful comments on an early draft. R. RUTA (Wrocław) provided photographs of material he studied and discussed various aspects of my draft. I thank both colleagues and an anonymous referee very much. Significant help by my wife, HEIDE ZWICK, not least proofreading, is gratefully acknowledged.

2 Material and methods

The specimens had been taken mainly by sweeping and beating vegetation. They experienced some maceration through acetic acid that formed from ethyl-acetate vapours during transport (A. RIEDEL, pers. comm.). The beetles had been mounted on cards. They were relaxed, the abdomen extracted and cleared in concentrated KOH over night. The abdomina were then thoroughly rinsed, dissected, and mounted in Euparal on transparent plastic slides. The preparations are pinned with the specimens.

A Wild M5A dissecting microscope and a Leica DMLS compound microscope were used for study, at up to 600×. The compound microscope was equipped with a drawing tube and a Canon EOS 350D camera. Digital images and line drawings were edited with standard software.

The samples were taken before the public availability of GPS-techniques. The precise location of the collecting sites is therefore not always known. Where possible, geographic coordinates are added in square brackets, together with the source of information.

Abdominal segment counts refer to morphological segments not all of which are freely visible. Abdominal sternites 1 and 2 are concealed, 3–7 exposed, 8 and 9 retracted into the abdomen.

The following abbreviations are used: “BL” is the combined body length from the front margin of pronotum to the apex of elytra, excluding the deflexed head. – “BW” is the body width across the widest point of elytra. – “S, T”, accompanied by a figure refer to the sternite or tergite, respectively, with that ordinal number.

All measurements are in metric units. Illustrations show the caudal end at the top (except Figs. 1–3).

The material was borrowed from and is deposited in Staatliches Museum für Naturkunde, Stuttgart (SMNS).

3 Genus *Cyphon*, the *C. erythrinus*-subgroup

3.1 Remarks on species groups

As members of *Cyphon* s. str. the new species exhibit the buttonhole configuration on the lower side of head.

This is an approximately circular gap in the ventrolateral head contour, in front of the raised cone on which the subgenal ridge ends (ZWICK 2013a). In males, sternite 8 is entirely reduced. The penis consists of a basal piece (pala) without trigonium which is replaced by paired movable appendages, the prosthemes (NYHOLM 1972). Alternatively, there may be paired rigid caudal appendages which may be homologous to parameroids, or be new formations. Females possess a brush organ in the duct between bursella and accessory gland (terminology after NYHOLM 2002). Caudally from the bursella is a complex prehensor.

Cyphon is traditionally divided into two species groups. The *variabilis*-group has complex modifications of male tergites 8 and 9 and is monophyletic. The monophyly of the very large *coarctatus*-group still needs to be documented. It is presently defined by a plesiomorphic character expression, the unmodified T8 with developed plate. Formally, the present species belong in the *coarctatus*-group. In the species from Irian Jaya here described T8 and T9 are little sclerotized and not strikingly modified.

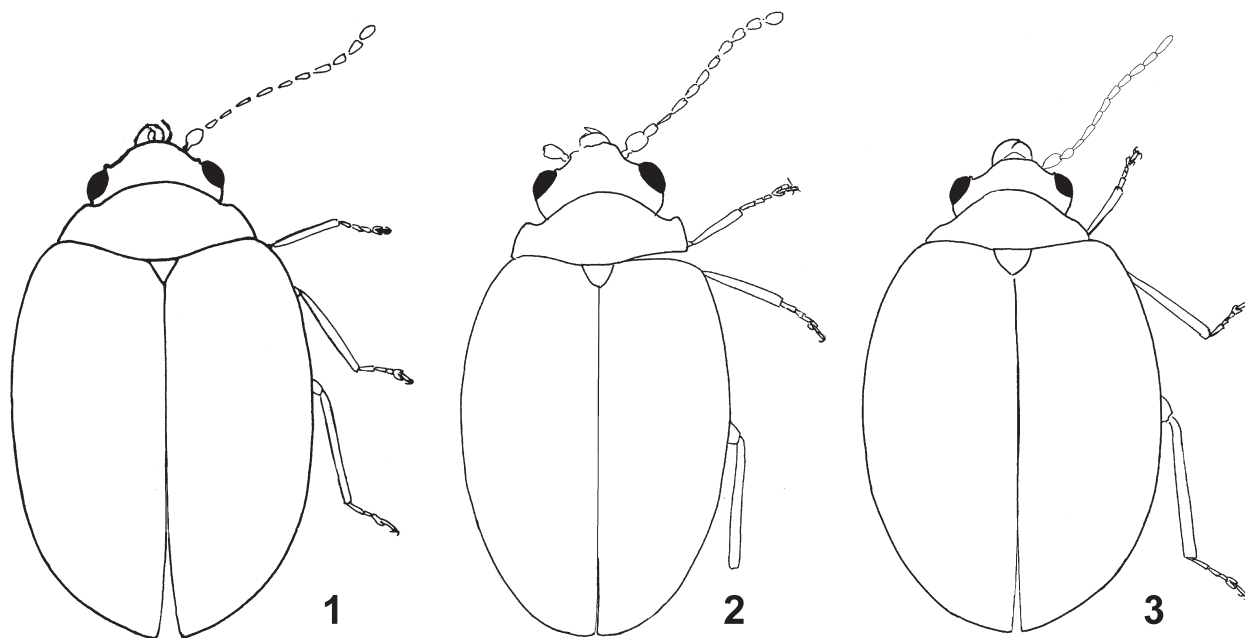
The new species below are part of the *erythrinus*-subgroup (KLAUSNITZER 2005) which has a wide S9 with caudally projecting lobes and a pair of large caudal horns. S9 resembles a large tray or dish in which the other genitalia rest. S9 may be entire and possess a median rib (YOSHITOMI 2009, KLAUSNITZER 2009, 2012, ZWICK 2013a). In the species here described S9 consists of only loosely connected halves which easily separate during manipulation. The tegmen is Y-shaped and consists of an unpaired rod which forks into parameres.

The penis differs between members of the *erythrinus*-subgroup. In *C. erythrinus* Klausnitzer, *C. baloghi* Klausnitzer, *C. simulans* Klausnitzer, and several others, the pala is caudally closed by paired appendages which seem to be movable prosthemes because a median unpaired retractor sinew attaches to them. In the species described here, the pala is closed by a stiff rigid sclerite bar, there is no median sinew, the appendages are rigid. I am presently unable to draw definite limits between the present taxa and various Oriental species with horned S9 which (from the descriptions alone) share some but not necessarily all of the aforementioned characters.

3.2 General description

The present general description is applicable to all *Cyphon* species dealt with below. Characters described here are not repeated in the specific diagnoses. Occasional exceptions are mentioned under the respective species.

Small (BL 2.3–2.9 mm) moderately convex beetles. Shape elongate-oval, elytral margins subparallel over part of their length (Fig. 1). Because of the frail condition the habitus of specimens suffered from dissections which lead to some variation in measurements. In a scatter plot of BW



Figs. 1–3. *Cyphon* and *Papuacyphon* spp., diagrammatic habitus, dorsal view. – 1. *C. alexriedeli* n. sp. 2. *C. curvispina* n. sp. 3. *P. globulus*. – To similar size, not to scale.

over BL, both sexes of all species fall in a single group described by the equation: $BW = 0.677BL - 0.130$ ($R^2 = 0.87$, $n = 44$, males and females).

Habitus differences seeming to distinguish *C. curvispina* (Fig. 2) need confirmation from additional material.

Colour of dorsal side varies from uniformly reddish to uniformly blackish brown, probably with age and maturity of specimen. In incompletely darkened specimens the elytra darken first on a triangle from between the humeri along the elytral suture, including scutellum. Legs about same colour as body. Antennae darker, in light coloured individuals at least the distal half infusate, mostly entirely blackish.

Well developed humeri, wings present. Pronotum narrower than elytra, basal edge sinuous, curved forward on sides. Lateral margins convex, convergent. Front angles blunt but distinctly projecting and embracing head. Recessed middle of front margin straight. Scutellum an equilateral triangle.

Head deflexed, large, transverse, no frontoclypeal suture. Eyes small, separated by a wide frons, in side view distinctly separated from subgenal ridge. Temples distinct.

Labrum transverse, separated from frontoclypeus by a membrane, front margin shallowly bilobed. Mandibles strong, right one with distinct tooth, left with undulating medial edge, molar area smooth, no spinules. Maxillary palpus 4-segmented, terminal segment bottle-shaped, tip of narrow distal half blunt. Labial palpus 3-segmented,

penultimate segment almost cup-shaped, last segment inserted medially on the wide end. Last segment bottle-shaped, distally curved outward.

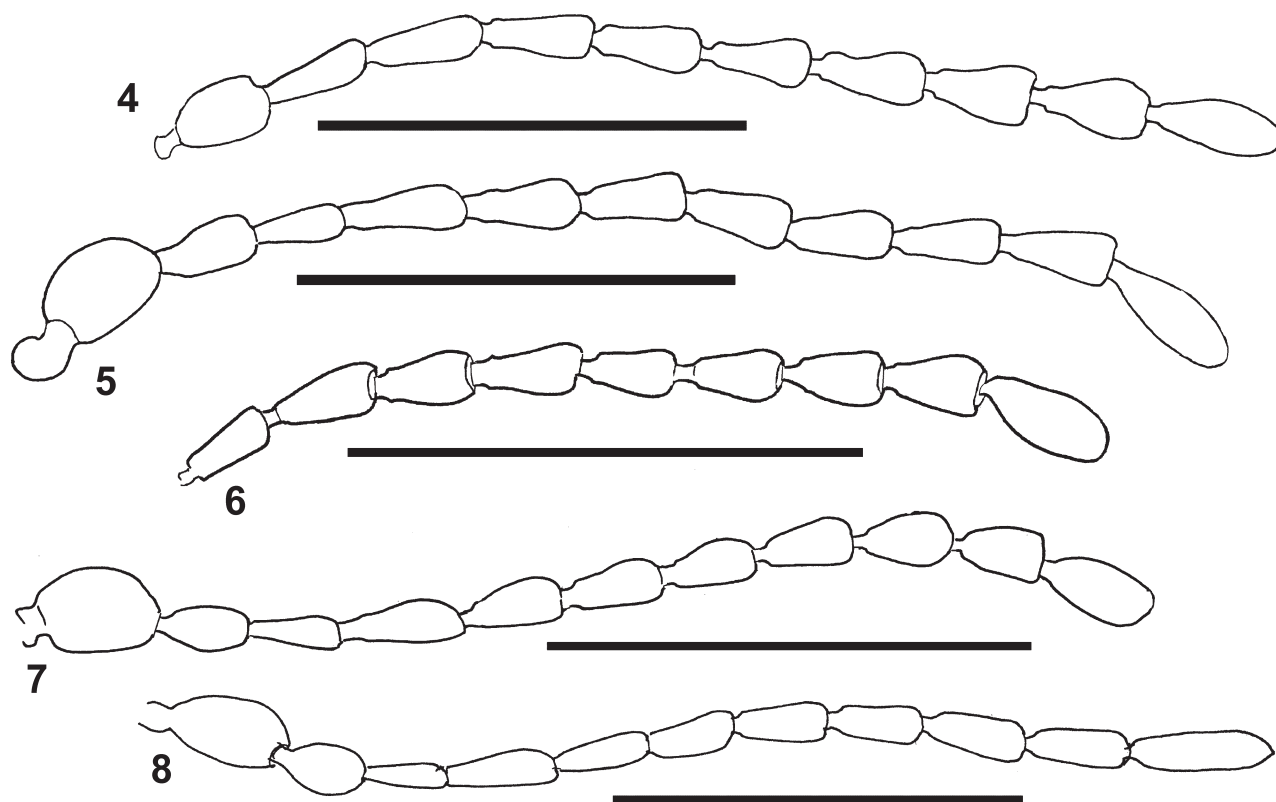
Antennae filiform. Scape asymmetrical, rear edge straight, front edge convex, no keel. Pedicel thinner and shorter. Segment 3 again thinner but only little shorter than pedicel. Flagellum loosely articulated, segment 4 and distal flagellar segments subconical, terminal segment elongate oval (Figs. 4–7).

Legs typical of the family, tibiae with paired external carinae. Hind femora and hind tibial spurs not modified, not enlarged, legs not saltatorial.

Upper surface densely irregularly punctate, with fine semi-erect pilosity. Punctures on head and pronotum granular, elytra with concave punctures. Pilosity directed forward on head, about centrifugal on pronotum, backward on scutellum and elytra. Differences in punctation between species are difficult to quantify.

Underside of body typical of genus, not distinctive. Head sutures exhibiting buttonhole configuration. Prosternal process anteriorly rounded, caudally widened, drop-shaped. Surface flat, pilose. Receiving groove a small transverse rhomboid. Mesoventral process elongate, caudally faintly incised. Discrimen almost complete. Visible abdominal sternites 3–7 unmodified, no sexual dimorphism.

