On the Trichoptera of the Cyclops Mountains (Papua, Indonesia)

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Abstract: Biodiversity research is badly limited by the present devastated state of the western taxonomy. In this paper we have tested the "*virginity ratio*": how many undescribed and described species are present in a sample collected during a single evening in the Cyclops Nature Reserve, Papua, Indonesia. We have recorded seven known species: *Chimarra cyclopica* Kimmins, 1962, *C. sinuosa* Kimmins, 1962, *Ecnomus cyclopicus* Kimmins, 1962, *Diplectrona semes* Oláh & Mey, 2013, *Hydropsyche flintorum* Oláh & Johanson, 2008, *Agapetus latosus* Ross, 1951, *Anisocentropus immunis* MachLachlan, 1863 and nineteen unknown species described here: *Chimarra aikei* **spec. nov.**, *C. davidi* **spec. nov.**, *C. josieae* **spec. nov.**, *C. hendriki* **spec. nov.**, *C. mendii* **spec. nov.**, *C. befordula* **spec. nov.**, *Cheumatopsyche kitera* **spec. nov.**, *Abacaria kimera* **spec. nov.**, *Hydropsyche simala* **spec. nov.**, *H. tompula* **spec. nov.**, *Baliomorpha maninae* **spec. nov.**, *Agapetus villas* **spec. nov.**, *A. hullamos* **spec. nov.**, *A. picin* **spec. nov.**, *A. tus* **spec. nov.**, *Anisocentropus cyclopicus* **spec. nov.**, *Oecetis josievriesae* **spec. nov.**, *Triaenodes aikevriesi* **spec. nov.** and *T. davidvriesi* **spec. nov.** We have described three more new species as misidentifications from other Papuan regions: *Hydropsyche kasimiri* **spec. nov.**, *H. nakala* **spec. nov.** and *Agapetus ives* **spec. nov.** All new species are described and habitus and genitalia are depicted.

Rangkuman: Pada saat ini ilmu taksonomi di daerah Barat adalah dalam situasi buruk. Situasi buruk ini sangat membatasi penelitian keanekaragaman hayati. Di publikasi ini kami menguji "*virginity ratio*": jumlah spesies yang belum dikenal dibandingkan dengan jumlah spesies yang sudah diketahui, dalam sampel yang dikoleksi pada satu malam di Cyclops Nature Reserve, Papua, Indonesia. Kami ketemu tujuh spesies yang sudah diketahui: *Chimarra cyclopica* Kimmins, 1962, *C. sinuosa* Kimmins, 1962, *Ecnomus cyclopicus* Kimmins, 1962, *Diplectrona semes* Oláh & Mey, 2013, *Hydropsyche flintorum* Oláh & Johanson, 2008, *Agapetus latosus* Ross, 1951, *Anisocentropus immunis* MachLachlan, 1863; dan sembilanbelas spesies baru yang deletakan disini: *Chimarra aikei* **spec. nov.**, *C. davidi* **spec. nov.**, *C. josieae* **spec. nov.**, *C. hendriki* **spec. nov.**, *C. mendii* **spec. nov.**, *C. befordula* **spec. nov.**, *Cheumatopsyche kitera* **spec. nov.**, *Abacaria kimera* **spec. nov.**, *Hydropsyche simala* **spec. nov.**, *H. tompula* **spec. nov.**, *Baliomorpha maninae* **spec. nov.**, *Agapetus villas* **spec. nov.**, *A. hullamos* **spec. nov.**, *A. picin* **spec. nov.**, *A. tus* **spec. nov.**, *Anisocentropus cyclopicus* **spec. nov.**, *Oecetis josievriesae* **spec. nov.**, *Triaenodes aikevriesi* **spec. nov.** and *T. davidvriesi* **spec. nov.** Kami juga letakan tiga spesies dari daerah lain di Papua yang sebelumnya salah identifikasi: *Hydropsyche kasimiri* **spec. nov.**, *H. nakala* **spec. nov.** and *Agapetus ives* **spec. nov.** Semua spesies baru diletakan disini serta gambar lingkungan hidupnya dan gambar genetalianya.

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Keywords: Virginity ratio of biodiversity, Trichoptera, new species, New Guinea, Cyclops Mts.

Introduction

Biodiversity is in crisis and the western taxonomy is on the verge to decline. Taxonomy has lost most of its human, institutional and financial resources in the western culture. This ongoing devastation of taxonomy seems to camouflage the habitat destroying industries. Their activities are causing climate change and have resulted in an accelerated extinction of living creatures. This disappointing state of taxonomy, the basic science of all natural sciences, is accompanied by the modern epistemic scenario: we have discovered and described less than two million species and there are over 100 million (Lee, 2016: 10^8) or including prokaryotes one to six billions (Larsen et al. 2017: 10^9) species waiting to be discovered, delineated and described before their extinction (Oláh et al., 2018).

We have recently documented how poorly we know the biodiversity, even of the best studied regions of Europe. With minimal collecting effort we have collected and described over two hundreds of incipient caddisfly species during a few years, mostly from the islands in the sky of the so called well studied European mountain ranges (Oláh, 2017; Oláh & Oláh, 2017; Oláh et al. 2015, 2017).

This paper gives a further simple example to symbolize the depressing results of this anti-science western policy. The Cyclops Nature Reserve is one of the most studied mountain ranges in New Guinea, a hot-spot of biodiversity in a region of the world with huge natural resources. We can easily fly to the large coastal capital city of Jayapura, Papua, Indonesia and drive to the lower elevation of the Cyclops Mts. in order to collect animals. Nevertheless its aquatic insects, including Trichoptera, are very poorly known. The second author of this paper has realised a collection trial at a waterfall at light during a single evening. The first author helped him to determine and describe all the male specimens. We have wondered and tried to quantify the virginity ratio of biodiversity: how many species were unknown and new to science in the collected sample and how many species were already discovered and described? Here we present the results produced by private resources of the authors to demonstrate again the debt of the modern western taxonomy. Twenty species were new to science and only seven species were known in this simple sampling in one of the most surveyed biodiversity hotspots in New Guinea! The descriptions of more new species follow.

Depositories

KSP - Koleksi Serangga Papua (Papua Insect Collection) in management of UNCEN (Universitas Cenderwasih), Waena, Papua, Indonesia

NMNHS - National Museum of Natural History, Sofia, Bulgaria

RMNH - Naturalis Biodiversity Center (former Rijksmuseum voor Natuurlijke Historie and Zoölogisch Museum Amsterdam), Leiden, The Netherlands

OPC - Oláh Private Collection, Debrecen, Hungary, under national protection by the Hungarian Natural History Museum, Budapest

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Descriptions and taxonomy

Philopotamidae

Chimarra cyclopica Kimmins, 1962

Examined material: 1 ♂ KSP; 1 ♂ OPC: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mt. Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.

Chimarra aikei spec. nov. (figs 1-3, 88)

urn:lsid:zoobank.org:act: 501CEC57-B5AC-4ABB-BCF6-56ADFA00E10C

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.
Paratypes (4 ♂♂): 1 ♂ KSP; 1 ♂ RMNH; 2 ♂♂ OPC: same as holotype.

Diagnosis: This remarkable medium-sized new species with a subquadrangular ventrum of the fused segment IX is most allied to *Chimarra sabrona* Kimmins, 1962 described from the Cyclops Mts. but differs by having a much shorter ventro-apical process on segment IX and long row of small endothecal spines are present in the phallic organ, not only two long spines.
Description: ♂ (in alcohol). Habitus brown with darker wings. Maxillary palp formula: I-IV-II-III-V. Fore tibial spurs reduced and diagnostic: spur formula 1-4-4. Wing membrane brown; forewing length 7 mm; on forewing discoidal cell as long as the median cell, but discoidal cell twice as large as median and median cell twice as large as thyridial cell; R and Rs slightly sinuous, not thickened; the basal fork which forms the basis of discoidal cell highly thickened and strongly pigmented; hyaline window pattern (reduced pigmentation) well developed present as lack of pigmentation on cross-veins lower half of r, r-m, m, very upper ending of m-cu, and on the arculus; on hindwing 2A diagnostic looping to join 1A incomplete, as a result a closed cell is lacking; 3A present.
Male genitalia: Tergite and sternite VIII distinct. Segment IX synsclerotized, dorsum short, ventrum very long; ventral half of the fused segment subquadrangular in lateral view; posterior margin straight vertical; ventro-apical keel short triangular in lateral view. Segment X membranous, indistinct. Cerci small. Paraproctal lateral vertical plate long, with blunt triangular ventral ending; a small group of sensory pits of around seven sensilla present middle near the basement. Gonopods broad mesad with slender straight and digitate apex in lateral view. Phallic organ long with a long row of short spines in the endotheca.

Etymology: The species is named and dedicated to the son of the collector and second author, Aike de Vries: "Cyclops Mountains and it's amazing biodiversity is one of the wonders of Creation. May you always remember and cherish the place where you grew up and the wonderful times we had in Papua."

Chimarra guentheri new species complex

The discovery of *Chimarra davidi* **spec. nov.** and *C. josieae* **spec. nov.** from the Cyclops Mts has initiated to establish this new species complex of the *Chimarra* genus. This interesting

new species complex is represented by species known only exclusively from New Guinea. It is characterized by the extremely elongated ventro-apical process on segment IX. Seven species are known to belong to this complex: *Chimarra guentheri* Mey, 2006 (Sepik River, Papua New Guinea); *C. talinensis* Johanson & Espeland 2010 (Solomon Islands); *C. kapcos* Oláh, 2016 (Indonesia, Papua Barat, Batanta Island); *C. eltuna* Oláh, 2015 (Indonesia, Papua Barat, Arfak Mts.); *C. sukula* Oláh, 2016 (Indonesia, Papua Barat, Batanta Island); *C. davidi* **spec. nov.** (Indonesia, Papua, Cyclops Mts) and *C. josieae* **spec. nov.** (Indonesia, Papua, Cyclops Mts).
The number and pattern of paraproctal sensilla seems specific and highly diverse in this species complex. The members of this complex are diverged and easily recognised by their pattern of sensilla (fig. 12).

Chimarra davidi spec. nov. (figs 4-7, 89)

urn:lsid:zoobank.org:act: 97A74E7A-0859-4EA7-B883-582C73305F16

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.

Diagnosis: *Chimarra davidi* **spec. nov.** belongs to the newly established *Chimarra guentheri* species complex and differs from all the known species by having (1) a pronounced dorsal lobe subbasad on the paraproctal plates; (2) a unique endothecal spine pattern of two stout spines accompanied by eight clusters of small spines; (3) only a single sensillum on the paraproctal plates located middle subbasad.

Description: ♂ (in alcohol). Pale brown habitus with darker wings. Maxillary palp formula: I-IV-II-III-V. Fore tibial spurs reduced and diagnostic: spur formula 1-4-4. Wing membrane brown; forewing length 7 mm; on forewing discoidal cell as long as the median cell, but discoidal cell larger than median and median cell twice as large as thyridial cell; R slightly sinuate, Rs sinuous with thickening before the discoidal cell, which veins are also thickened at the very base; hyaline window pattern (reduced pigmentation) less developed present as a lack of pigmentation on cross-veins r-m, m, m-cu, and on the arculus; on hindwing 2A diagnostic looping to join 1A incomplete, as a result a closed cell is lacking; 3A present.
Male genitalia: Tergite and sternite VIII distinct, sternite VIII produced in a triangular ventral process. Segment IX synsclerotized, its dorsum tapering and shorter than sternum; anterior margin straight vertical, slightly concave; posterior margin rounded convex; ventro-apical keel modified into a very long, process with slightly dilated apical half in lateral view. Segment X membranous, indistinct. Cerci small. Paraproctal lateral vertical plate elongated, with downward pointed apex and with a dorsal lobe subbasad; a single sensillum of styloconica type (elevated pegs or cones) present middle subbasad on the paraproctal plates. Gonopods broad based with slender apical half. Phallic organ with two black robust spines and eight large clusters of small spines.

Etymology: The species is named and dedicated to the son of the collector and second author, David de Vries: "Cyclops Mountains and it's amazing biodiversity is one of the wonders of Creation. May you always remember and cherish the place where you grew up and the wonderful times we had in Papua."

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Chimarra josieae **spec. nov.** (figs 8-11, 90)

urn:lsid:zoobank.org:act: FCD90D1D-CDC3-428F-851C-B70200DF71DA

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.

Diagnosis: *Chimarra josieae* **spec. nov.** is a member of the *Chimarra guentheri* species complex and related, as an allied sibling species, to the nominate species of the complex *C. guentheri* Mey, 2006, described from Sepik River (collected by Bürgers), but differs by the basal lobe of the paraproctal plates being more pointed and armed only by two sensilla, not simply sloping and armed with five sensilla; the gonopod ventral pattern differs and the phallic organ has only two spines, not three spines. These structural divergences indicate again the rapid contemporary allopatric speciation processes could be integrated in isolated and nearby mountain ranges.

Description: ♂ (in alcohol). Pale brown habitus with pale wings. Maxillary palp formula: I-IV-II-III-V. Fore tibial spurs reduced and diagnostic: spur formula 1-4-4. Wing membrane pale brown; forewing length 4 mm; on forewing discoidal cell as long as the median cell, but discoidal cell larger than median and median cell twice as large as thyridial cell; R slightly sinuate, Rs sinuous with thickening before the discoidal cell, which veins are also thickened at the very base; hyaline window pattern (reduced pigmentation) less developed present as lack of pigmentation on cross-veins r-m, m, m-cu, and on the arculus; on hindwing 2A diagnostic looping to join 1A incomplete, as a result a closed cell is lacking; 3A present.
Male genitalia: Tergite and sternite VIII distinct, sternite VIII produced in a triangular ventral process. Segment IX synsclerotized, its dorsum and sternum almost equal long; anterior margin vertical, slightly concave; posterior margin rounded convex; ventro-apical keel modified into a very long, process dilating apicad in lateral view. Segment X membranous, indistinct. Cerci small. Paraproctal lateral vertical plates with laterad directed apex and pointed basal half; two sensilla of styloconica type (eleveted pegs or cones) present on the basal pointed tips on the paraproctal plates. Gonopods broad based with slender mesad turning pointed apical half. Phallic organ with two black robust spines only, no clusters of small spines discernible.

Etymology: The species is named and dedicated to the daughter of the collector and second author, Josie de Vries: "Cyclops Mountains and it's amazing biodiversity is one of the wonders of Creation. May you always remember and cherish the place where you grew up and the wonderful times we had in Papua."

Chimarra hendriki **spec. nov.** (figs 13-16, 91)

urn:lsid:zoobank.org:act: 6C2E8DC0-E51B-4713-8DF9-5909A42AF2B5

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.

Diagnosis: This medium-sized new species with brown body, appendages and wings is most allied to *Chimarra horgoka* Oláh, 2012 described from Batanta Island, Papua Barat, Indonesia, but differs by having more tapering paraproctal plates without stout hook-formation on the apex, cerci are ovoid, not subquadrangular and the endotheca of the phallic organ armed with two rows of small spine clusters besides the two long and black stout spines.

Description: ♂ (in alcohol). Light brown habitus with slightly darker wings. Maxillary palp formula: I-IV-II-III-V. Fore tibial spurs reduced and diagnostic: spur formula 1-4-4. Wing membrane brown; forewing length 4 mm; on forewing discoidal cell as long as the median cell, but discoidal cell twice as large as median and median cell twice as large as thyridial cell; R and Rs slightly sinuous, not thickened; the basal fork that is the basis of discoidal cell highly thickened and strongly pigmented; hyaline window pattern (reduced pigmentation) well developed present as lack of pigmentation on cross-veins lower half of r, r-m, m, very upper ending of m-cu, and on the arculus; on hindwing 2A diagnostic looping to join 1A incomplete, as a result a closed cell is lacking; 3A present.
Male genitalia: Tergite and sternite VIII distinct. Segment IX synsclerotized, dorsum shorter, ventrum long; anterior margin concave in lateral view; posterior margin straight vertical below the cerci; ventro-apical keel short triangular in lateral view. Segment X membranous and indistinct partially covered with microtrichia. Cerci small ovoid. Paraproctal lateral vertical plate long, tapering with two sensilla supapicad. Gonopods broad mesad with pointed apex in lateral view. Phallic organ long with a two long row of short spine clusters and two long black spines in the endotheca.

Etymology: The species is named and dedicated to one of the local guides, Hendrik Kogoya, who helped with the collecting activity of the second author in the steep valley of the Pos 7 waterfall, at the foot of Cyclops Mountains.

Chimarra mendii **spec. nov.** (figs 17-20, 92)

urn:lsid:zoobank.org:act: 3802AF4D-D3A3-4A35-AEDD-B04E1F06E11A

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.

Diagnosis: This medium-sized new species with yellowish body, appendages and wings is most allied to *Chimarra kampa* Oláh, 1916, described from Batanta Island, Papua Barat, Indonesia, but differs by having a ventro-apical keel on segment IX, absent in *C. kampa*; membranous segment X is more produced; lateral paraproctal plates downward directed, not apicad; the shape pattern of the gonopods differs both in lateral and in ventral view; the shape of the endothecal spines different, broad-based in the new species.

Description: ♂ (in alcohol). Yellowish habitus with slightly darker wings. Maxillary palp formula: I-IV-II-III-V. Fore tibial spurs reduced and diagnostic: spur formula 1-4-4. Wing membrane brown; forewing length 4 mm; on forewing discoidal cell shorter than the median cell, but discoidal cell twice as large as median and median cell twice as large as thyridial cell; however the median cell is just discernible in the left forewing and completely lacking on the

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right forewing; Rs strongly sinuous, not thickened; the basal fork which forms the basis of discoidal cell highly thickened and strongly pigmented; hyaline window pattern (reduced pigmentation) well developed present as lack of pigmentation on cross-veins lower half of r, r-m, m, very upper ending of m-cu, and on the arculus; on hindwing 2A diagnostic looping to join 1A incomplete, as a result a closed cell is lacking; 3A present.
Male genitalia: Tergite and sternite VIII distinct. Segment IX synsclerotized, dorsum shorter, ventrum long; anterior margin concave in lateral view; posterior margin convex vertical below the cerci; ventro-apical keel short and blunt triangular in lateral view. Segment X membranous but strongly produced, its basal region covered with microtrichia. Cerci small ovoid. Paraproctal lateral vertical plate short and downward directed, tapering with two sensilla in the middle. Gonopods broad with pointed dorsal apex in lateral view. Phallic organ long with two long black broadly based spines in the endotheca.

Etymology: The species is named and dedicated to one of the local guides, Mendi Kogoya, who helped with the collecting activity of P.J.A. de Vries in the steep valley of the Pos 7 waterfall, at the foot of Cyclops Mountains.

***Chimarra befordula* spec. nov.** (figs 21-24)

urn:lsid:zoobank.org:act: 88731CF1-0681-46B9-84C8-6448CC1218FB

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.

Diagnosis: Wing venation and genital architecture are similar to *Chimarra parza* Oláh, 2018, described from Batanta Island (Indonesia, Papua Barat), but differs by having the apices of the gonopods turning mesad in a right angle and diverse and stable diagnostic trait of sensilla on the lateral plates of the paraproct moved dorsad, not ventrad. *Chimarra befordula* **spec. nov.** belongs to a rather well delineated species complex restricted to the region of New Guinea together with *Chimarra cyclopica* Kimmins, 1962 from the Cyclops Mts; *C. parza* Oláh, 2018 from Batanta Island; *C. rokona* Oláh, 2016 from Batanta Island and *C. lerovida* Oláh, 2015 from the Arfak Mts.