Male. T8 with straight separate apodemes supporting a bare plate. Plate short, wider than long, caudally truncate or excised, with a projecting semi-membranous caudal



Figs. 4–8. *Cyphon* and *Papuacyphon* spp., antenna (scape and scape and pedicel, respectively, missing in 4 and 6). – 4. *C. gladifer* n. sp. 5. *C. alexriedeli* n. sp. 6. *C. pugionifer* n. sp. 7. *C. curvispina* n. sp. 8. *P. globulus* n. sp. – Scale: 0.5 mm.

area covered with fine microtrichia (e. g., Figs. 9, 14, 19). S8 not developed. T9 smaller than T8, apodemes convergent, basally connected by a faint arched sclerite, continuing onto plate. Plate of T9 weakly sclerotized, narrower than T8, caudally rounded, distally with a few fine microtrichia (e. g., Fig. 15). Genitalia and S9 differ between species.

Female (Figs. 61–64). Apodemes of S8 short, anteriorly connected. Apodemes of T9 about twice as long, separate. Segment 9 forms an ovipositor with slender coxites and tubular stylites with apical sensilla. Apodemes very long, with recurrent branchlet near caudal end. Prehensor different between species. Bursella only with a few minute inward projecting structures on surface near caudal end, close to prehensor.

Note. *Cyphon pavens* Klausnitzer, 1980 and *C. scabridus* Klausnitzer, 1980 are the closest relatives of the new species, both differ from all of them. In *C. pavens* the horns insert caudodistally on S9 and are immediately bent mediad, lying in an almost horizontal position. *C. scabridus* has tortuous horns and caudally widened, truncate tips of the penis appendages. None of the new species can be confused with either of the two.

3.3 Species diagnoses

Cyphon alexriedeli n. sp. (Figs. 1, 5, 9–13, 32)

Holotype ♂: Irian Jaya: Jayawijaya, Eipomek-Langda, Oranje-Mts. [139°39'E, 4°30'S: Gazetteer "Papua Insects Foundation"], 3500 m, 23.–24.VIII.1992, leg. A. RIEDEL (SMNS).

Paratypes: 51 ♂♂, 6 ♀♀ with the same data (SMNS).

Etymology

The species is named in honour of ALEXANDER RIEDEL (Karlsruhe), specialist of Curculionidae, who collected abundant material of Scirtidae in Irian Jaya, mainly by sweeping and beating vegetation.

Diagnosis

BL, males 2.60–2.84 mm, mean 2.73 mm (n=9); females 2.60–3.00 mm, mean 2.72 mm (n=6).

Punctures on head separated by about 1.5–2 times their own diameter, much finer on pronotum, obsolete on scutellum. Concave elytral punctures are the largest.

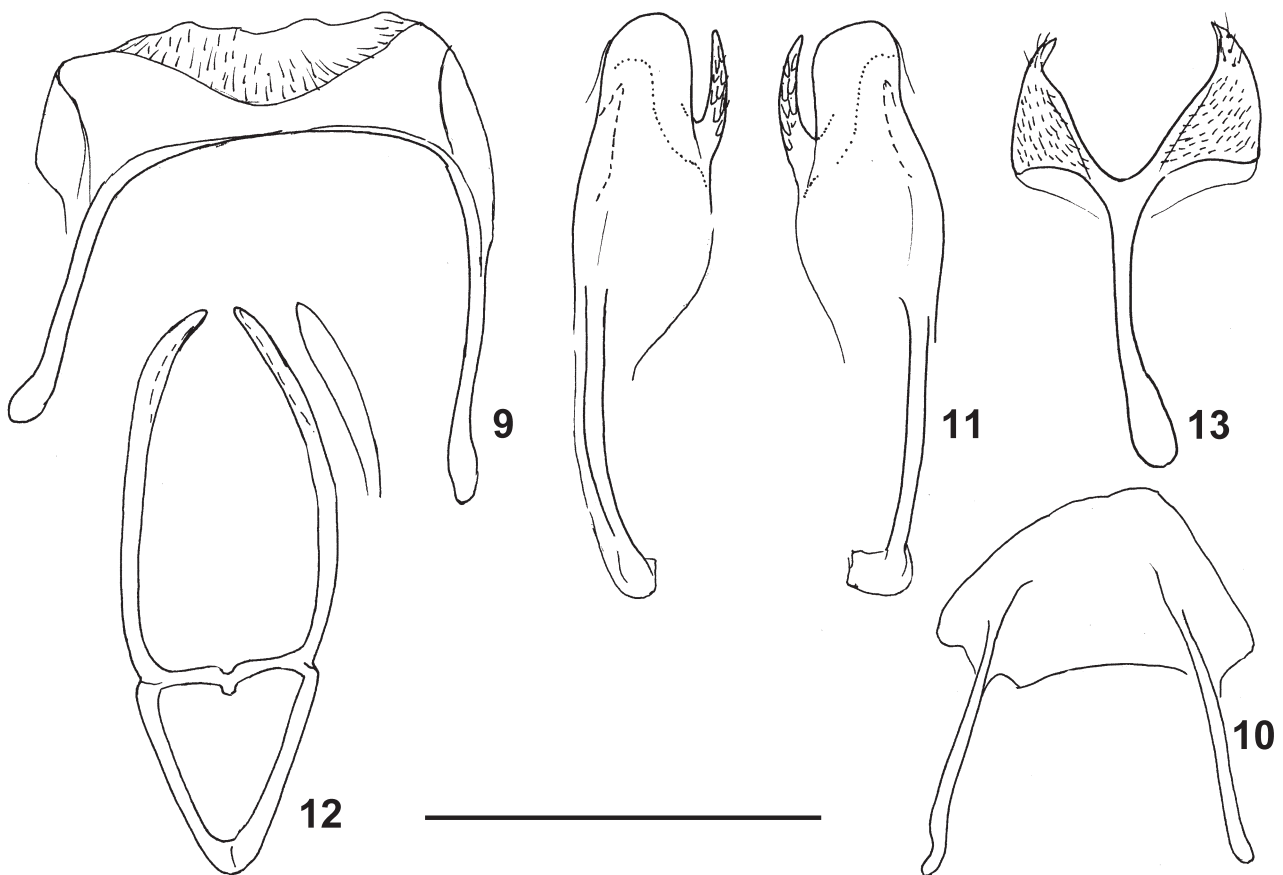
Antenna a little slenderer, flagellomeres less widened caudally than in the other species (Fig. 5).

Male. Plate of T8 strongly transverse, caudally with wide rounded excision, medially extremely short, only about twice as long as width of an apodeme, a faint transverse arched connecting sclerite between apodemes. Soft caudal portion with microtrichia short, wide. T9 not distinctive (Figs. 9, 10). – S9 large (Fig. 11), apodemes faintly convex, anterior end a little enlarged. Plate medially membranous, halves separate easily. Each half ends in a wide tongue-shaped sclerotized lobe that bears on its medial edge a curved horn not extending caudally beyond the lobe. Surface of horn covered with deep elongate excavations, scarred. – Tegmen Y-shaped with unpaired apodeme longer than the sharply tipped triangular parameres which are covered with fine microtrichia and apically some hairs (Fig. 13). – Pala of penis (Fig. 12) triangular, anterior corner rounded, posterior transverse sclerite with short anteromedian extension. Caudolateral appendages about twice as long as pala, slender, gently curved, tips narrowly spatulate.

Female. Prehensor large, approximately bell-shaped (Fig. 32). A short anteromedian rib supports a pair of caudally divergent elongate sclerites with a few spinules. Near their end, at about midlength of the prehensor, occurs a pair of oblique short sclerites. Behind and partly between them is a large sclerite with a pocket-like median area. Caudally a pair of inverted sleeves with dark cap-like front end is seen.

Differential diagnosis

In *C. alexriedeli* and *C. longelobatus* the horns of S9 do not extend back beyond the caudal margin of S9 which is the case in the others. The two species differ in several characters. In *C. alexriedeli* the horns are on the medial edge (Fig. 11), in *C. longelobatus* they are on the external edge of the half plates of S9 (Fig. 29). The penis of *C. longelobatus* is exceptionally narrow and long, the caudolateral appendages are about 3 times as long as the narrow pala; the tegmen is also different (Figs. 30, 31). Prehensor distinctive, the central pocket-like area is unique.



Figs. 9–13. *Cyphon alexriedeli* n. sp., male genitalia. – 9. T8. 10. T9. 11. S9. 12. Penis with detail of apex of caudolateral process. 13. Tegmen. – Scale: 0.5 mm.

Cyphon gladifer n. sp.
(Figs. 4, 14–18, 34)

Holotype ♂: Irian Jaya: Jayawijaya, Gn. Elit, 3500 m, 25.–26.IX.1992, leg. A. RIEDEL (SMNS).

Paratypes: 22 ♂♂, 2 ♀♀ with the same data (SMNS). 4 ♂, Irian Jaya: Jayawijaya, w. Gn. Elit, 3300 m, 26.–27.IX.1992, leg. A. RIEDEL (SMNS).

Etymology

A Latin noun in apposition, meaning “carrier of a sword”.

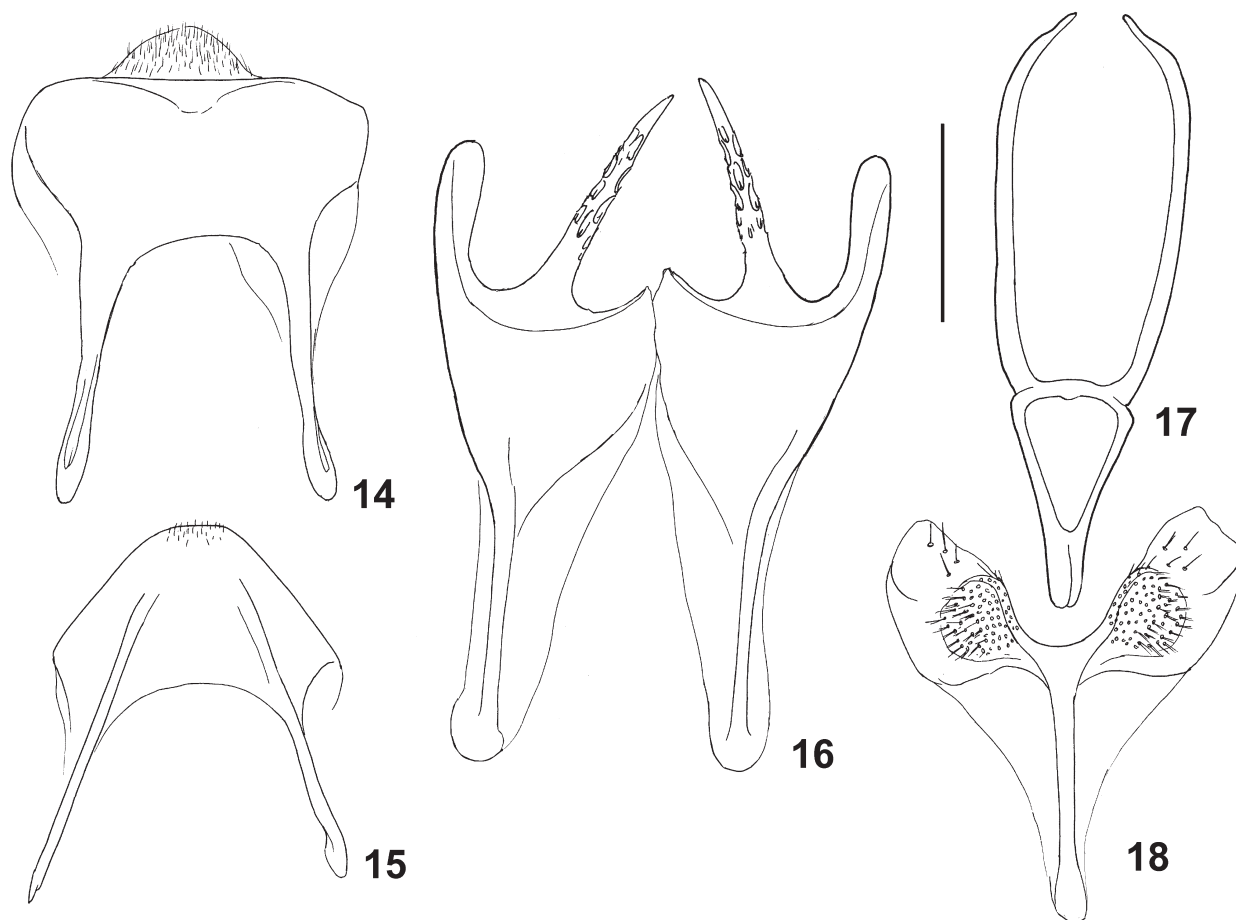
Diagnosis

BL, males 2.28–2.92 mm, mean 2.66 mm (n=10); females 2.68 and 2.92 mm. Distal flagellomeres apically a little wider than in *C. alexriedeli* (Fig. 4). Punctuation of dorsal side similar to that species.