Description: ♂ (in alcohol). Medium-sized pale brown habitus. Maxillary palp formula: I-IV-II-III-V, segment II is much shorter than segment III. Fore tibial spurs reduced and diagnostic: spur formula 1-4-4. Wing membrane brown; forewing length 4 mm; discoidal, median and thyridial cells on forewing increasing in length, discoidal cell twice as large as median and median cell twice as large as thyridial cell; R slightly, Rs strongly sinuous with thickening before the discoidal cell, veins at base of discoidal cell also thickened; hyaline window pattern (reduced pigmentation) less developed present as lack of pigmentation on crossveins r-m, m, m-cu, and on the arculus; on hindwing 2A diagnostic looping to join 1A incomplete, as a result a closed cell is lacking; 3A present.
Male genitalia: Tergite and sternite VIII distinct, sternite VIII with pointed ventral process. Segment IX synsclerotized, ventro-apical process present, broad. Segment X membranous, elongated, badly discernible, somehow fused to the lateral plates of the paraproct. Cerci seem fused to segment IX. Lateral vertical plates of paraproct long tapering apicad and straight, not curving mesad; a pair of sensilla distinct and moved to dorsobasad onto lateral

hump. Gonopods enlarged liguliform with an apical upward and in a right angle mesad turning pointed apex. Phallic organ with large spherical basal section; endotheca with two long spines; phallotremal sclerite indiscernible.

Etymology: The species name *befordula* is derived from "*beforduló*", which means "inward turning" in Hungarian. It refers to the pronounced distinguishing character of the new species, the apices of gonopods turning mesad in a right angle.

Chimarra sinuosa Kimmins, 1962

Examined material: 1 ♂ KSP; 1 ♂ OPC: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.

Ecnomidae

Ecnomus cyclopicus Kimmins, 1962

Examined material: 1 ♂ KSP; 1 ♂ OPC: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.

Hydropsychidae
Diplectroninae

Diplectrona semes Oláh & Mey, 2013

Examined material. 4 ♂♂ KSP; 4 ♂♂ OPC: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.

Hydropychinae

Cheumatopsyche kitera spec. nov. (figs 25-28)

urn:lsid:zoobank.org:act: E669E873-75AC-48F5-90D7-51A84550353D

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.
Paratypes (10 ♂♂): 5 ♂♂ KSP; 2 ♂♂ RMNH; 3 ♂♂ OPC: same as holotype.

Diagnosis: This pale brown-winged animal with light mottled wing pattern is a member of the *Cheumatopsyche expeditionis* species group and is similar to *Cheumatopsyche ebal*

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Malicky, 2009, described from the Bismarck Archipelago, but differs by having the forewing clearly light spotted; *C. ebal* is without any light spots, at least on the old specimens. There are divergences in genital structures: suture pattern is reduced to a middle transversal suture, complete pattern of transversal and horizontal sutures present on segment X at *C. ebal*; ventro-apical setose lobes robust broad, more stretched in dorsal view; movable endothecal sclerites differently shaped, ovoid, not excised ventrad.

Description: ♂ (in alcohol). Cephalic and thoracic sclerites brown, legs paler brown. Maxillary palp formula: I-IV-III-II-V. Spur formula 2-4-4. Forewing length 6.5 mm; brown with veins slightly darker; light brown membrane feebly mottled with small light spots. Forewing SC and R run free to margin, Cu_2 and A1 run free to margin, not confluent. Hindwing SC and R met after r; r precedes s, fork 1 absent.
Male genitalia: Abdominal segment IX annular, tergum very short, sternum almost 2x longer; anterior margin convex, produced rounded; apical lobe of posterior margin straight vertical, slightly above sclerotized articulation cavity of gonopods; antecosta broad, gradually narrowing ventrad and dorsad with antecostal suture visible externally; small acrotergite present and visible both in lateral and dorsal view; spine row on posterior margin of segment IX with a long break at segment X; in dorsal view dorso-apical spiny lobes almost half-circular, separated by deep and wide excision. Intersegmental lateral profile between segments IX and X is high and obtuse angled. Segment X short, subquadratic, slightly upward directed; basal part slightly sclerotized; terminating distally by the less produced setaless mesocaudal rounded lobe; ventro-apical setose lobe short and broad with rounded apex, especially in dorsal and ventral view. Single transversal suture of segment X visible in middle position. Cerci (lateral setose area) forming rounded circular wart. Coxopodite of the gonopods extends well beyond the apex of segment X, straight rod-formed in lateral view, slightly dilated at apex both in lateral and ventral view; harpago parallel-sided, straight in lateral and falcate in ventral view. Phallotheca robust, basal section slightly broader and bent at obtuse angle to stem; middle region slightly arched ventrad in lateral view, followed by apex broadening into a distinctive, ventral bulge at the very apex; endophallus long and narrow; chitinized endothecal process rounded ovoid, strongly pigmented; phallotremal sclerite slightly exposed ventrad in lateral view.

Etymology: The species name *kitera* is derived from the Hungarian “kiterül” which means stretch or widen. It refers to the shape of ventro-apical setose lobes which are wide, broadened in dorsal view.

Abacaria kimera spec. nov. (figs 29-32)

urn:lsid:zoobank.org:act: 9FE5A5CA-66AA-41BB-9446-B383A5EB27A1

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.
Paratype: 1 ♂ OPC: same as holotype.

Diagnosis: This beautiful dark brown pigmented hydropsychid species with scarcely light and fine spotted forewing has the typical wing venation of the *Abacaria* genus. However, the plesiomorphic setose wart on pro-episternum is present similarly to *Abacaria caledona* Oláh

& Barnard, 2006 from New Caledonia, *A. beroni* (Kumanski, 1979) from New Guinea, *A. kevera* Oláh, 2018 and *A. kovacsi* Oláh, 2014 from Batanta Island. In most species of the genus *Abacaria* the pro-episternal setose wart has been lost. This plesiomorphic character state is present in the other five genera of the *Hydropsyche* genus cluster. At the same time *A. kimera* **spec. nov.** has an asymmetric tarsal claw present on all legs, similarly to most members of the *Abacaria* genus. But the species of *A. caledona* and *A. kovacsi* have symmetrical tarsal claws. The genital structure has resemblance to *A. kevera*, but differs especially in significant shape divergences in the periphallic organs of segment X and harpago. The segment X produced a very pronounced less sclerotized, almost membranous window dorsobasad which is absent in *A. kevera*. Apex of harpago is highly modified. The phallic organ is almost identical.

Description: ♂ (in alcohol). Body and wings dark brown. Maxillary palp formula I-(II,III,IV)-V. Pro-episternal setal wart present. Tarsal claw asymmetric on all legs with setal bundle present. Spur formula 2-4-4. Forewing length 8 mm; hind wing median cell open; hind wing with forks 2,3,5.
Male genitalia: Segment IX fused annular and short; its median keel vestigial; apical lobe on posterolateral margin elongated triangular. Intersegmental profile between the ninth and tenth segments is simply concave. Segment X elongated in lateral view and rounded quadrangular in dorsal view; suture pattern reduced to a single transversal suture; horizontal sutures seems delineate the dorsobasal membranous window; ventro-apical lobes small digitate shifted upward; cerci moved dorsad and subapicad as setose region. The coxopodit of the gonopod robust significantly broadening apicad, harpago with capitate apex produced laterad. Phallic organ almost with equal diameter along the down-curving basal and the horizontal sections of the phallotheca; horizontal section with slightly concave dorsum; endothecal and phallotremal sclerite complex movable; sclerotized endothecal processes longer ventrad and phallotremal sclerites smaller.

Etymology: The species name *kimera* is derived from “kiméra” or chimera in Hungarian, a monstrous hybrid creature in Greek mythology composed of parts of more than one animal. It refers to the disparate parts of different origin, that is to the mixed trait combinations: the joint presence of the pro-episternal setose wart and the asymmetry of tarsal claws; the membranous basal window on segment X combined with the phallic organ of *A. kevera*.

Hydropsyche flintorum Oláh & Johanson, 2008

Examined material: 14 ♂♂ KSP; 7 ♂♂ OPC: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.

Hydropsyche ungulata species group

This species group was established from the *Herbertorossia* genus (Oláh & Johanson, 2008). This hydropsychine genus was created by Ulmer (1957) giving generic rank to non-adaptive stochastic body characters of asymmetric pretarsal claws on foreleg and abbreviated

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segment V of maxillary palp, although the shortening of segment V of maxillary palp is not so pronounced in various species (Oláh & Johanson, 2008). Based on adaptive integration of the phallic organ the members of the *Hydropsyche ungulata* species group are similar to the *Hydropsyche asiatica* species group having the same shell-shaped and movable sclerotized endothecal processes (outer lips). This species group is represented in New Guinea probably by many new undescribed species. With focus on the fine structures of the phallic organ here we establish a new species complex restricted to New Guinea.

Hydropsyche orakaivai new species complex

Hydropsyche orakaivai Kimmins, 1962, now as a member of the *Hydropsyche ungulata* species group, was described from Kokoda (Easternmost area of New Guinea). It was recorded from Telefomin (West Sepik, Papua New Guinea) by Kumanski (1979) however with shape modifications of segment IX and X. Later this species was recorded from Wandammen Peninsula by Oláh & Mey (2013).

A single male specimen was collected at Lake Sentani (Papua, Jayapura). A detailed re-examination and comparison of the know specimens of the related taxa revealed that they represent independent incipient sibling species forming a new species complex. This species complex is characterised by the unique formation of the constricted, very narrow and almost right angled basal region of the phallotheca. Having the same constricted narrow basal region of the phallotheca, the fine structure of the lateral and ventral profiles of the phallotheca differs as well as the periphallic complex of dorsum IX and segment X is variously abbreviated and shaped (fig. 33). The new species complex is represented by five species: *Hydropsyche kasimiri* **spec. nov.**, *H. nakala* **spec. nov.**, *H. orakaivai* (Kimmins, 1962), *H. rapsoni* (Korboot, 1964) and *H. simala* **spec. nov.** They populate different mountain ranges from the eastern Kokoda to the western Doberai Peninsula (figs 33-37).

Hydropsyche kasimiri spec. nov. (fig. 35)

urn:lsid:zoobank.org:act: 3D6208A4-19E4-4968-8CEB-618B1B8CC3FB

Herbertorossia orakaivai: Kumanski (1979: 200-201)(nec Kimmins, 1962) [identified with notes on shape divergences of the segment IX and X complex. Misidentification]

Holotype: ♂ NMNHS: Papua New Guinea, Telefomin, West Sepik Province, 166m, 25.vii.1975, British Speleological Expedition in Papua New Guinea, leg. P. Beron & Ph. Chapman.