Male. T8 with relatively long plate, the soft caudal part projecting behind the shallowly notched caudal edge (Fig. 14). S9 separates readily into halves (Fig. 16). Each half with long free apodeme surrounded by some transparent membrane. Caudally each apodeme supports a tri-

angular plate and merges with its convex lateral contour. Posterior edge of S9 drawn out into long, narrow, almost finger-like lobes between which the caudal edge is widely and deeply excised. A long straight scarred horn rises on each side, half way between lateral lobe and midline. The horn projects back beyond the lateral lobes. – Unpaired apodeme of tegmen (Fig. 18) longer than the widely forked caudal part consisting of oval lobes. Each lobe divided into an almost circular pilose basal area and a caudal area of similar size which is bare except for a few long isolated setae. – Penis (Fig. 17): Pala an anteriorly narrow long triangle. Caudolateral appendages first curving outward until they are wider apart than the width of the pala, then straight, apices thin, curved mediad, with subterminal sinuosity.

Female. Prehensor very large, bell-shaped, surface of front half with small denticles (Fig. 34). Anteromedian rib located in an anteriorly bilobed, caudally narrowing sclerite. Area behind it bilobed, with paired lateral pockets. Lateral sclerites weak but much extended caudally, with unpigmented caudo-medial notch. Only the caps of the caudal sleeves visible as oblique dark patches.



Figs. 14–18. *Cyphon gladifer* n. sp., male genitalia. – 14. T8. 15. T9. 16. S9. 17. Penis. 18. Tegmen. – Scale: 0.2 mm.

Differential diagnosis

The penis is most similar to *C. curvispina* but the two differ strikingly in the shape of tegmen and S9, the long narrow lateral lobes and long straight horns of S9 of *C. gladifer* being unmistakable. The anterior half of the prehensor has some resemblance to the entire prehensor of *C. pugionifer*, but, among other, the large caudally notched posterior sclerite area distinguishes them.

Cyphon pugionifer n. sp.
(Figs. 6, 19–23, 33)

Holotype ♂: Irian Jaya: Jayawijaya, Gn. Elit, 3500 m, 25.–26.IX.1992, leg. A. RIEDEL (SMNS).

Paratypes: 38 ♂♂, 10 ♀♀ with the same data (SMNS). 1 ♀, Irian Jaya: Jayawijaya, Langda, 2100–2300 m, 27.–28.VIII.1992, leg. A. RIEDEL (SMNS).

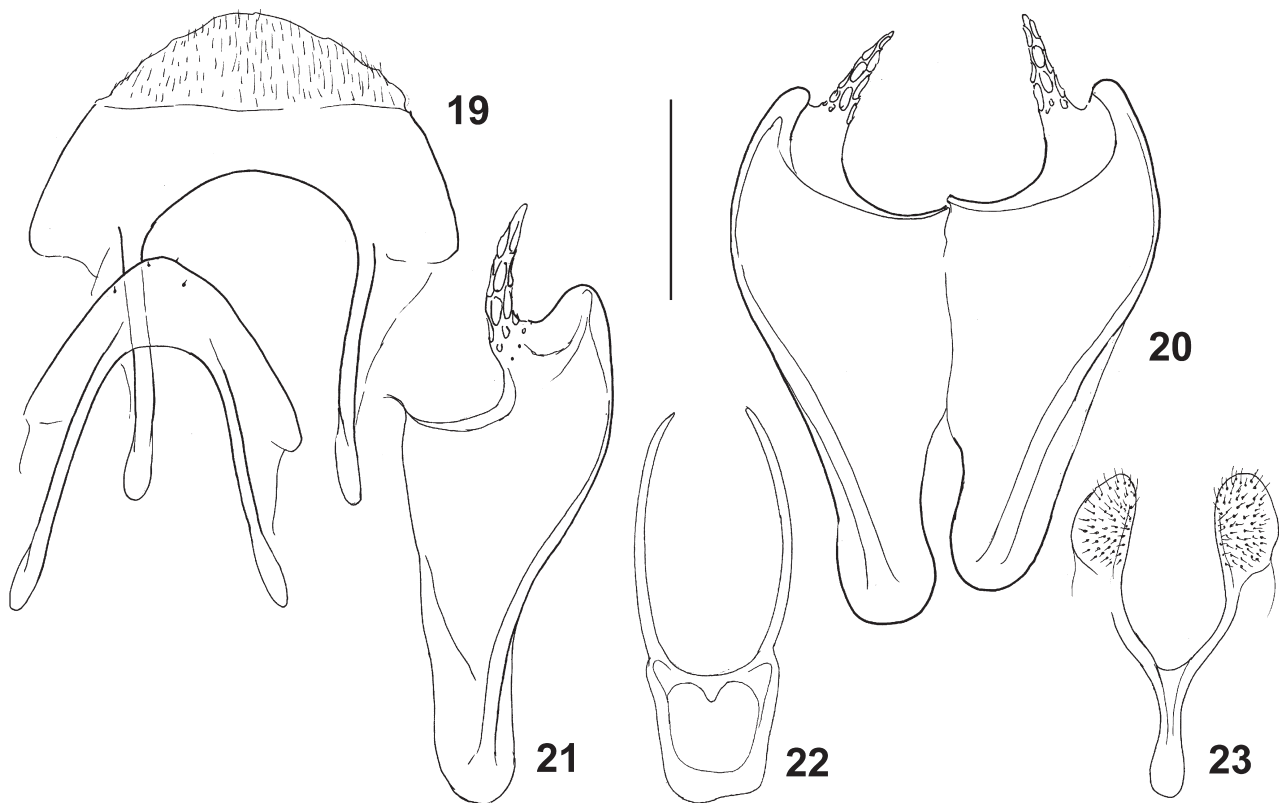
Etymology

A Latin noun in apposition, meaning “carrier of a dagger”.

Diagnosis

BL, males 2.28–2.40 mm, mean 2.3 mm (n=10); females 2.36–2.52 mm, mean 2.43 mm (n=6). Antennae (Fig. 6) shorter and appearing more massive than in *C. alexriedeli* and *C. gladifer*. Punctuation coarser and denser than in the other species, granules on head separated by little more than their own diameter. Punctures on pronotum finer, those on scutellum still finer but granular. Concave elytral punctures hardly larger than punctures on head.

Male. T8 and T9 mushroom-shaped, border between sclerotized basal and soft distal portion of plate of T8 straight (Fig. 19). S9 large, calyx-shaped (Fig. 20), anterior third divided by a narrow notch separating two wide rounded lobes into which the apodemes are embedded. Caudally, the apodemes blend into the lateral contour. Halves of S9 remain mostly connected. Their caudal lobes are short, shoulder-like, separated by a shallow notch from the horns between which the caudal margin of S9 is deeply excised. Depending on angle of view the scarred horns appear straight (Fig. 20), or gently curved outward-



Figs. 19–23. *Cyphon pugionifer* n. sp, male genitalia. – 19. T8 (top) and T9, superimposed. 20. S9. 21. Half of S9 under different angle of view to show curvature of spine. 22. Penis. 23. Tegmen. – Scale: 0.2 mm.

upward (Fig. 21). Although the horns are short they project far beyond the lateral lobes of S9. – Tegmen Y-shaped, the unpaired apodeme shorter than the forked distal portion, lobes oval, finely pilose (Fig. 23). – Pala (Fig. 22) almost square, anterior edge little narrower than the caudal sclerite with short anteromedian extension. The long thin curved appendages on the sides are about twice as long as the pala.

Female. Prehensor (Fig. 33) about box-shaped, antero-medial rib connected to a large entire sclerite beset with asperities. Bilobed front margin of said sclerite spinose, sides shorter than middle. Lateral sclerites near midlength faint, small. Posterior main sclerite caudally bilobed, each lobe pocket-like. The very short and wide sleeves lie behind the sclerotized area, their caps look comma-like.

Differential diagnosis

The short caudal lobes and horns of S9, the approximately square pala, and the simple oval lobes of the tegmen immediately identify male *C. pugionifer*. Females are distinguished by the compact prehensor with well defined bilobed front and rear edges. The coarse punctation of the head in combination with small body size separates *C. pugionifer* from its congeners and supports the association of the coexisting sexes.

Cyphon curvispina n. sp.

(Figs. 2, 7, 24–28)

H o l o t y p e ♂: Irian Jaya: Jayawijaya, Emdoman-Okloma, 1660–2000 m, 16.IX.1992, leg. A. RIEDEL (SMNS).

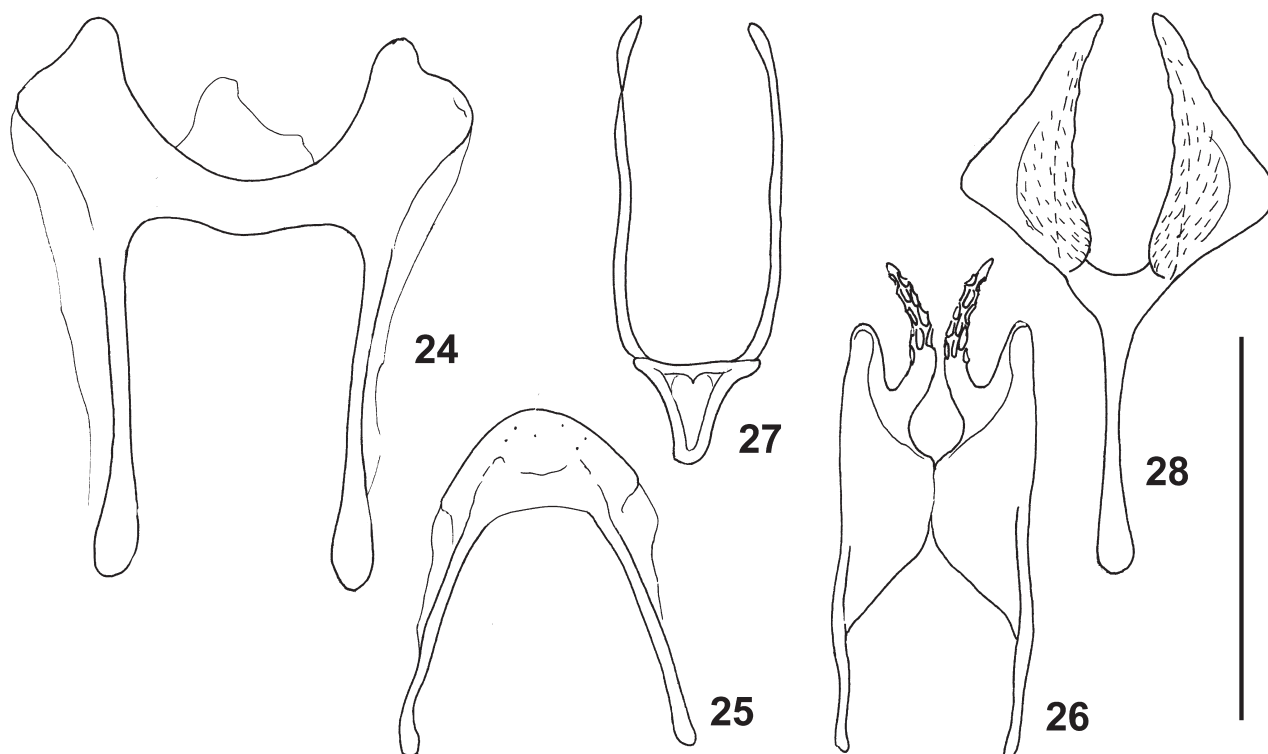
Etymology

A Latin noun in apposition, meaning “curved spine”.

Diagnosis

BL 2.56 mm. Elytral margins gently convex over entire length (Fig. 2), body appears more oval than in the other species. Punctuation finer than in the other species, very fine on elytra. The single specimen is entirely reddish. Antenna (Fig. 7) generally similar to *C. alexriedeli*, except penultimate segments almost drop-shaped, with more rounded sides.

Male. T8 remarkably wide, sides drawn out, bilobed, a wide and deep caudal notch present (Fig. 24). T9 (Fig. 25) as for genus. Sides of S9 parallel, anterior ends of apodemes free, caudally continued along the straight outer edge (Fig. 26). Between the short caudolateral lobes is a deep U-shaped notch from the medial face of which originate two long, strongly outwardly curved scarred horns. – Unpaired base of tegmen (Fig. 28) a little longer than the



Figs. 24–28. *Cyphon curvispina* n. sp., male genitalia. – 24. T8. 25. T9. 26. S9. 27. Penis. 28. Tegmen. – Scale: 0.5 mm.

elongate-triangular caudal parameres, each with a crescent-shaped median area covered with fine microtrichia. – Penis (Fig. 27) with small triangular pala with concave sides. The caudolateral lobes curve basally outward, are then parallel and much farther apart than width of the pala. Apices narrowly spatulate, bent slightly mediad.

Female. Unknown.

Differential diagnosis

The medially short deeply notched T8, the triangular parameres and the triangular pala resemble *C. alexriedeli*. However, the two species differ in details of the same structures, in habitus, and most strikingly in the very different S9.

Cyphon longelobatus n. sp. (Figs. 29–31)

Holotype ♂: Irian Jaya: Jayawijaya, Wamena, Jiwika, 2300 m, 29.IX.1992, leg. A. RIEDEL (SMNS).

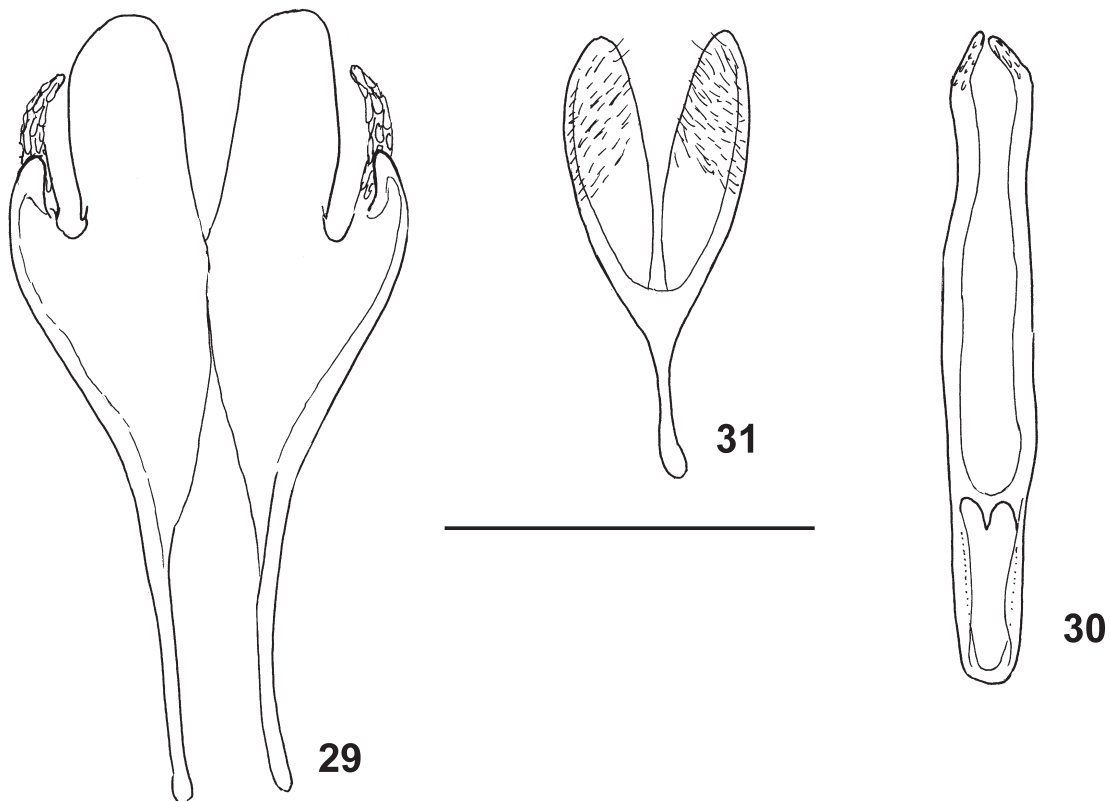
Etymology

A Latin adjective, meaning “with a long lobe”, describing the remarkable caudal lobes of S9.

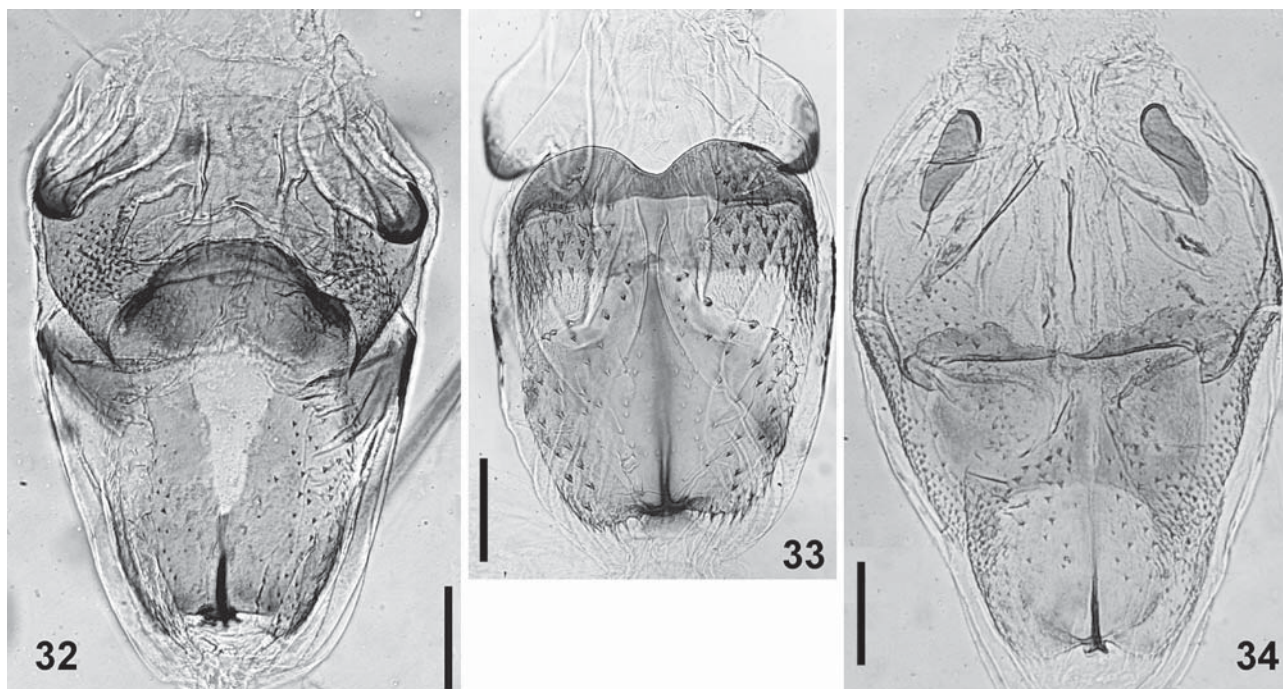
Diagnosis

BL 2.40 mm. Resembles *C. gladifer* in shape and punctuation, slenderness of antennae intermediate between that species and *C. alexriedeli*. Chocolate brown, sutural space in anterior third reddish brown.

Male. T8 and T9 poorly sclerotized and unpigmented, only the apodemes distinct. Apodemes of T8 nearly parallel, plate large, transverse, caudally shallowly excised. Apodemes of T9 strongly convergent, plate not even half as wide as T8, its caudal margin semicircular. S9 calyx-shaped, slender, sides curved, the bare front ends of apodemes close together (Fig. 29). Halves of S9 medially touching but not firmly connected. Medially located caudal lobes long, almost twice as long as wide at base, caudally rounded. A deep narrow notch separates the lobe from the base of the curved scarred horn on the outside. –Parameres oval, caudally pilose (microtrichia, Fig. 31),



Figs. 29–31. *Cyphon longelobatus* n. sp, male genitalia. – 29. S9. 30. Tegmen. 31. Penis. – Scale: 0.5 mm.



Figs. 32–34. *Cyphon* spp., female prehensors. – **32.** *C. alexriedeli* n. sp. **33.** *C. pugionifer* n. sp. **34.** *C. gladifer* n. sp. – Scale: 0.1 mm.

longer than the unpaired apodeme of the tegmen. – Penis long and very narrow, pala elongate rectangular with rounded corners. Caudolateral processes distally a bit sinuous, medially bent apices spinulose (Fig. 30).

Female. Unknown.

Differential diagnosis

The genitalia are unmistakable. They resemble only *C. alexriedeli*, and only insofar as the horns of S9 do not extend back beyond other parts of S9. The brownish colour may not be characteristic of the species but indicate that the available specimen is not fully matured.

4 Genus *Papuacyphon*, n. gen.

A small group of stout, convex beetles, at first glance reminiscent of genus *Cyphon* but different from it in many structures. Presently known only from Irian Jaya (West New Guinea).

Type species: *P. globulus* n. sp.

Additional included species: *Papuacyphon minax* (Klausnitzer, 1980) n. comb.; *P. felix* (Klausnitzer, 1980) n. comb.; *P. klausnitzeri* n. sp.; *P. erectus* n. sp.; *P. horribilis* n. sp.; *P. mordax* n. sp.; *P. lazarus* n. sp.

4.1 Generic diagnosis

Small (2.3–3.5 mm body length) marsh beetles resembling stout strongly convex members of genus *Cyphon* in habitus (Fig. 3). Front corners of pronotum projecting, pronotal front margin between them recessed (bent down too much to be visible in Fig. 3). From *Cyphon* and the other *Cyphon*-like Scirtidae the new genus differs in the following. Head: the subgenal ridge ends freely, there is no buttonhole (ZWICK 2013a); the mandibles are symmetrical, both toothed. No antennal sulcus. Scape unmodified, basal flagellomere at best little shorter than pedicel. Prosternal process blade-like ending in an elongate plate resembling a slender drop. Receiving mesosternal groove long, anteriorly open, U-shaped. Mesosternal process between middle coxae slender, caudally finely excised. Male between S9 and the penis above it with a complex sclerite (uncifer) carrying caudal styli and lateral hooked movable appendages. S8 distinct. Female with anteriorly connected apodemes of the unusually wide S8 and a folded sclerotized sleeve through which the ovipositor passes. With complex prehensor, without brush organ. Gonocoxae very long and narrow.

4.2 General description

Characters described in the general description concern all species, unless differently stated. They are not repeated in the diagnoses.

Stout, oval, body sides strongly rounded, dorsal face convex. Reddish brown, head and margins of pronotum often lighter, reddish, no other pattern. Appendages yellowish. Long pilosity arises from very fine granulous punctures on head, from a little larger granulous punctures on pronotum and scutellum, and from normal punctures on elytra. Punctuation irregular.

Head short, transverse, eyes small, in dorsal view inner edges converging forward, distance between anterior inner corners of eyes 0.52 mm, at a total head width of 0.74 mm across eyes. Labrum transverse, front edge rounded. A fine crest coming from the eye runs above the antennal insertion and connects to the lateral border of the frontoclypeus which projects forward beyond the antennal base.

Antenna (Fig. 8) slender, scape enlarged, longer than distance between antennal insertion and inner margin of eye, a sharp anterior edge only in distal half. Pedicel smaller, drum-shaped. Basal flagellar segment much thinner but as long or even a little longer than segment 2. More distal flagellar segments about 2.5 times as long as apically wide, base a little narrower than apex. Segments 4 and 11 are longer than the others, segment 11 is longest.

Mandibles symmetrical, with distinct subterminal tooth. Maxillary palpus with bottle-shaped terminal segment, distal half thin and slender. Terminal segment of labial palpus large, bean-shaped, inserted terminally on penultimate segment but standing at right angle to it.

Pronotum strongly transverse, rear edge regularly rounded, rear angles marked but blunt, sides converging anteriorly towards front angles to the inside of which the front edge of pronotum is a little excised which renders the blunt angles distinct.

Scutellum an equilateral triangle. Elytra short and wide, with barely marked humeri, side edges rounded, no striae.

Legs short, tibiae with paired keels on outside, hind legs not saltatorial.

Ventral face. Gular suture distinct, continued by a raised fold alongside the outer border of the maxilla. The subgenal ridge runs towards this longitudinal suture but remains narrowly separate from it. However, there is no distinct gap, no buttonhole (ZWICK 2013a).

Prosternal process narrow, bare, its terminal plate elongate, narrow, widening rearward to about two-thirds of its length, then again restricted in a regular parabolic curve, with fine marginal ridge. Mesosternal groove long, U-shaped, well marked, reaching back to between middle coxae. The groove is anteriorly open, not separated from

the vertical plicae in front of it on the declivous front of mesosternum. Mesosternal process narrow, elongate, caudally finely divided. Discrimen on metaventrite almost complete.

Male. T8 little sclerotized, transverse, apodemes continue onto plate, straight. Apodemes connected by the angled antecosta of T8, free parts of apodemes longer than plate. Plate covered with microtrichia in a transverse band caudally from the diffuse end of the apodemes, and on a triangular patch between the apodemes. The areas between the microtrichia and the antecosta are less sclerotized than the rest and appear as two round transparent windows. A subterminal strip in front of caudal edge completely bare. Edge with sparse fringe of socketed fine setae and a microtrichial pecten (Fig. 39) (ZWICK 2013b). S8 triangular, large, only the unpaired apodeme and two strips diverging from it towards two caudolateral rounded sclerites with a few setae and a number of fine pores are lightly sclerotized (Fig. 40). T9 soft and pale, narrower than T8 but plate longer, its antecosta indistinct, apodemes only half as long as the bare plate. S9 consisting of two apically pilose lobes which differ in shape between species (e.g., Figs. 35, 45, 56). There is no visible front edge, anteriorly the lobes taper and blend with colourless membranes.

Immediately above S9 and directly beneath the penis lies a sclerite of unknown homology which I call the uncifer (Lat., hook-carrier). At each side it carries a movable appendage armed with huge hooks or blades (e.g., Figs. 35, 43, 46). The uncifer also supports a pair of backward directed immobile styles of variable size and shape. The central sclerite of the uncifer varies in shape, extreme variants resemble a long bar whose fine structure resembles a torquate ribbon (Fig. 43) on one hand, and a short oval plate (Fig. 46) on the other hand. In the middle between the styles the uncifer possesses a backward extension of variable shape. The uncifer looks like a dorsal appendage of S9 but the two structures change their relative position when the penis is everted (*P. erectus*, Fig. 50). In *P. horribilis* it seems to connect with the pala of the penis by structures resembling a snap-fastener (arrows in Figs. 55, 57).