Diagnosis and description: According to Kumanski (1979) the single specimen collected at Telefomin (West Sepik) differs from *H. orakaivai* Kimmins, 1962 in the shape of segment IX with its concave (not convex) sides in dorsal view and in the shape of IX-X segment's dorsal excision, which seems larger and shallower. The comparison of the lateral profile of the complex of dorsum IX and segment X clearly suggests discernible divergences between *H. orakaivai* and *H. kasimiri*. These traits are usually not contemporary adaptive structures. They vary randomly. Moreover the dorsal excision is less sclerotized therefore its shape is rather functioning dependent whether it is virgin or before/after copulation. However there are subtle and stable divergences in the lateral and ventral profiles of the adaptive phallic organ. Phallotheca is slender, not stout, especially its apical half; dorsum is concave in lateral view; the apical margin is less widened in ventral view.

The following chimeric character combination helps in species delineation: (1) dorsal keel of segment IX narrowing in dorsal view with concave lateral margins; (2) dorsal keel long and straight horizontal in lateral view; (3) intersegmental profile of segment IX and X right angled; (4) interlobular excision on segment X wide and shallow; (5) the phallotheca is slender; (6) apical tip of the phallotheca less widened in ventral view.

Etymology: This interesting incipient sibling species is dedicated to the Bulgarian scientist Kasimir Kumanski, one of the few Trichopterologists working on the caddisflies of New Guinea, and who has first recognised the divergences between *H. orakaivai* and *H. kasimiri*.

Hydropsyche nakala spec. nov. (figs 37, 38-42)

urn:lsid:zoobank.org:act: E1C62348-A1FF-4086-8000-14D9C73E7189

Herbertorossia orakaivai: Oláh & Mey (2013: 419)(nec Kimmins, 1962) [recorded from Indonesia, Papua Barat, Wandammen Peninsula. Misidentification]

Holotype: ♂ OPC: Indonesia, Irian Jaya [Papua Barat], Wandammen Peninsula, Dotir, 150 m, River Mawoy, secondary forest, 2km inland, 2°38'S 134°30'E, at light, 17.ii.1996, leg. ZMA Expedition 1996.
Paratypes (5 ♂♂): 4 ♂♂ RMNH, 1 ♂ OPC: same as holotype.

Diagnosis: This medium sized species with stramineous faintly marbled spotted forewing has hindwing with closed median cell and 1, 2, 3, 5 fork present as well as asymmetric pretarsal claws on foreleg and abbreviated segment V of maxillary palp. This is the character state combination of the *H. ungulata* species group. Most allied to *H. simala* **spec. nov.**, but differs by longer dorsal keel of segment IX and shorter dorsum of segment X; intersegmental profile almost disappeared, simply sloping; dorso-apical setose lobes well separated by deep mesal excision in dorsal view; setose surface of cerci reduced; horizontal shaft of the phallotheca almost straight, not curving upward; apical tip of phallotheca widened and subapical region constricted.
The following chimeric character combination helps in species delineation: (1) dorsal keel of segment IX narrowing in dorsal view with concave lateral margins; (2) dorsal keel long and straight horizontal in lateral view; (3) intersegmental profile of segment IX and X sloping; (4) interlobular excision on segment X wide and deep; (5) the phallotheca straight horizontal; (6) apical tip of the phallotheca widened and formed by pronounced subapical constriction in ventral view.

Description: ♂ (in alcohol). Medium sized stramineous animal. Wings ochraceous with paler pubescens, with just discernible marble spotted pattern on apical region of forewing. Hind wing median cell present. Maxillary palp formula I-IV-III-II-V. Asymmetric pretarsal claws and abbreviated segment V of maxillary palp pronounced. Spur formula 2-4-4. Forewing length 10 mm.
Male genitalia: Segment IX fused annular and short; its median keel narrowing; apical lobe on posterolateral margin blunt triangular. Lateral intersegmental profile between the ninth and tenth segments sloping. Segment X short with upward curving apex; lateral setose area, the cerci ovoid; dorso-apical setose lobes slightly upward curving in lateral and mesad turning in dorsal view. The coxopodite of the gonopod longer than the apex of segment X. The harpago is broad, almost parallel-sided in lateral view and capitate in ventral view.

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Phallic organ with very narrow and right angled basal portion; the horizontal shaft almost straight, endothecal sclerites vertically elongated semicircular.

Etymology: The species name *nakala* is derived from the Hungarian "nyak" or "nyakas" which means "neck". It refers to the constricted subapical region of the phallic organ in ventral view.

Hydropsyche orakaivai (Kimmins, 1962) (fig. 33)

Herbertorossia orakaivai Kimmins (1962: 141-142). Kokoda, Papua New Guinea.
Hydropsyche orakaivai: Oláh & Johanson (2008: 156)

The genus *Herbertorossia* Ulmer, 1957 was synonymized with *Hydropsyche* Pictet, 1834 by Oláh & Johanson (2008) and transferred to the newly erected *Hydropsyche ungulata* species group. Having phallic organ with movable endothecal processes the species in the new group are closely allied to the *Hydropsyche asiatica* species group. In New Guinea they diverted from hydropsychine taxa by the asymmetric pretarsal claws and abbreviated maxillary palp segment V produced in random stochastic integrative organisation in allopatric isolation.
Both the original description and drawings of Kimmins (1962) are detailed enough to establish the character combinations of the name bearing species in spite of the partial lacking of the basal region of the phallotheca. The following chimeric character combination helps in species delineation: (1) dorsal keel of segment IX broad in dorsal view with convex lateral margins; (2) dorsal keel long and straight horizontal in lateral view; (3) intersegmental profile of segment IX and X is most right angled in the species complex; (4) interlobular excision on segment X narrow and deep; (5) the phallotheca is the most robust in the species complex; (6) apical tip of the phallotheca strongly widened.

Hydropsyche rapsoni (Korboot, 1964) stat. rev. (fig. 34)

Herbertorossia rapsoni Korboot (1964: 52). Minj, Papua New Guinea.
Herbertorossia orakaivai: Neboiss (1987: 136) (nec Kimmins, 1962)

The species was synonymized with *H. orakaivai* by Neboiss (1987) who stated: „both sexes show some small differences, these are not considered sufficient for separating *H. rapsoni* from *H. orakaivai"*. The reproduced drawings (Neboiss, 1987) are detailed enough to establish the character combinations of the species: (1) dorsal keel of segment IX narrowing in dorsal view with concave lateral margins; (2) dorsal keel long and straight horizontal in lateral view; (3) intersegmental profile of segment IX and X is obtuse angled; (4) interlobular excision on segment X wide and shallow; (5) the phallotheca is the most convex ventrally in the species complex in lateral view and (5) having a constricted subapical tip of the phallotheca. This character combination delineate from all the other members of the species complex and therefore the species status of *H. rapsoni* (Korboot, 1964) is justified and is restored here.

Hydropsyche simala **spec. nov.** (figs 36, 43-47)

urn:lsid:zoobank.org:act: 916B2FB7-4C93-4BD2-AA1D-D25C1C87A129

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Sentani Lake, S02.592987° E140.449422°, 13.vi.2019, leg. P.J.A. de Vries.

Diagnosis: This medium sized species with marble spotted stramineous forewing has hindwing with closed median cell and 1, 2, 3, 5 fork present as well as asymmetric pretarsal claws on foreleg and abbreviated segment V of maxillary palp. This is the character state combination of the *H. ungulata* species group. Most allied to *H. nakala* **spec. nov.**, but differs by shorter dorsal keel of segment IX and longer dorsum of segment X; intersegmental profile rounded obtuse angled; dorso-apical setose lobes well separated by shallow mesal excision in dorsal view; setose surface of cerci reduced; horizontal shaft of the phallotheca curving upward on apical region; apical tip of phallotheca not widened.
The following chimeric character combination helps in species delineation: (1) dorsal keel of segment IX narrowing in dorsal view with concave lateral margins; (2) dorsal keel short and straight horizontal in lateral view; (3) intersegmental profile of segment IX and X obtuse angled; (4) interlobular excision on segment X wide and shallow; (5) the phallotheca with upward curving apical region; (6) apical tip of the phallotheca not widened.

Description: ♂ (in alcohol). Medium sized stramineous habitus. Wings ochraceous with paler pubescens, with well discernible marble spotted pattern on forewing. Hind wing median cell present. Maxillary palp formula I-IV-III-II-V. Asymmetric pretarsal claws and abbreviated segment V of maxillary palp pronounced. Spur formula 2-4-4. Forewing length 10 mm.
Male genitalia: Segment IX fused annular and short; its median keel narrowing; apical lobe on posterolateral margin rounded triangular. Lateral intersegmental profile between the ninth and tenth obtuse angled. Segment X with long dorsum; lateral setose area, cerci ovoid; dorso-apical setose lobes indistinct. The coxopodite of the gonopod longer than the apex of segment X. The harpago is broad, almost parallel-sided in lateral view and capitate in ventral view. Phallic organ with very narrow and right angled basal portion; the horizontal shaft with upward curving apical region, endothecal sclerites vertically elongated semicircular.

Etymology: The species name *simala* is derived from the Hungarian “sima”, which means smooth or plane. It refers to the smooth apical region of the phallic organ in ventral view.

Hydropsyche tompula **spec. nov.** (figs 48-52)

urn:lsid:zoobank.org:act: BBC312C5-5B27-42E8-84B7-AF533EBE271B

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.

Diagnosis: This medium sized species without pattern on the forewing has the hindwing with closed median cell and 1, 2, 3, 5 fork present as well as asymmetric pretarsal claws on foreleg and abbreviated segment V of maxillary palp, although the shortening of segment V of maxillary palp is not so pronounced. This is the character state combination of the *H. ungulata* species group. Most allied to *H. striata* Kimmins, 1962 described from Kokoda,

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Papua New Guinea, but differs by having dorso-apical setose lobes with rounded blunt apices, not with pointed apices, the harpago clavate in lateral view, not parallel-sided, moreover the phallotheca has different arching profile.

Description: ♂ (in alcohol). Medium sized stramineous habitus. Wings ochraceous with paler pubescens, without spotted pattern on the forewing. Hind wing median cell present. Maxillary palp formula I-IV-III-II-V. Asymmetric pretarsal claws and abbreviated segment V of maxillary palp detectable. Spur formula 2-4-4. Forewing length 11 mm.
Male genitalia: Segment IX fused annular and short; its median keel reduced; apical lobe on posterolateral small and shifted ventrad. Lateral intersegmental profile between segments IX and X sloping triangular. Segment X short and low; lateral setose area, the cerci moved apicad; dorso-apical setose lobes with blunt apices dominating on the entire segment both in lateral and dorsal view. The coxopodit of the gonopod almost as long as the apex of segment X, harpago clavate in lateral and parallel-sided in ventral view. Phallotheca S-shaped with very short sclerotized endothecal processes.

Etymology: The species name *tompula* is derived from the Hungarian "tompul", which means getting blunt or obtuse. It refers to the rounded dorso-apical setose lobes of segment X as compared to his sibling species *H. striata* Kimmins, 1962 having pointed lobes.

***Baliomorpha maninae* spec. nov.** (figs 53-58, 93)

urn:lsid:zoobank.org:act: DC79ABBA-74DB-41C8-99E0-31C1439E09F8

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.

Diagnosis: This new species has a combination of forewing traits (unforked Sc) of *Macrostemum* Kolenati, 1859 and the abbreviated, but still free, not retracted plesiomorphic terminal structures on the phallic head present in *Baliomorpha* Neboiss, 1984. Most allied to *Baliomorpha barna* Oláh, 2012, but differs by the forewing pattern and by the fine structure of the phallic head.

Description: ♂ (in alcohol). The ground colour of body and wings are brown with yellowish body appendages. Forewing length 9 mm. Brown forewing light patterned; the unique light pattern marginate the apical half of the forewing. Like at macro-nematini genera the head is rather glabrous, there are only few compact setal warts present: a single small labral anteromedian compact setal wart, a small frontal interantennal compact setose wart and a pair of large reniform vertexal latero-ocellar compact setal warts; frontal medial diffuse setose wart represented by scattered setae; there is no elevated transversal ridge on the occipital region. Maxillary palp formula is I-II-IV-III-V, segment III about three times the length of segment II. Spur formula 1-4-4. Forewing rounded apically, crossvein sc-c absent, Sc unforked at apex, however the fork connecting to R may represent crossvein sc-r; fork I sessile.
Male genitalia: Abdominal segment IX fused annular, very short, dorsum longer than ventrum; dorso-apical region developed into 2 rounded ridges in dorsal view; anterior margin straight vertical; posterior spine row intermittent; lateral intersegmental profile

between the ninth and tenth segments very deep, with 2 steps. Body of segment X short; cerci present middle as less pigmented rounded area with short setae; ventro-apical setose lobe indistinct; dorso-apical setose lobe reduced to setose diffuse surface on apical margin; sutures indistinct; well-sclerotized tergal straps connecting segment X to the dorsum of the phallic organ very broadening in coronal plane, plate-formed. Gonopods fused, straight in lateral and mesad curving in ventral view. Phallic apparatus with oblique vertical enlarged basal section; this basal part is connected to the basal plate of gonopods ventrolaterad and to segment X by the pair of tergal plates; the tube of the horizontal phallotheca with produced broadening ventrum and upward directed apex; this apex bilobed in ventral view; endophallus long, its phallotrema, the distal opening of the endophallus surrounded by pointed phallotremal sclerites.

Etymology: The species was named and dedicated to the daughter of the collector and second author, Manin de Vries: "Cyclops Mountains and it's amazing biodiversity is one of the wonders of Creation. May you always remember and cherish the place where you grew up and the wonderful times we had in Papua."

Glossosomatidae

Agapetus gorbul new species complex

The discovery of a new species in the Cyclops Mts, *Agapetus villas* **spec. nov.**, has necessitated to re-examine all the specimens of *Agapetus gorbul* Oláh & Mey, 2013 described from the Central Highlands and later reported from the Arfak Mts (Oláh, 2015). The examination of fine structures of the parameres is a hard, difficult and never perfect procedure in the genus *Agapetus* Curtis, 1834. Ross (1951) has neglected to examine and to draw these completely, but in perspectives of fine structures it seems rewarding. In this new species complex we have delineated a small number of species having a particular lateral profile of the paraproctal plate with filiform and mesad turning elongated apices. The epithet of the nominated species of the complex, "*gorbul*" emphasizes in Hungarian the delineating character that is the paraproct with mesad curving, turning or arching filiform apices. This particular trait of the species complex is accompanied by character combination of elongated cerci and gonopods with very diverse paramere shapes of the phallic organ. This clearly demonstrates again how important the primary sexual structures are in the early initial splits of species in spatial isolation of allopatry. Four species are known to belong to this complex distributed in Indonesia, Papua, the western part of New Guinea: *Agapetus apalapsili* Malicky, 1978, from the Central Highlands (Apalapsili); *A. gorbul* Oláh & Mey, 2013, from the Central Highlands (Walmak); *A. ives* **spec. nov.** from the Arfak Mts; and *A. villas* **spec. nov.** from the Cyclops Mts.

Agapetus gorbul Oláh & Mey, 2013

Re-examined material: Paratypes: 1 ♂ RMNH, 1 ♂ OPC: Indonesia**,** Papua, Kecamatan Nipsan, Walmak, 1710m, cultivated area, 04°07'S 139°38'E, 31.i-9.ii.2005, at light, UNCEN-ZMA Expedition.

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The re-examination of paratypes under higher resolution of a compound microscope revealed the presence of the second paramere on the phallic organ. Both parameres hook-shaped apically; the left paramere has an additional hook-shaped spine subbasad; it turns mesad, difficult to discern. The cerci and gonopods robust, high and not slender and low compared to the sibling *A. ives* **spec. nov.**

Agapetus ives spec. nov. (figs 59-61)

urn:lsid:zoobank.org:act: 8CAEC55E-034F-4B51-814C-CBC24E33ACBF
Agapetus gorbul Oláh & Mey (2013: 410-411) in part misidentified [Arfak Mts]

Holotype: ♂ OPC: Indonesia, Papua Barat, Birdshead Peninsula, Arfak Mountains, mountain top stream, 2149 m, 1°07.620'S 133°44.333'E, 19. V. 2014, at light, leg. R. Horvath.
Paratypes (5 ♂♂): 1 ♂ OPC: same as holotype; 1 ♂ OPC: Indonesia, Papua Barat, Birdshead Peninsula, Arfak Mountains, guesthouse, 1576 m, 1°05.875'S 133°54.551'E, 17.V.2014, light trap at resort, leg. R. Horvath; 3 ♂♂ RMNH: Indonesia, Papua Barat, Birdshead Peninsula, Arfak Mountains, Mokwam, 1510 m, 1°06'S 133°54'E, 6-10.XI.2011, at light, PIF expedition.

Diagnosis: Judged by the mesad arching filiform terminal of the paraproctal plates, this new species belongs to the *Agapetus gorbul* new species complex and most allied to the name bearing nominate species; it is actually an incipient sibling species of *A. gorbul* described from the Central Highlands (Walmak). It differs by the slender and lower periphallic organ of cerci and gonopods; by the sub-marginal position of the ventral subapical dental ridge on the gonopod; and by the arched right and the right-angled left paramere, neither hook-shaped apically.

Description: ♂ (in alcohol). Brown habitus, with legs and venter slightly paler. Maxillary palp formula I-II-IV-V-III, second segment with globular mesolateral projection. Wing membrane brown; forewing length 4 mm; on hindwing Fork I lost R1 vestigial. Blister-formed protuberance on the dorsal margin of sternite V present detached from the ridge; ventral process on sternite VI long.
Male genitalia: Segment IX synsclerotized, triangularly convex anterad and less convex posterad in lateral view. Segment X membranous, indistinct, but discernible deeply excised in dorsal view. Cerci broad based, slender almost filiform. Paraproctal lateral vertical plates (lateral lobe of segment X) narrowing, projecting on their apical half and mesad curving. Gonopods rounded elongated in lateral view; ventral subapical dental ridge mostly sub-marginal with three small teeth in ventral view. Phallic organ with arched right and right-angled left paramere, neither hook-shaped apically.

Etymology: The species name *ives* is derived from the Hungarian "íves", which refers to the less curved, not hooked, rather arched shape of the asymmetric sclerites, parameres inside the phallic organ.

Agapetus villas spec. nov. (figs 62-65)

urn:lsid:zoobank.org:act: 541CD9FE-8FEC-4A1F-923E-244B6C763CB2

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.
Paratypes (4 ♂♂): 2 ♂♂ KSP; 1 ♂ RMNH; 1 ♂ OPC: same as holotype.

Diagnosis: Judged by the mesad arching filiform terminal of the paraproctal plates this new species belongs to the *Agapetus gorbul* new species complex but differs from each by having forked ventral elongation of the phallic organ; by the mesal position and elongation of the ventral subapical dental ridge on the gonopod; and by the particularly asymmetric parameres.

Description: ♂ (in alcohol). Brown habitus, with legs and venter slightly paler. Maxillary palp formula I-II-IV-V-III, second segment with globular mesolateral projection. Wing membrane brown; forewing length 4 mm; on hindwing Fork I lost R1 vestigial. Blister-formed protuberance on the dorsal margin of sternite V present detached from the ridge; ventral process on sternite VI long.
Male genitalia: Segment IX synsclerotized, triangularly convex anterad and less convex, almost straight posterad in lateral view. Segment X membranous, indistinct, but discernible deeply excised in dorsal view. Cerci elongated. Paraproctal lateral vertical plates (lateral lobe of segment X) narrowing, projecting on their apical half and mesad curving. Gonopods rounded elongated in lateral view; ventral subapical dental ridge positioned mesad. Phallic organ with mesad turning and arching right and simple plate-formed elongated left paramere.

Etymology: The species name *villas* is derived from the Hungarian “villás”, which means forked. It refers to the phallic terminal process, the ventral elongation of the apical ending of the phallotheca or aedeagus with forked terminal head.

Agapetus hullamos spec. nov. (figs 66-68)

urn:lsid:zoobank.org:act: DBF0F31B-E615-4BDA-8B4F-2297BCDD0E48

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.
Paratype: 1 ♂ OPC: same as holotype.

Diagnosis: This tiny species differs from all the know species by the character combination of the short blunt cerci, rounded blunt apices of paraproctal plates and by the particular pattern of the internal dental ridge on the gonopods in ventral view.