Tegmen a short strip-like sclerite bridge dorsally over the penis base. Its sides are drawn out into long wide parameres extending alongside the basal two-thirds of the penis. Shape and armature of the paramere apex provide excellent specific characters.

Penis with elongate pala of different form to which the basal trigonium arms attach. They converge and form a long, slender spine-like trigonium which is gently curved ventrad. Its length is about the same as that of the slender unarmed parameroids.

Female. Segment 8 unusually large and wide. Apodemes of S8 delicate, anteriorly connected by a sclerite arch or transverse bar. Apodemes of T8 about twice as long, those of the ovipositor again about twice as long

(Figs. 61–64). The weakly sclerotized S8 projects medio-caudally, T8 bulges out on the sides. Immediately beneath T8 lies the end gut. It often contains food items and is well visible. Further ventrad sits a voluminous structure between T8 and S8. Sagittal sectiona through segment 8 of *P. globulus* revealed it is a folded telescoped sleeve. In some other species folds in segment 8 exhibit distinctive patterns in dorsoventral view (Figs. 61, 64). Details were not analyzed, for shortage of material.

The ovipositor passes through segment 8, its relation to the sleeve is unknown. Gonocoxae very long and slender, conical, stylites short tubular structures with apical sensilla (Figs. 61, 64).

Prehensor of complex structure. One side of the duct to the bursella seems to be extensible because of numerous concentric or parallel folds (e.g., Figs. 67, 68). Between the folds arises a pair of caudally divergent toothed ridges. Between them raised edges form a delicate oval frame. On the opposite side of the duct lies a sclerite of specific form, as counterpart (Figs. 68–70). Duct from prehensor to bursella with some large and deep circular cuticular ornaments (Fig. 66). Ornaments on bursellar surface itself much smaller, each surrounded by exceedingly delicate radial plicae. There is no brush organ (ZWICK 2013a).

Notes. KLAUSNITZER (1980) described the uncifer and the pilose distal lobes of S9 together as a strongly mod-

ified sternite 9 (S9). In contracted genitalia their superposition and the lack of a visible front edge of S9 indeed suggest this. However, the naturally everted penis of *P. erectus* (Fig. 50) shows that the structures in question shift independently upon eversion.

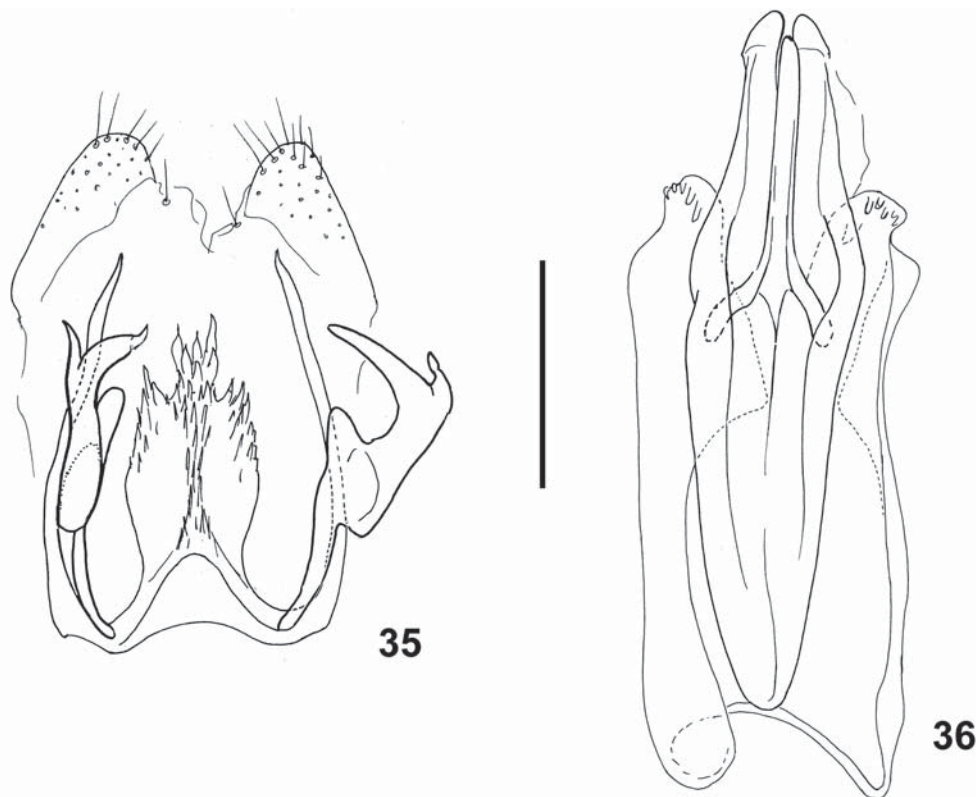
4.3 Species diagnoses

Papuacyphon felix (Klausnitzer, 1980) **n. comb.**

The species was readily identified from the original description. For distinction from the only similar species, *P. klausnitzeri* n. sp., see there. However, homologies suggested in this study necessitate a re-interpretation of the original description. KLAUSNITZER's fig. 18 shows S8, his fig. 19 depicts S9 plus the uncifer, penis and parameroids are shown in his fig. 20.

Papuacyphon klausnitzeri **n. sp.** (Figs. 35, 36)

Holotype ♂: Irian Jaya: Jayawijaya, Diuremna [near Nalca: BREMER 2004; 139°5'E, ~4°2'S: Gazetteer "Papua Insects Foundation"], 1900–2100 m, 9.–11.IX.1992, leg. A. RIEDEL (SMNS).



Figs. 35–36. *Papuacyphon klausnitzeri* n. sp., male genitalia. – 35. S9 with uncifer. 36. Tegmen and penis. – Scale: 0.2 mm.

Etymology

Named in honour of BERNHARD KLAUSNITZER (Dresden), expert of genus *Cyphon*, in recognition of his continuing fruitful life-work on Scirtidae.

Diagnosis

BL 2.3 mm, BL/BW 1.5. Oval, sides regularly curved from front of pronotum to tip of elytra. Very strongly convex. Brown with reddish tinge on head, along margins of pronotum, and on scutellum. Appendages yellow. Sharp granulous punctures on head and pronotum finer than elytral punctures. Punctures on scutellum very fine. Pilosity pale, almost procumbent (possibly an artifact caused by wetting during manipulation).

Male. Median process of uncifer wide, flame-shaped, the lateral horn-like styles long, not armed. The hook-bearing appendage of the uncifer has a knee-shaped extension in continuation of the basal arm, and the large hook has a smaller curved side branch. Pala conical, the slender penis surrounded by the long parameres which have only a few blunt teeth at apex.

Female. Unknown.

Differential diagnosis

P. klausnitzeri resembles the much larger *P. felix* (BL 3.1–3.5 mm: KLAUSNITZER 1980) in many ways. However,

P. felix differs clearly by a much narrower flame-shaped process of the uncifer, and flat ribbon-like styles with a large hook at tip. Also, in *P. felix*, the large slender hook of the appendage to the uncifer is not branched but a pair of short hooks stands in a straight line with the basal arm.

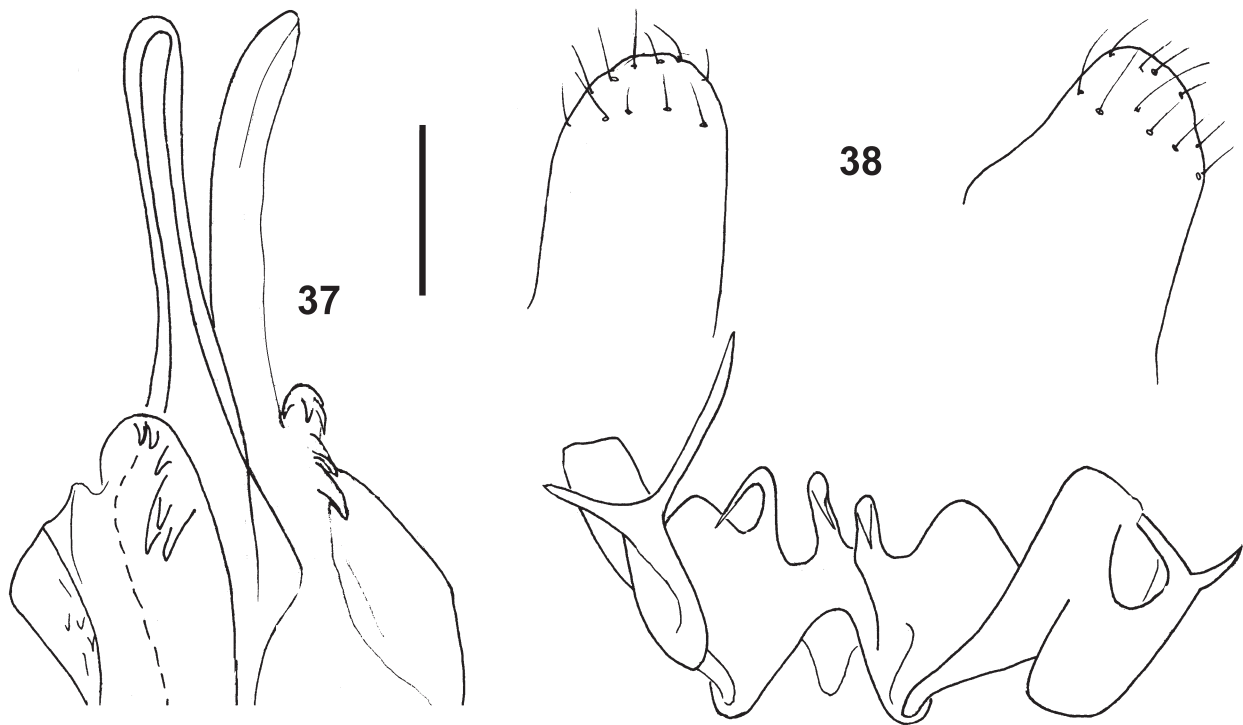
Papuacyphon minax (Klausnitzer, 1980) **n. comb.**

(Figs. 37, 38)

Material studied: 1 paratype ♂, partly damaged microscope preparation: "Neuguinea, Sevre Valley Camp, 3800 m, IX.38, L. J. TOXOPEUS, ex coll. RMNH Leiden" (coll. KLAUSNITZER).

Supplementary description

Male. T8, S8, as for genus. Apodemes of T9 connected by an faint angled sclerite and caudally continued by slightly longer convergent sclerite rods, plate not visible. The widely separate lobes of S9 are caudally rounded (Fig. 38). – Pala of penis pointed, narrow, trigonium a little shorter than the parameroids. Apex of parameres slightly offset from rest, armed with a small number of teeth of variable size (Fig. 37). Details of base of penis and tegmen not well visible. – The uncifer has a short triangular anteromedian process and large wing-like side lobes. The median backward extension and the styles are very short,



Figs. 37–38. *Papuacyphon minax*, male genitalia of a paratype. – 37. Tips of tegmen and penis. 38. Uncifer (lobes of S9 in the background). – Scale: 0.1 mm.

their thin pointed apices are recurved, the acute needle-fine tips point forward (Fig. 38).

Female. Unknown.

Differential diagnosis

The shortness of the hook-shaped backward extension and styles of the uncifer as well as the skinny hooks on the movable appendage are unique.

Papuacyphon globulus n. sp.

(Figs. 3, 8, 39–44, 61, 65)

Holotype ♂: Irian Jaya: Jayawijaya, Langda, 2100–2300 m, 27.–28.VIII.1992, leg. A. RIEDEL (SMNS).

Paratypes: 5 ♂♂, 22 ♀♀ with the same data (SMNS, except 2 ♂♂, 2 ♀♀ in coll. ZWICK).