Description: ♂ (in alcohol). Tiny species with a brown habitus, with legs and venter slightly paler. Maxillary palp formula I-II-IV-V-III, second segment with globular mesolateral projection. Wing membrane brown; forewing length 4 mm; on hindwing Fork I lost R1 vestigial. Blister-formed protuberance on the dorsal margin of sternite V present detached from the ridge; ventral process on sternite VI long.

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Male genitalia: Segment IX synsclerotized, rounded subtriangular in lateral view. Segment X membranous, less produced. Cerci short with blunt apices. Paraproctal lateral vertical plates (lateral lobe of segment X) rounded. Gonopods elongated in lateral view; with an wavy internal dental ridge in ventral view. Phallic organ with highly asymmetric parameres; two spines turning in opposite direction on the apical region.

Etymology: The species name *hullamos* is derived from the Hungarian "hulámos", which means wavy or undulated. It refers to the particular pattern of internal mesal dental ridge on the gonopods, detectable in ventral view.

Agapetus latosus Ross, 1951

Examined material: 1 ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.
The species was described from Doromena, Papua, Indonesia, with tenth tergite lobes that are the paraproctal plates, having curious lateral sclerotized and serrated overhang which were not detected yet in the genus *Agapetus*.

Agapetus picin spec. nov. (figs 69-71)

urn:lsid:zoobank.org:act: EE64B3E1-4596-42F6-A50C-C2575C166C4E

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.

Diagnosis: This tiny species differs from all the know species by its small body as well as by the character combination of the upward turning and tapering paraproctal head, ventral profile of the gonopods and the internal structure of the phallic organ that is very complex, difficult to discern.

Description: ♂ (in alcohol). Tiny species, with a brown habitus, with legs and venter slightly paler. Maxillary palp formula I-II-IV-V-III, second segment with globular mesolateral projection. Wing membrane brown; forewing length 2 mm; on hindwing Fork I lost R1 vestigial. Blister-formed protuberance on the dorsal margin of sternite V present detached from the ridge; ventral process on sternite VI long.
Male genitalia: Segment IX synsclerotized, subtriangular in lateral view. Segment X membranous, very produced. Cerci elongated slightly tapering. Paraproctal lateral vertical plates (lateral lobe of segment X) upward directed, narrowing. Gonopods rounded elongated in lateral view; with a single subapical tooth mesad in ventral view. Phallic organ with highly asymmetric parameres; almost indiscernible two spine cluster discernible on the apical region.

Etymology: The species name *picin* is derived from the Hungarian "piciny", which means tiny. It refers to the small size of this really tiny *Agapetus* with 2 mm forewing length.

Agapetus tus spec. nov. (figs 72-74)

urn:lsid:zoobank.org:act: 4147F1D8-71E0-4AF0-8A83-BDA62F8F630D

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.

Diagnosis: Most allied to *Agapetus productus* (Kimmins, 1962) described from Kokoda, Papua New Guinea. Especially the basic architecture of the phallic organ is similar having the same highly asymmetric pair of parameres, but the dorsal paramere starting from the basal region is forked at the new species. Moreover *A. tus* is easily distinguished by the pointed cerci.

Description: ♂ (in alcohol). Brown habitus, with legs and venter slightly paler. Maxillary palp formula I-II-IV-V-III, second segment with globular mesolateral projection. Wing membrane brown; forewing length 4 mm; on hindwing Fork I lost R1 vestigial. Blister-formed protuberance on the dorsal margin of sternite V present detached from the ridge; ventral process on sternite VI long.
Male genitalia: Segment IX synsclerotized, subtriangular in lateral view. Segment X membranous, very produced. Cerci long triangular and pointed. Paraproctal lateral vertical plates (lateral lobe of segment X) slightly narrowing, with dorsal subapical rounded lobe. Gonopods rounded elongated in lateral view; with a single subapical tooth mesad in ventral view. Phallic organ with highly asymmetric parameres; dorsal paramere long, heavily sclerotized black with forked head; other more internal inside position pointed spine-formed.

Etymology: The species name *tus* is derived from the hungarian “tűs”, which means pointed or needle-formed. It refers to the cerci with unique pointed apices.

Calamoceratidae

Anisocentropus cyclopicus spec. nov. (figs 75-78)

urn:lsid:zoobank.org:act: BF240083-D2FB-451E-A157-38686ECBB069

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.
Paratype: 1 ♂ OPC: same as holotype.

Diagnosis: This small new species having the forewings without any pattern is similar to *A. immunis* McLachlan, 1863 described from New Guinea without additional data; *A. mentes* Oláh, 2015 and *A. arfakensis* Oláh, 2018 from Arfak Mts. Indonesia, Papua Barat and *A. batantensis* Oláh, 2018 from Batanta Island, Indonesia, Papua Barat. All the other *Anisocentropus* species described from New Guinea have various patterns on forewings. *A. immunis, A. mentes* and *A. arfakensis* are large species with a forewing length of around 14-15 mm. *A. batantensis* and *A. cyclopicus* are small species having a forewing length of only 7 mm. Genitalic characters are combined by chimerism: (1) cerci similar to *A. batantensis*; (2)

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gonopods similar to *A. mentes*, (3) as well as the dorsal view of segment X and paraproct complex similar to *A. arfakensis*.

Description: ♂ (in alcohol). A medium sized pale coloured species with forewing length of only 7 mm. Forewing membrane is yellowish without any pattern.
Male genitalia: The basic construction of the male genitalia in the Australasian species is rather similar. *A. cyclopicus* has the tergite and sternite also fused into a complete ring, apicolateral margin produced posteriorly into a rounded lobe superimposed by the lateral flank developed and produced rather high and regularly rounded posteriorly between cerci and gonopods. Tergite IX and segment X fused extending posterad in a roof-formed manner above phallus; latero-apical angles directed downward and terminated into a pointed hook. Cerci high ovoid. Gonopod rounded in lateral view and elongated with somewhat tapering apex in ventral view. Phallic organ tube-formed, curved dorsoventrally.

Etymology: The name of the species refers to the type locality.

Anisocentropus immunis MachLachlan, 1863

Examined material: 3 ♂♂ KSP; 2 ♂♂ OPC: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.

Leptoceridae

Oecetis josievriesae spec. nov. (figs 79-81, 94)
urn:lsid:zoobank.org:act: 8D4FFF60-D20F-4716-8CD6-2C64086CC968

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.
Paratype: 1 ♂ OPC: same as holotype.

Diagnosis: Allied to *O. longiterga* Kimmins, 1962 described from Lake Sentani, Ifar, Papua, Indonesia, but differs by having tergum IX longer, cerci shorter with a ventral setaless spine, the rod-shaped segment X more robust, gonopods symmetric, not asymmetric and its basal region with a dorsomesal spine and a ventromesal large rounded lobe. Phallic organ supplied with a group of small spines besides the two long and black spines.

Description: ♂ (in alcohol). Light brown habitus. Wing membrane brown; forewing length 11 mm.
Male genitalia: Segment IX synsclerotized, shorter dorsad, triple longer ventrad; dorso-apical margin with a pair of small membranous triangular lobes; ventro-apical margin with deep V-shaped excision in ventral view. Segment X consisting of a digitiform robust median process, downward directed on its apical third. Cerci fused to segment IX, long triangular continuing ventrad into a setaless strongly sclerotized spine-formed process, a probable remnants of the paraproct. Gonopods mesad curving long slender processes, each with a quadrangular basis in lateral view; that produced by right angled lobe in ventral view and a smaller lobe on

the inner margin beyond the basal lobe. Phallic organ elongated with globular phallobase and two heavily sclerotized long black spines accompanied by a group of 5-6 small spines apicad inside the endotheca.

Etymology: The species is named and dedicated to the daughter of the collector and second author, Josie de Vries: "Cyclops Mountains and it's amazing biodiversity is one of the wonders of Creation. May you always remember and cherish the place where you grew up and the wonderful times we had in Papua."

Triaenodes aikevriesi spec. nov. (figs 82-84, 95)

urn:lsid:zoobank.org:act: 570658C0-7DC3-4B9C-AEF5-27A1E966F059

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.
Paratype: 1 ♂ OPC: same as holotype.

Diagnosis: The new species resembles *Triaenodes nemaproka* Oláh, 2016 described from Batanta Island, Papua Barat. However, the new species has much shorter cerci, paraproct heavily sclerotized, not membranous, the structure and the pattern of processes on the gonopod much diverged, differently shaped in lateral view.

Description: ♂ (in alcohol). Brown habitus, scape enlarged. Maxillary palp fomula IV-I-III-II-V. Spur formula 1-2-2. Wing membrane pale yellowish, without any pattern and without any scent setae; forewing length 7 mm.
Male genitalia: Segment IX synsclerotized, inverted trapezoid in lateral view. Segment X comprising of digitiform mesal process (upper process of segment X) in lateral view. Cerci setose filiform, one-thirds long of segment X. Paraproct (lower process of segment X) forming heavily sclerotized long mesal process. Gonopod composed of (1) an asymmetric dorsobasal process turning anterad, upward and posterad, but present only on the left gonopod, on right gonopod it is reduced to a short less sclerotized rod; (2) a mesal basodorsal process curving upward and posterad; (3) a short digitiform setose process; (4) a dorsal subapical small triangular process and (5) the apical rounded lobe. Phallic organ with a pair of asymmetric large sclerotized wings and dilated membranous apical portion of the aedeagus; phallobase connected with a pair of lateral sclerotized strips to sclerotized strips produced discontinuity in ventrum IX.

Etymology: The species is named and dedicated to the son of the collector and second author, Aike de Vries: "Cyclops Mountains and it's amazing biodiversity is one of the wonders of Creation. May you always remember and cherish the place where you grew up and the wonderful times we had in Papua."

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Triaenodes davidvriesi spec. nov. (figs 85-87, 96)

urn:lsid:zoobank.org:act: 7F988326-EC78-4C2E-A10B-8A75B3FF4DB0

Holotype: ♂ KSP: Indonesia, Papua, Sentani, Kab. Jayapura, Cyclops Mts, Cyclops Nature Reserve, Pos 7 waterfall, S02.53614° E140.51317°, 8.vi.2019, leg. P.J.A. de Vries.
Paratypes (3 ♂♂): 1 ♂ KSP; 1 ♂ RMNH; 1 ♂ OPC: same as holotype.

Diagnosis: The genus *Triaenodes* McLachlan, 1865, is characterized by the loss of the parameres on the phallic organ. However, a single paramere below the aedeagus has been recorded at *T. tafana* Kimmins, 1962, *T. thespios* Malicky, 2005, *T. marleorum* Oláh, 2016 and *T. torpa* Oláh, 2016 and a single paramere is also present on the ventrum of the phallic organ at *T. davidvriesi*. This new species is most similar to *T. torpa*, described from Batanta Island, Papua Barat, but differs in fine structures of the periphallic organ as well as by its very long parameres.

Description: ♂ (in alcohol). Small, brown habitus. Maxillary palp fomula I-IV-II-(III,V). Spur formula 1-2-2. Wing membrane pale yellowish, hyaline window present on lower anastomosis. Forewing length 5 mm.
Male genitalia: Segment IX fused with triangular sternum and short tergum, without any discernible suture or groove. Segment X simplified into a single gradually tapering median process with a few tiny emerged setae. Paraproct composed of a quadrangular plate with a median rim hooding the phallic organ and of a pair of lateral lobe with very slender filiform process. Cerci setose digitiform, shorter than segment X. Gonopods with broad body continuing into upward curving digitate apex in lateral view; spine-formed lateral basodorsal process curving with tapeing apex. High located phallic organ asymmetric with more developed left lateral ridge; a unique single, well developed black spine-formed paramere present; phallobase receives a pair of sclerotized strips, this strip is rather detached from the ventro-apical region of sternite IX.

Etymology. The species is named and dedicated to the son of the collector and second author, David de Vries: "Cyclops mountains and it's amazing biodiversity is one of the wonders of Creation. May you always remember and cherish the place where you grew up and the wonderful times we had in Papua."

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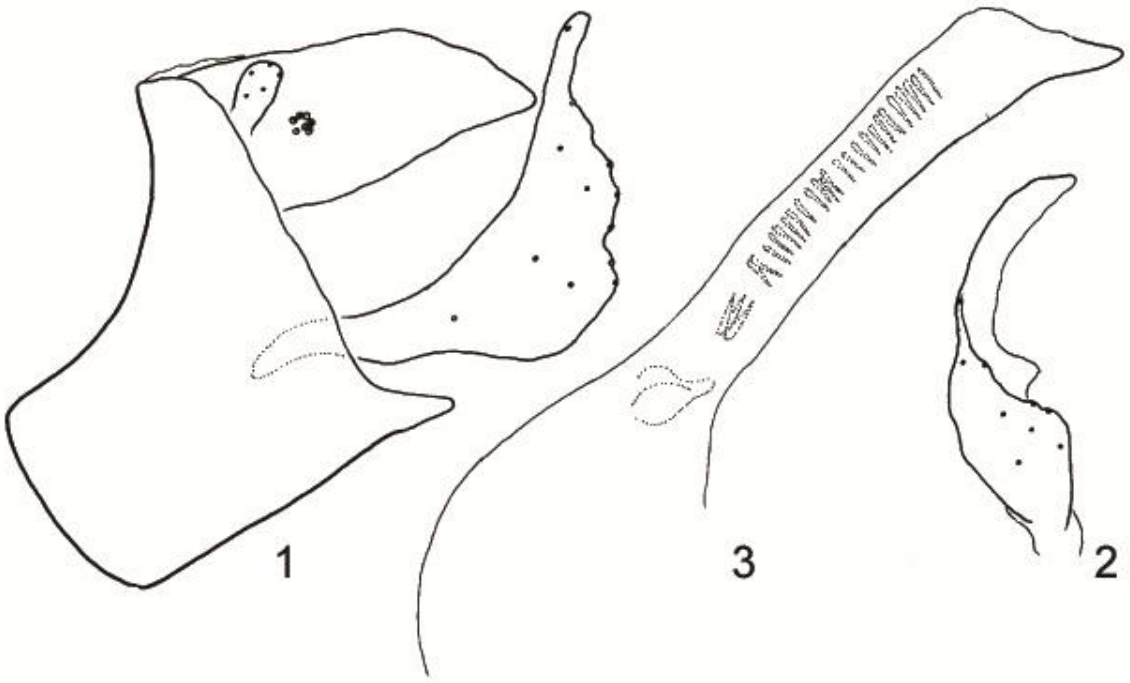
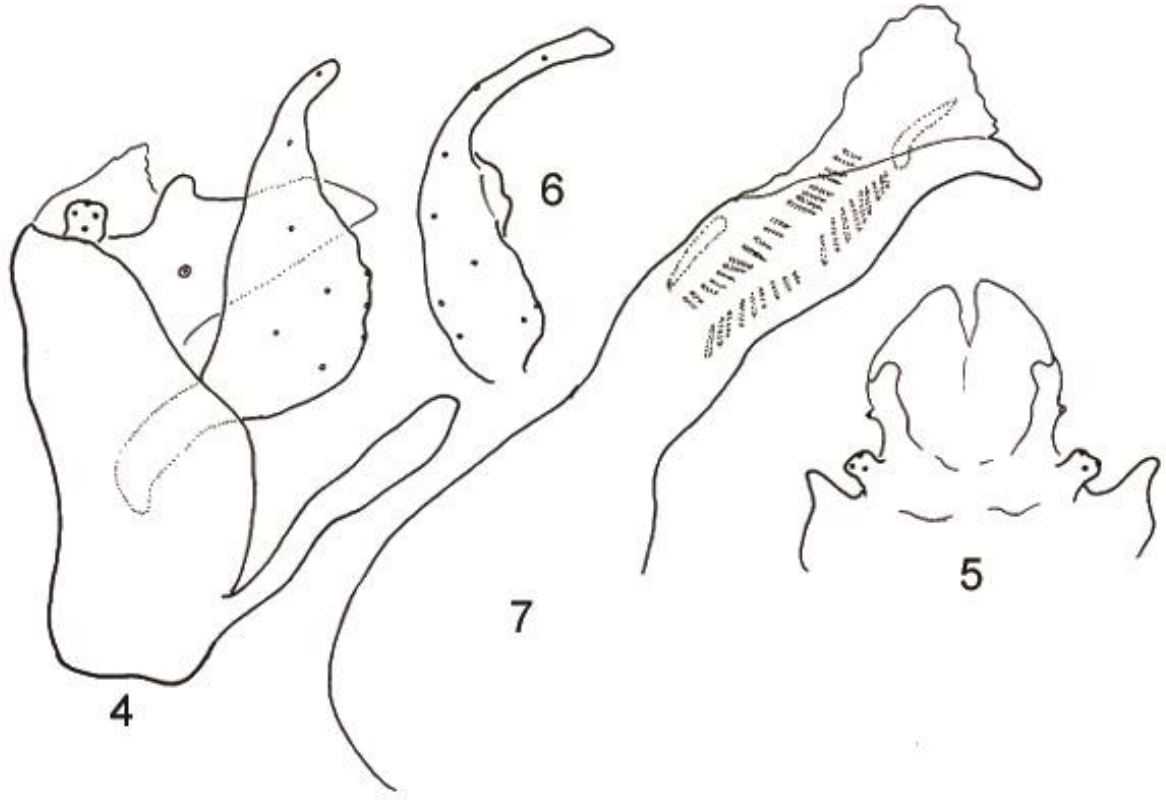
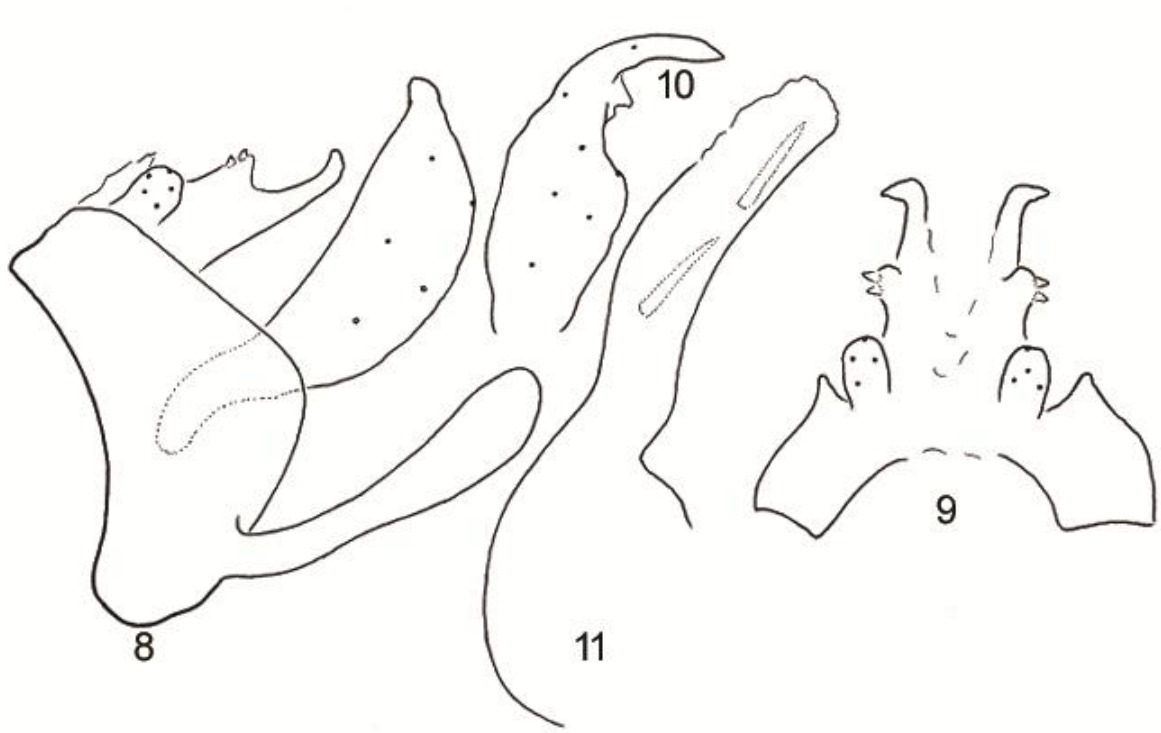


Figs 1-3. *Chimarra aikei* **spec. nov.** holotype ♂: **1.** genitalia in left lateral view; **2**. gonopod in ventral view; **3**. phallic organ in left lateral view.