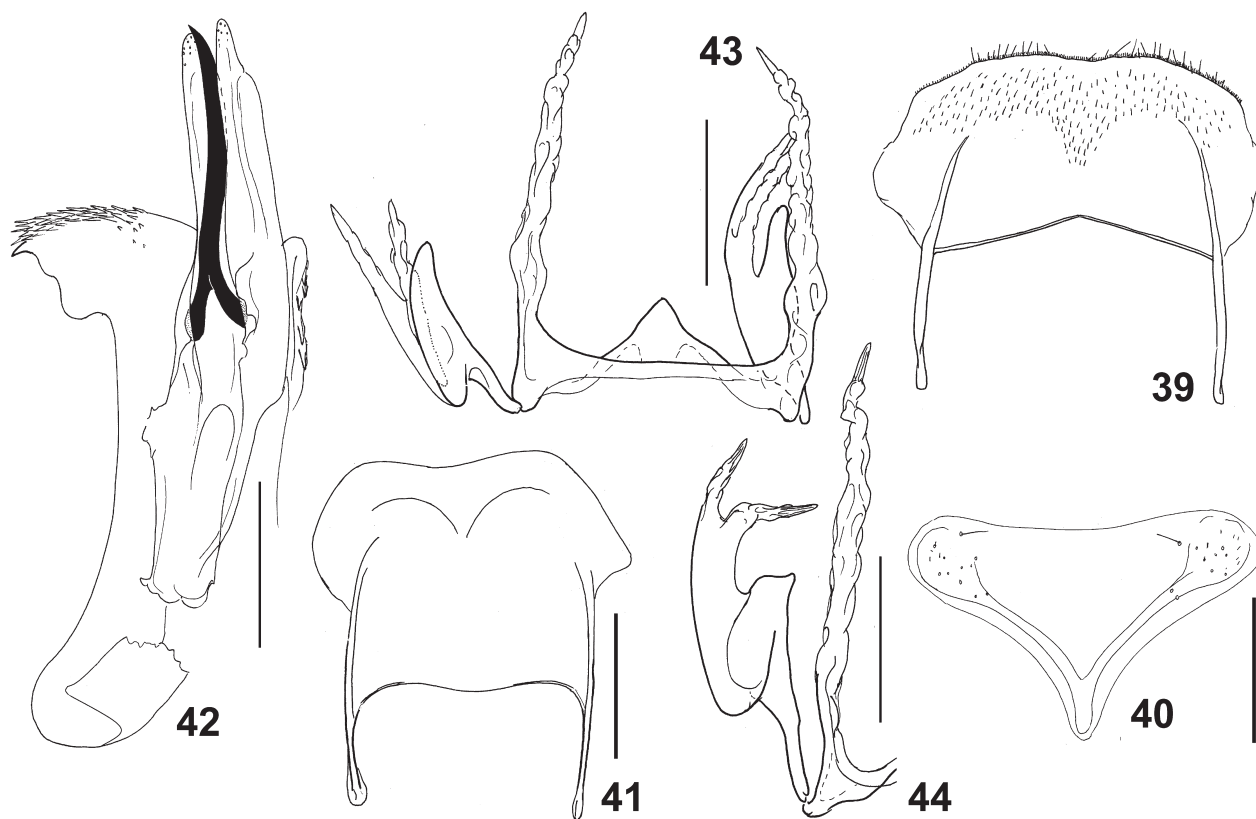
Etymology

The name is a Latin noun (meaning small globe) in apposition, in reference to the strongly rounded body shape.

Diagnosis

BL 2.3–2.6 mm, BL/BW ~1.5. Almost hemispherical, strongly convex, sides of body regularly curved (Fig. 3). Dark reddish brown, head and pronotum lighter, appendages yellowish. Antenna (Fig. 8) thin and slender, flagellar segments subcylindrical, long. Reddish erect long pilosity.

Male. Segments 8 and 9 (Figs. 39–41) as for genus. Lobes of S9 (not illustrated) short, triangular, blunt. – Uncifer (Figs. 43, 44) a long transverse bar, medially with a backward triangular extension. Styles very long, somewhat irregularly curved, surface complexly sculptured, appearing scarred. Movable appendage with two large hooks, both with scarred surface rendering curvature of hooks a bit irregular. – Pala (Fig. 42) a wide semi-tube supporting the slender, spine-like gently sinuous trigonium and the slender unarmed parameroids with conical blunt tips. – The elongate parameres (Fig. 42) end in an axe-shaped piece with downcurved apex with a belt of sharp teeth along its distal edge. A narrow medial paramere lobe is barely visible in ventral view; it is armed with a short row of a few sharp teeth.



Figs. 39–44. *Papuacyphon globulus* n. sp, male genitalia. – 39. T8. 40. S8. 41. T9. 42. Penis and half of tegmen with left paramere, superimposed; trigonium black. 43. Uncifer. 44. Half of uncifer, of another specimen. – Scale: 0.2 mm.

Female. Segment 8 (Fig. 61) relatively narrow, apodemes of S8 connected by a narrow parabolic sclerite loop, only about twice as long as largest distance between them. No special shapes or patterns. Prehensor long and slender, folded areas small, toothed ridges long but extending between the folds only for a short distance. Counterpart sclerite Y-shaped, with long median process (Fig. 65).

Differential diagnosis

The only species where common occurrence of numerous similar specimens permits the definite association of sexes. The axe-shaped paramere tip and the wide uncifer with the long scarred styles differ clearly from the congeners. The long median process of the counterpart sclerite immediately identifies the female.

Papuacyphon mordax n. sp.

(Figs. 45–49, 66)

Holotype ♂: Irian Jaya: Jayawijaya, w. Gn. Elit, 3300 m, 26.–27.IX.1992, leg. A. RIEDEL (SMNS).

Paratype: 1 ♀ with the same data (SMNS).

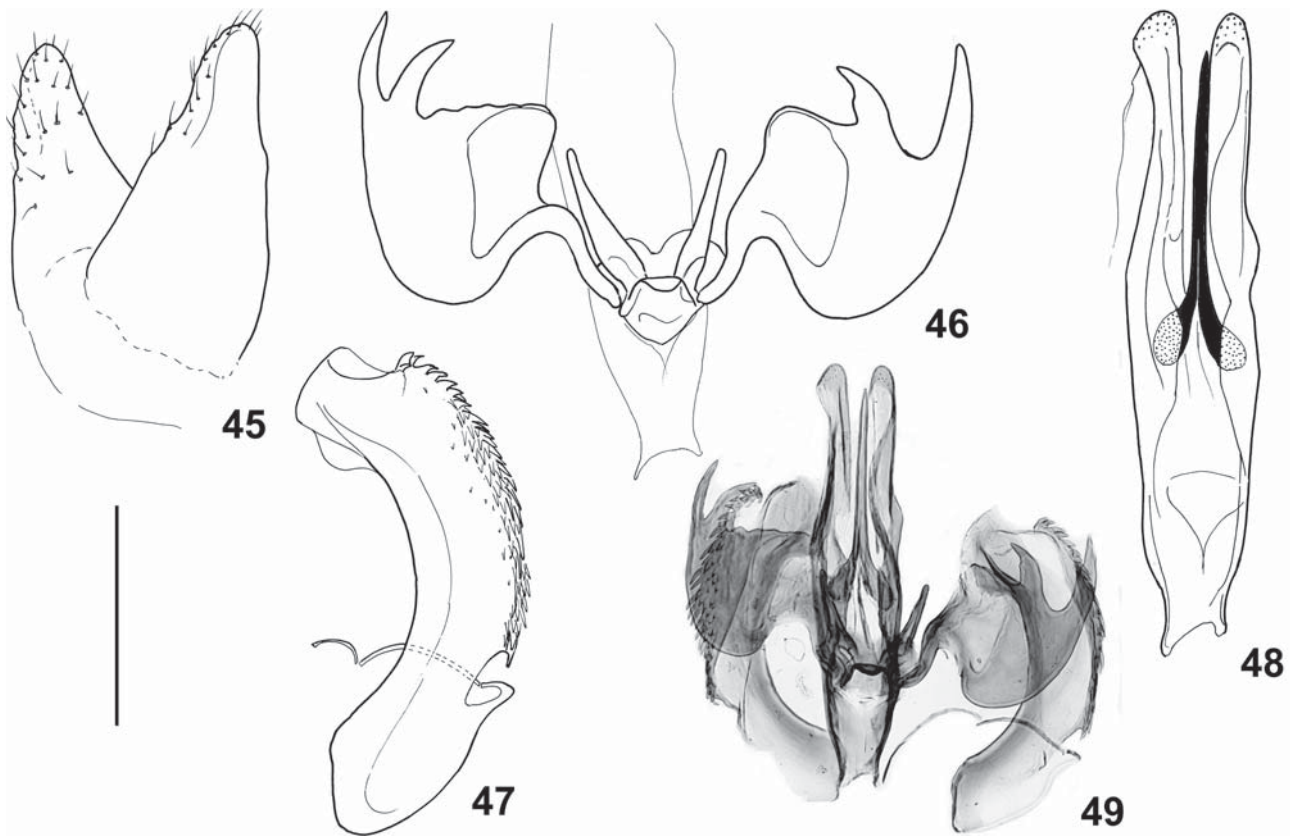
Etymology

The large movable appendages of the uncifer remind one of a pair of beetle mandibles ready to bite. This suggested the name *mordax* (a Latin adjective meaning biting).

Diagnosis

BL 2.60 mm, BL/BW 1.55. Ovate, relatively slender, with regularly arched body sides. Chocolate brown, appendages lighter brown. Pilosity brown, semi-erect, not shaggy.

Male. Lobes of S9 large, relatively narrow and conical, apically pilose (Fig. 45). The uncifer (Fig. 46) is a narrow central sclerite supporting short straight lateral styles and huge movable appendages with two sharp-tipped large hooks resembling a pair of large toothed beetle mandibles. – Pala of penis a semi-tube with concave wide front corner. It supports the simple spine-like trigonium and the slightly longer slender parameroids. At a short distance from their origin they have a dorsolateral swelling or extension, their unarmed apices are broadly rounded (Fig. 48). – The parameres (Fig. 47) are interconnected by a strip-like sclerite loop, the tegmen (torn in Fig. 47). Each paramere is a slender curved sclerite. A shallow notch in its contour



Figs. 45–49. *Papuacyphon mordax* n. sp., male genitalia. – 45. Lobes of S9. 46. Uncifer. 47. Right paramere. 48. Penis (trigonium black, concealed parts of basal arms stippled). 49. Genitalia slide of holotype. – Scale: 0.3 mm (49 not to scale).

separates the simple truncate apex from a long band of mostly very large sharp hooks along the ventral edge.

Female. Segment 8 not distinctive. Apodemes of S8 more than 3 times as long as the distance between them, anterior connection a short bar. Prehensor (Fig. 66) with moderately long ridges with numerous hooks. Counterpart sclerite ending in a pair of narrowly and shallowly separated triangular lobes.

Differential diagnosis

None of the other species has an uncifer with similarly large hooked appendages and straight short styles. The long row of hooks along the parameres is also distinctive. The female is best recognized by the shape of the counterpart sclerite.

Papuacyphon erectus n. sp. (Figs. 50–52, 62, 67)

H o l o t y p e ♂: Irian Jaya: Jayawijaya, Bommela [Bomela: 138°05'E, ~4°39'S: Gazetteer "Papua Insects Foundation"], ca. 1750 m, 30.VIII.–1.IX.1992, leg. A. RIEDEL (SMNS).

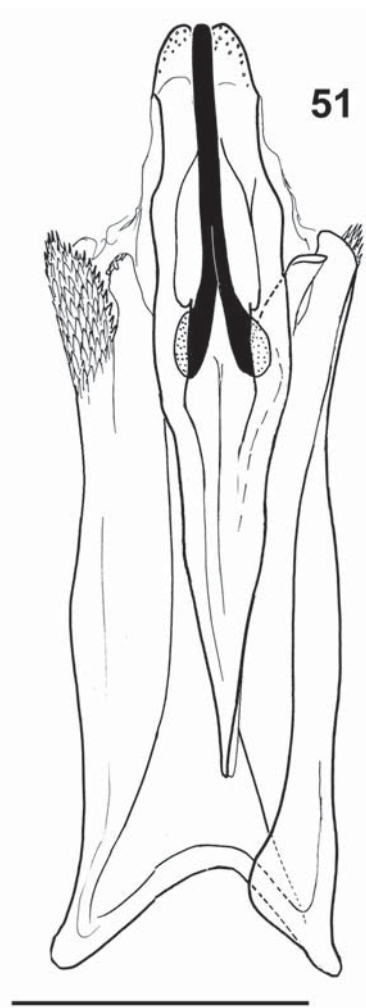
P a r a t y p e: 1 ♀ with the same data (SMNS).

Etymology

The male had naturally everted, erect genitalia to which the Latin adjectival name alludes.

Diagnosis

BL 2.8 mm, BL/BW ~1.5. Brown with reddish tinge, fore body lighter and more strongly reddish, appendages yellow, semi-erect long pilosity brownish.



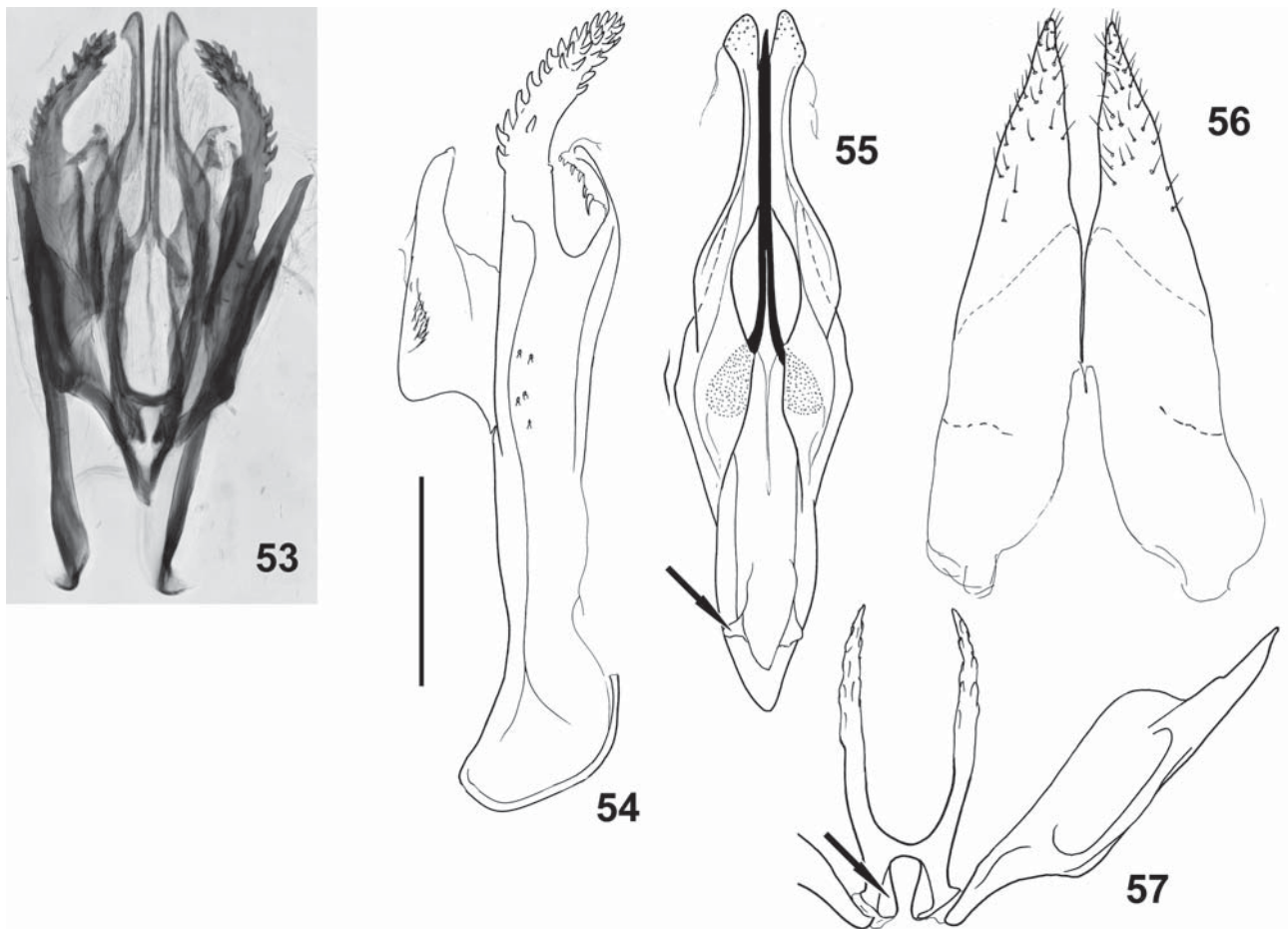
Figs. 50–52. *Papuacyphon erectus* n. sp, male genitalia. – **50.** Genitalia slide of holotype (arrows point at lobes of S9). **51.** Penis (trigonium black, concealed parts of basal arms stippled). **52.** Uncifer. – Scale: 0.3 mm (50 not to scale).

Male. In the specimen with naturally everted genital segments the apically pilose lobes of S9 diverge widely (Fig. 50, arrows), the base is unsclerotized and not visible. – The uncifer (Fig. 52) with a short median triangular extension and long curved and scarred styles. Each movable appendage carries one huge distally faintly scarred caudal hook and a much shorter poorly differentiated one near the articulation. – Penis (Fig. 51) with narrow conical pala. Apex of the straight trigonium blunt. Parameroids wide near base, their outer contour first almost parallel, then a little restricted towards the blunt tips which end level with the trigonium. Inner edge of parameroids concave in basal half, leaving a pale elongate window on either side of trigonium. – Tegmen with narrow basal sclerite strip connecting the long parameres (Fig. 52). Each paramere apically bifid, the slightly shorter medial branch dorsally with a few blunt teeth. The outer branch ends in an approximately conical tip which is dorsally densely covered with triangular scales.

Female. Segment 8 very wide, the straight part of the apodemes before their wide, rounded connection only about 1.5 times as long as the distance between them. T8 forms dark cap-like lateral protrusions (Fig. 62). Prehensor (Fig. 67) very short, the conical toothed ridges barely longer than the folded areas anterolaterally from them. Counterpart sclerite arched, with two minute paramedian projections.

Differential diagnosis

The conical pala resembles, among other, *P. lazarus* n. sp. which also has long curved styles. However, in *P. lazarus* the movable appendages of the uncifer are stout with closely appressed relatively short hooks while in *P. erectus* the same appendages consist essentially of the widely divergent slender hooks. The dark protruding caps of T8 immediately identify the female.



Figs. 53–57. *Papuacyphon horribilis* n. sp, male genitalia. – **53.** Genitalia slide of holotype. **54.** Right paramere, oblique lateral view. **55.** Penis, dorsoventral view (trigonium black, concealed parts of basal arms stippled). **56.** Lobes of S9. **57.** Uncifer (only one movable appendage shown). – Arrows point at components of the suspected holdfast between penis and uncifer. – Scale: 0.3 mm (53 not to scale).

Papuacyphon horribilis n. sp.
(Figs. 53–57, 63, 68)

Holotype ♂: Irian Jaya: Jayawijaya, Gn. Elit, 3500 m, 25.–26.IX.1992, leg. A. RIEDEL (SMNS).

Paratypes: 1 ♂, 1 ♀ with the same data (SMNS).

Etymology

The heavily armed paramere tips suggested the adjectival name, Lat. *horribilis* = terrible, frightening.

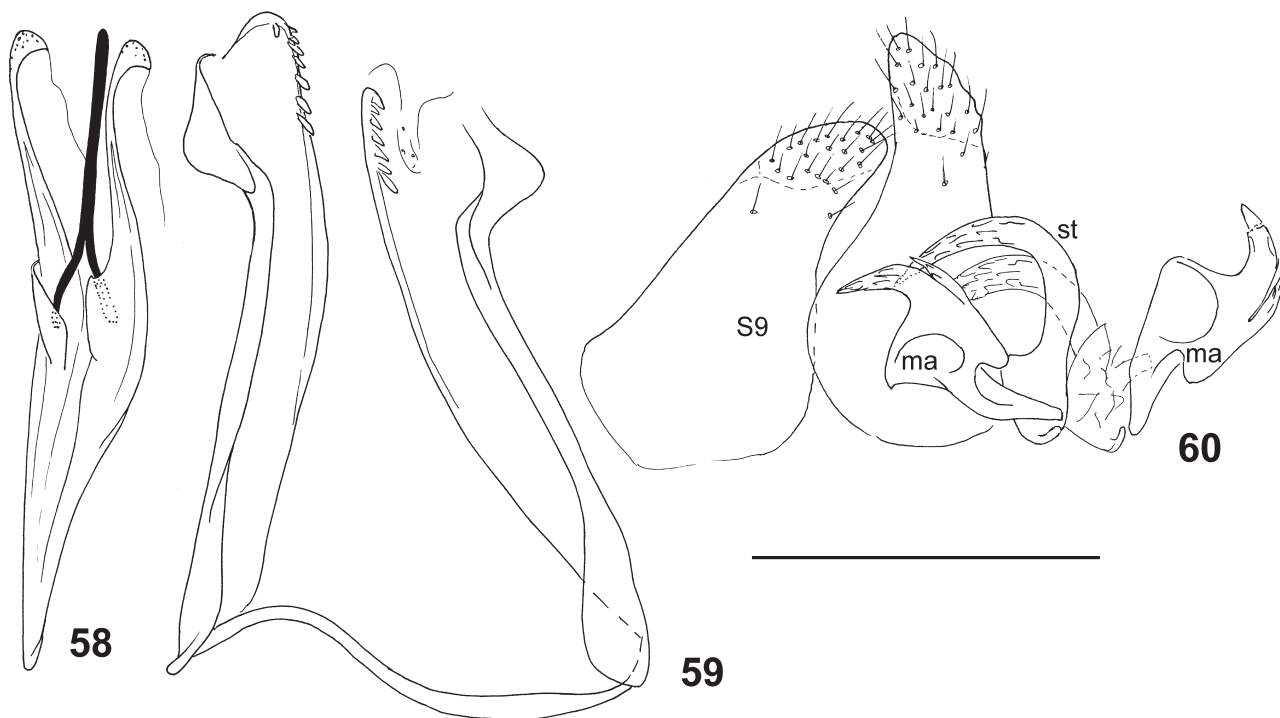
Diagnosis

BL 3.0–3.2 mm, BL/BW ~1.6. More slender and less convex than most congeners, except *P. mordax*. Dark brown, front part of pronotum rufous.

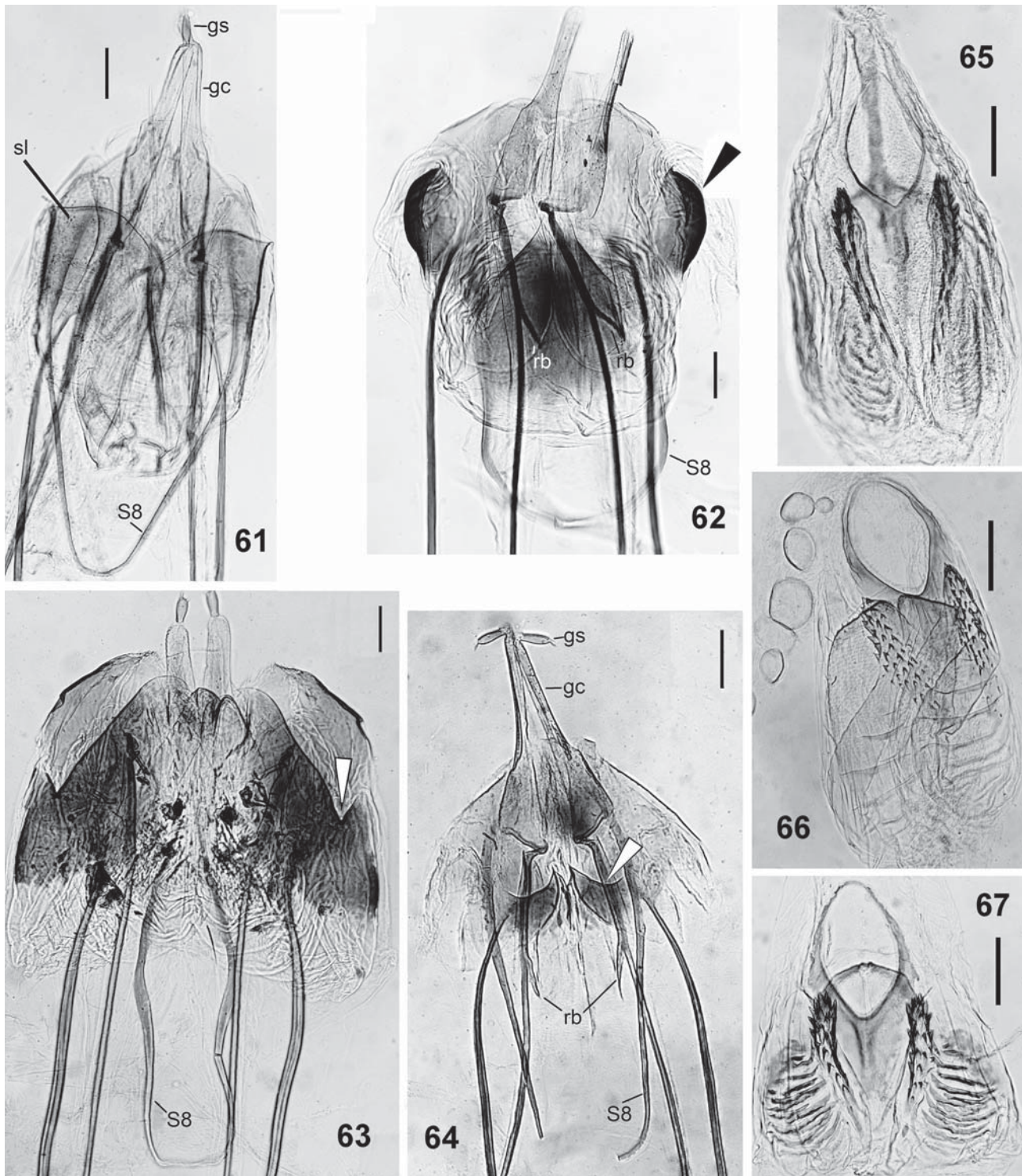
Male. Segment 8 and T9 as for genus, lobes of S9 large, completely separated by a narrow unsclerotized strip, their pilose apices long, pointed (Fig. 56). – Central sclerite of uncifer (Fig. 57) a narrow bridge between the long, gently curved scarred styli. Side parts of central sclerite bent back, the movable appendages articulate at the end. Movable appendage with handle-like base supporting an approximately rectangular slender plate with an outer enforced ridge delimiting the opening of a large straight spine which is faintly scarred. On its dorsal face the central uncifer

sclerite is equipped with a U-shaped raised structure with flange-like outwardly bent sides. The raised structure is opposed to raised flanges on the ventrolateral sclerites of the pala (arrows in Figs. 55, 57). – Penis (Fig. 55) with conical pala which abruptly widens where the basal trigonium arms and the parameroids originate. Trigonium spine-like, long and slender, straight, with sharp tip. Parameroids basally wide and twisted, curving around an oval window next to the trigonium. Distally the parameroids are narrowed to a neck-like section. They end in approximately triangular apices. – Tegmen (Fig. 54) consisting of large parameres basally connected by a narrow dorsal sclerite loop. The wide base narrows to a slender straight bar from which a flag-like ventral blade rises abruptly. The main bar itself divides caudally into a short weak lobe with a few faint teeth and a strong upcurved finger beset with large backward-directed curved teeth over its entire length.

Female. Segment 8 moderately wide, apodemes of S8 about 3 times as long as the distance between them, anteriorly connected by a transverse sclerite. T8 caudolaterally sharply notched (Fig. 63). Prehensor with long and slender toothed ridges. The counterpart sclerite on the opposite side of the duct is a medially divided transverse bar beset with minute denticles (Fig. 68).



Figs. 58–60. *Papuacyphon lazarus* n. sp, male genitalia of holotype. – **58.** Penis, slightly oblique view (trigonium black, concealed parts of basal arms stippled). **59.** Tegmen and parameres. **60.** Lobes of S9 and uncifer (central part damaged), superimposed. – ma = movable appendage; S9 = lobes of S9; st = style. – Scale: 0.3 mm.



Figs. 61–67. *Papuacyphon* spp., females, terminal section of genitalia (61–64), preensors (65–67). – **61.** *P. globulus* n. sp. **62.** *P. erectus* n. sp. **63.** *P. horribilis* n. sp. **64.** *P. lazarus* n. sp. **65.** *P. globulus* n. sp. **66.** *P. mordax* n. sp. **67.** *P. erectus* n. sp. – gc = gonocoxite; gs = gonostyle; rb = recurrent branchlet of ovipositor apodeme; S8 = apodemes of sternite 8; sl = sleeve; arrows indicate details described in text. – Scale: 0.1 mm.

Differential diagnosis

The raised sclerites on the ventral side of the pala on the one hand and the dorsal face of the uncifer (arrows in Figs. 55, 57) on the other hand seem to fit together like some 'click-on'-device or a snap fastener. This probably explains the difficult separation of these structures during dissection. Similar structures seem to occur in the other species but dissections were technically too poor to show details. The unique heavily armed paramere tips and the also unique large blades of the movable appendage of the uncifer dominate the aspect of the undissected male structures (Fig. 53). There is no similar species. The female can be identified by the combination of long toothed ridges and small separate counterpart sclerites.

Papuacyphon lazarus n. sp. (Figs. 58–60, 64)

Holotype ♂: Irian Jaya: Jayawijaya, Eipomek [140°01'E, ~4°25'S, 1800–2100 m: Gazetteer "Papua Insects Foundation"], 19.VIII.1992, leg. A. RIEDEL (SMNS).

Paratype: 1 ♀ with the same data (SMNS).

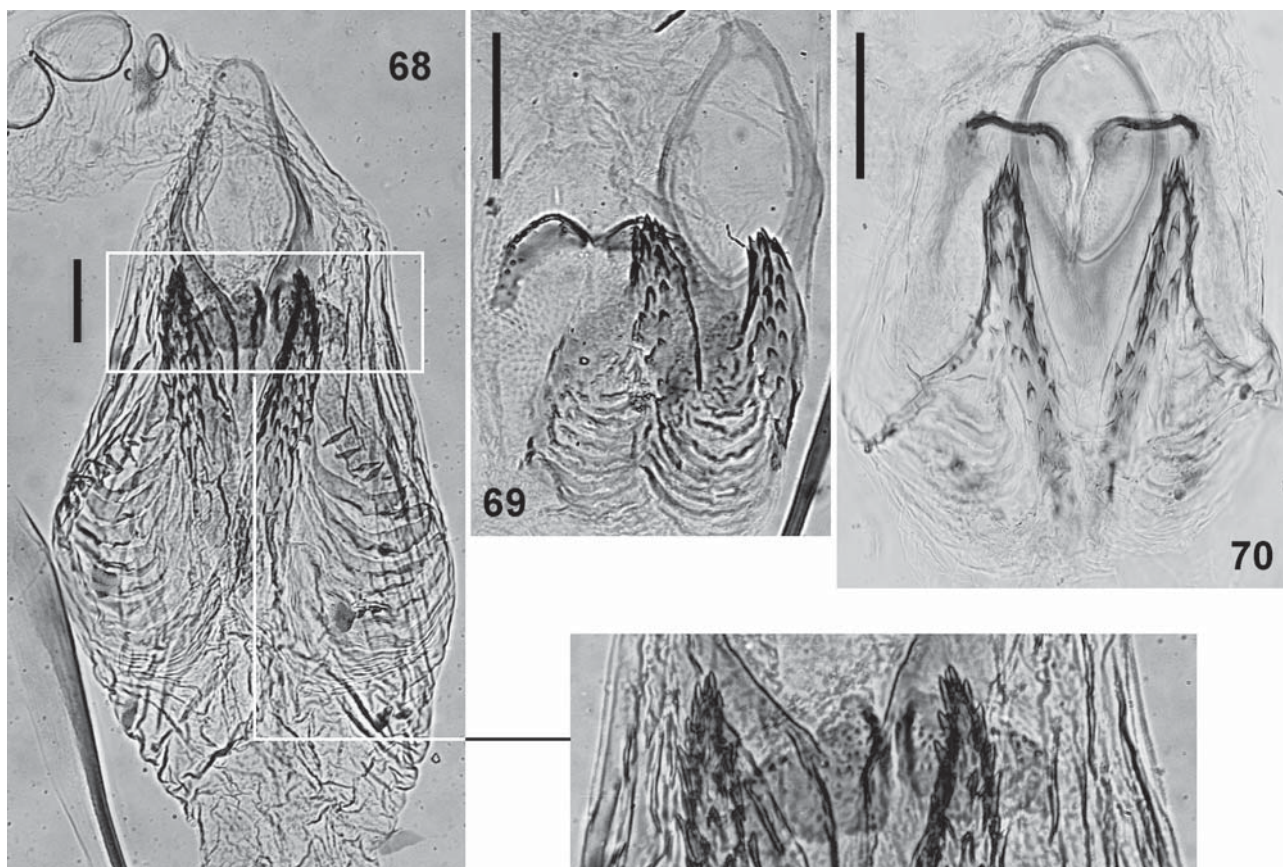
Etymology

The lamentable damaged condition of the uncifer suggested the biblical name, Lazarus. A noun in apposition.

Diagnosis

BL 2.5–2.6 mm, BL/BW ~1.4. Convex, highly domed, in lateral view the dorsal contour is a continuous convex arch. Dorsal side brown, head and edges of pronotum slightly reddish, appendages yellowish. Pilosity semi-erect, long, pale. Head and pronotum with coarse sharply granulous punctation, punctures on elytra normal, barely larger than on forebody.

Male. T8 and S8 as for genus. T9 very soft, unpigmented, only the long apodemes distinct. S9 consisting of two lobes with concave medial edge and tongue-shaped pilose tips (Fig. 60). – Penis (Fig. 58) slender, pala anteriorly narrow, almost pointed. Trigonium and parameroids of similar length, simple, the latter with narrow neck-like section and a small apical cap with sensory pores. – Parameres (Fig. 59) are long sclerites connected by a narrow dorsobasal sclerite. Each paramere apically with a short row of a few teeth along dorsomedial edge. Ventromedial



Figs. 68–70. *Papuacyphon* spp., female prehensors. – 68. *P. horribilis* n. sp. 69. *P. lazarus* n. sp. 70. *P. sp. A.* – Scale: 0.1 mm.

edge more sclerotized, with a knee-like subterminal extension, unarmed. – Uncifer (Fig. 60) damaged during dissection, shape of central portion not known. The styli are strong hooks, almost semicircular. The movable lateral appendages are relatively small. Each carries a strong curved hook to the convex face of which a smaller less strongly curved hook is closely appressed. All hooks with distinctly scarred surface.

Female. Apodemes of T8 about 2.5 times as long as the distance between them, anteriorly connected by a wide arch. Folded sleeve inside segment 8 with a distinctive pair of sharply pointed sickle-shaped structures (Fig. 64). Toothed ridges of prehensor (Fig. 69) very short, a little curved, located immediately behind the small area with concentric folds. Counterpart sclerite a short bilobed sclerite arch, some asperities along edge.

Differential diagnosis

Male similar to *P. erectus* in several details, distinctly different in others, compare under *P. erectus*. No other female exhibits a similar combination of short curved toothed ridges, small concentric folds and a bilobed arched counterpart sclerite. Sexes were associated by common occurrence and similar habitus.

Papuacyphon sp. A (Fig. 70)

Material studied: 1 ♀, Irian Jaya: Jayawijaya, Emdoman-Okloma [139°5'E, ~4°1'S: Gazetteer "Papua Insects Foundation"], 1660–2000 m, 16.IX.1992, leg. A. RIEDEL (SMNS).

Diagnosis

Body strongly convex, damaged, details of habitus not visible. BL approximately 3 mm.

Segment 8 not distinctive, apodemes of S8 twice as long as the distance between them, connected by a transverse sclerite. Prehensor very characteristic (Fig. 70), with short, caudally tapering almost conical toothed ridges. Two separate transverse counterpart sclerites opposite them.

4.4 Key to species

There are minor differences in habitus, surface sculpture, and pilosity. However, they do not generally permit identification of species or reliable association of sexes. Because of allopatry, males and females taken together are almost certainly conspecific. Identification requires study of the genitalia. Males are very easily identified, specific differences between females are less obvious.

Males

- 1 Parameres with heavily armed upcurved finger as long as penis (Figs. 53, 54). *P. horribilis* n. sp.

- Different. 2
- 2 Mediocaudal extension of uncifer long, resembling a flame, styles long (Fig. 35). 3
- Mediocaudal extension of uncifer inconspicuous, short (e. g., Figs. 38, 43), styles variable. 4
- 3 Flame-shaped part of uncifer narrow, uncifer with band-shaped styles. *P. felix* (Klausnitzer)
- Flame-shaped part of uncifer broad, styles of uncifer tubular (Fig. 35). *P. klausnitzeri* n. sp.
- 4 Parameres with prominent armature of numerous hooks or scales (e. g., Figs. 42, 47, 51). 5
- Parameres without striking armature, only some small teeth (e. g., Figs. 37, 59). 7
- 5 Apex of paramere resembling the head of an asparagus, with many scales (Fig. 51). *P. erectus* n. sp.
- An irregularly plurilinear band of strong hooks along caudal or dorsal edge of parameres (Figs. 42, 47). 6
- 6 A long band of hooks along dorsal edge of paramere (Fig. 47). Uncifer a narrow plate, styles are short straight rods, movable appendages broad, resembling toothed beetle mandibles (Fig. 46). *P. mordax* n. sp.
- A short band of hooks along caudal edge of paramere (Fig. 42). Uncifer a transverse bar with long styles, movable appendages slender (Fig. 43). *P. globulus* n. sp.
- 7 Styles of uncifer about as large as movable appendages, all sickle-shaped, scarred (Fig. 60). *P. lazarus* n. sp.
- Styles and mediocaudal extension of uncifer are small smooth sharply pointed hooks, much shorter than the movable appendages (Fig. 38). *P. minax* (Klausnitzer)

Known females

- 1 Counterpart sclerite Y-shaped (Fig. 65), with long median process. Apodemes of S8 connected by a V-shaped loop (Fig. 61). *P. globulus* n. sp.
- Counterpart sclerite without unpaired branch, apodemes of S8 anteriorly connected by a transverse bar (e. g., Fig. 62). ... 2
- 2 Segment 8 laterally with strongly projecting sclerotized caps (Fig. 62, arrow). Toothed prehensor ridges very short. Counterpart sclerite a regular arch with two median pimples (Fig. 67). *P. erectus* n. sp.
- Segment 8 without protruding lateral projections. 3
- 3 A triangular caudolateral notch in T8 (Fig. 63, white arrow). Toothed prehensor ridges long, counterpart sclerite transverse, asperous, medially divided (Fig. 68). *P. horribilis* n. sp.
- T8 unmodified. Toothed prehensor ridges variable, counterpart sclerite bilobed or divided. 4
- 4 Prehensor ridges short, conical. Two separate transverse counterpart sclerites (Fig. 70). *P. sp. A*
- The single counterpart sclerite caudally shallowly notched or bilobed. 5
- 5 Segment 8 without special pattern. Toothed ridges moderately long, counterpart sclerite ending in adjacent triangular lobes (Fig. 66). *P. mordax* n. sp.
- A pair of sickle-shaped plates near front end of segment 8 (Fig. 64, white arrow). Prehensor small, ridges very short, counterpart sclerite ending in two shallow rounded lobes (Fig. 69). *P. lazarus* n. sp.

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Addendum

Cyphon Paykull, 1799 was long known to be a synonym of *Elodes* Latreille, 1796. For some reason the name *Cyphon* was nevertheless generally used, also in the present paper. However, this violates the International Code of Zoological Nomenclature. A paper solving the nomenclatural problems by re-establishing the valid available name *Contacyphon* Gozis, 1866 (ZWICK et al. 2013) was unexpectedly published before the present study. Therefore, the new species still placed in *Cyphon* above need to be transferred to the genus *Contacyphon*:

Contacyphon alexriedeli (Zwick, 2014), **n. comb.**
Contacyphon gladifer (Zwick, 2014), **n. comb.**
Contacyphon pugionifer (Zwick, 2014), **n. comb.**
Contacyphon curvispina (Zwick, 2014), **n. comb.**
Contacyphon longelobatus (Zwick, 2014), **n. comb.**

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