Figs 4-7. *Chimarra davidi* **spec. nov.** holotype ♂: **4**. genitalia in left lateral view; **5**. genitalia in dorsal view; **6**. gonopod in ventral view; **7**. phallic organ in left lateral view.



Figs 8-11. *Chimarra josieae* **spec. nov.** holotype ♂: **8**. genitalia in left lateral view; **9**. genitalia in dorsal view; **10**. gonopod in ventral view; **11**. phallic organ in left lateral view.

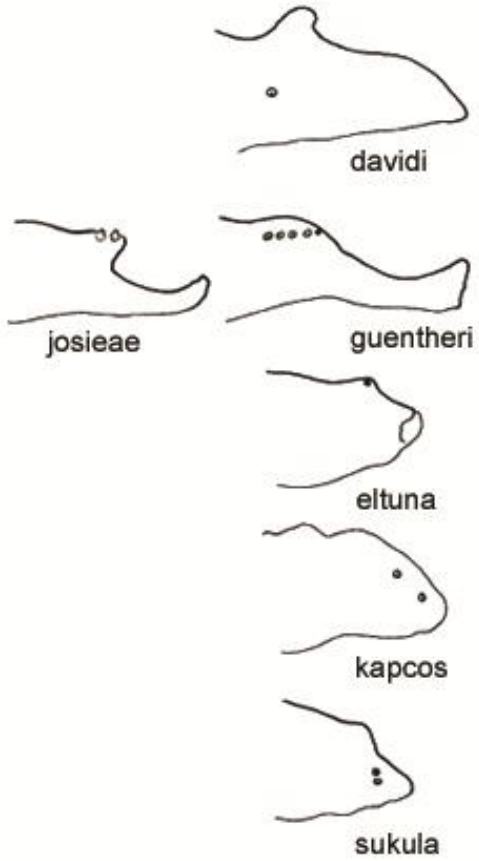


Fig. 12. Paraproctal plates in lateral view with the location and the number of sensory sensilla in the species of the *Chimarra guentheri* new species complex.

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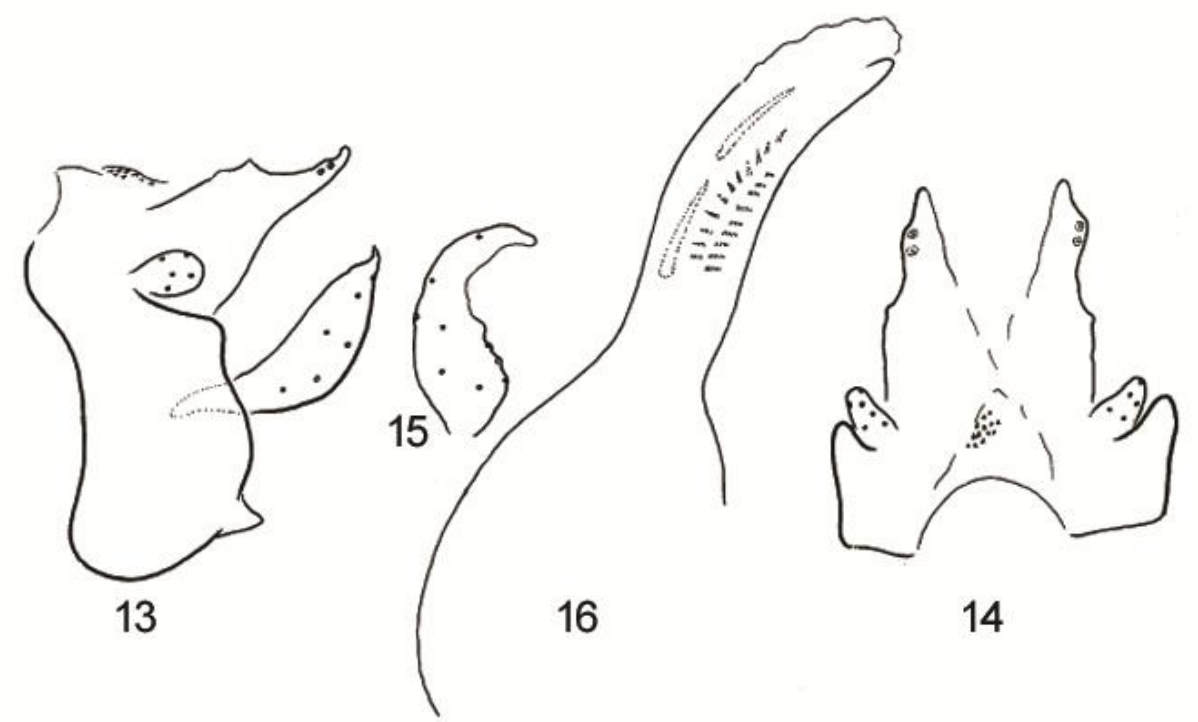
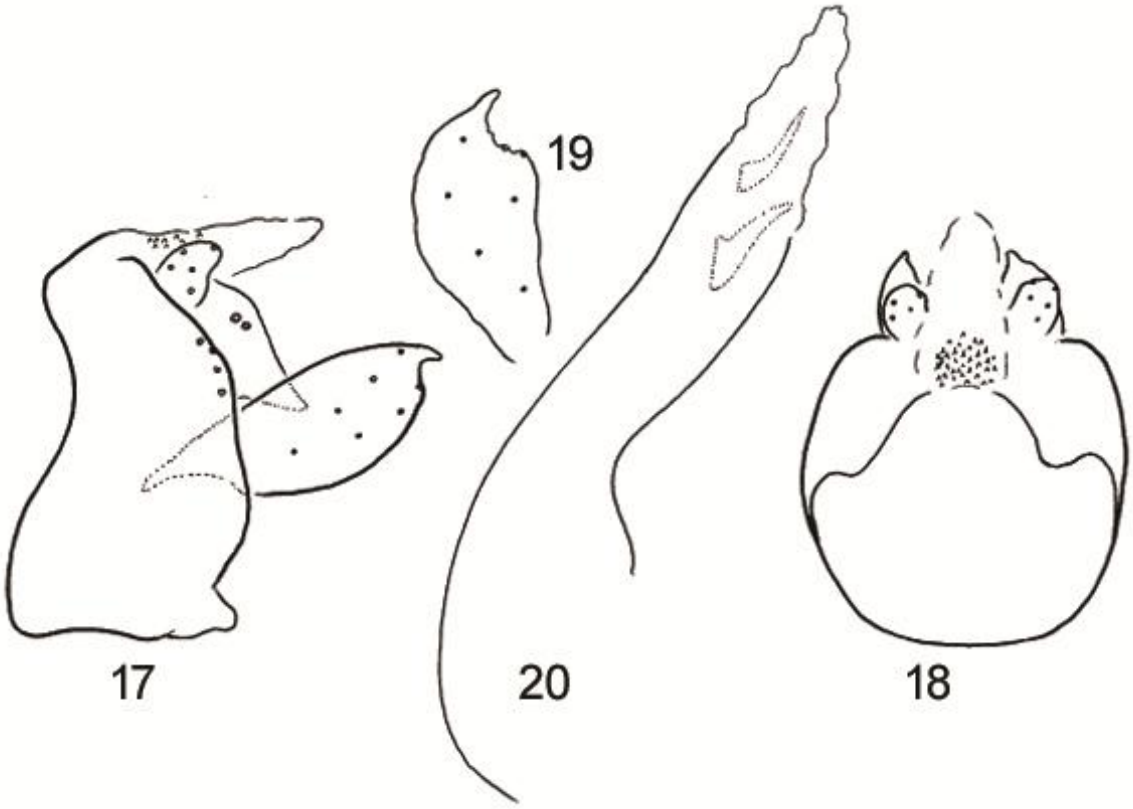
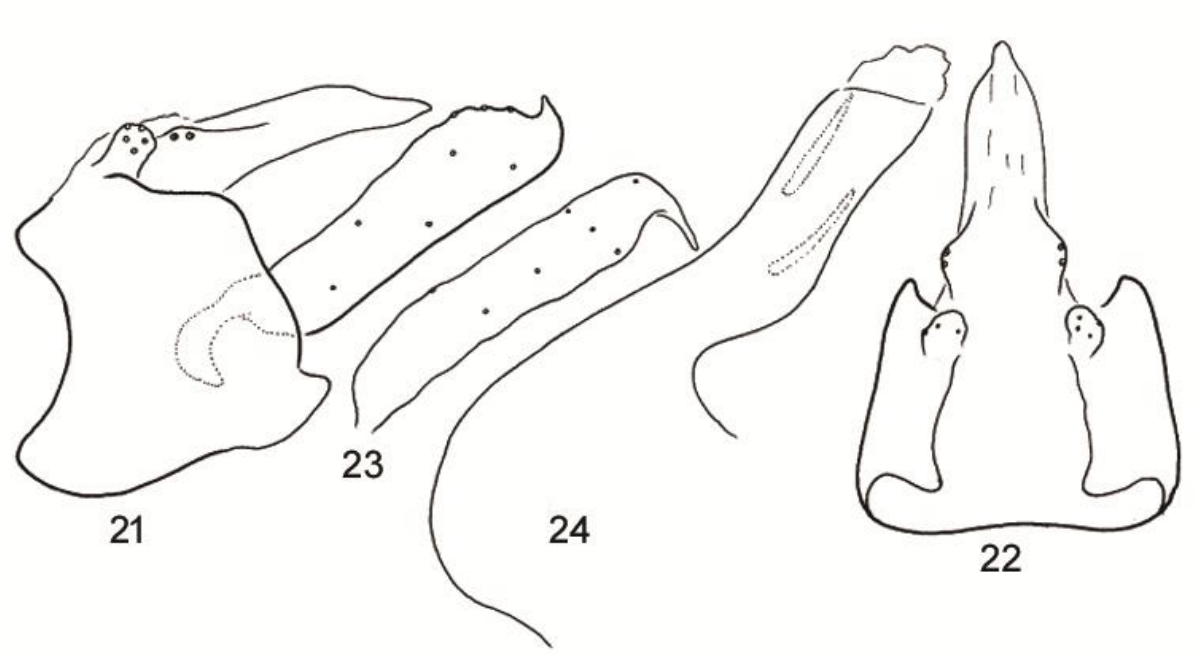


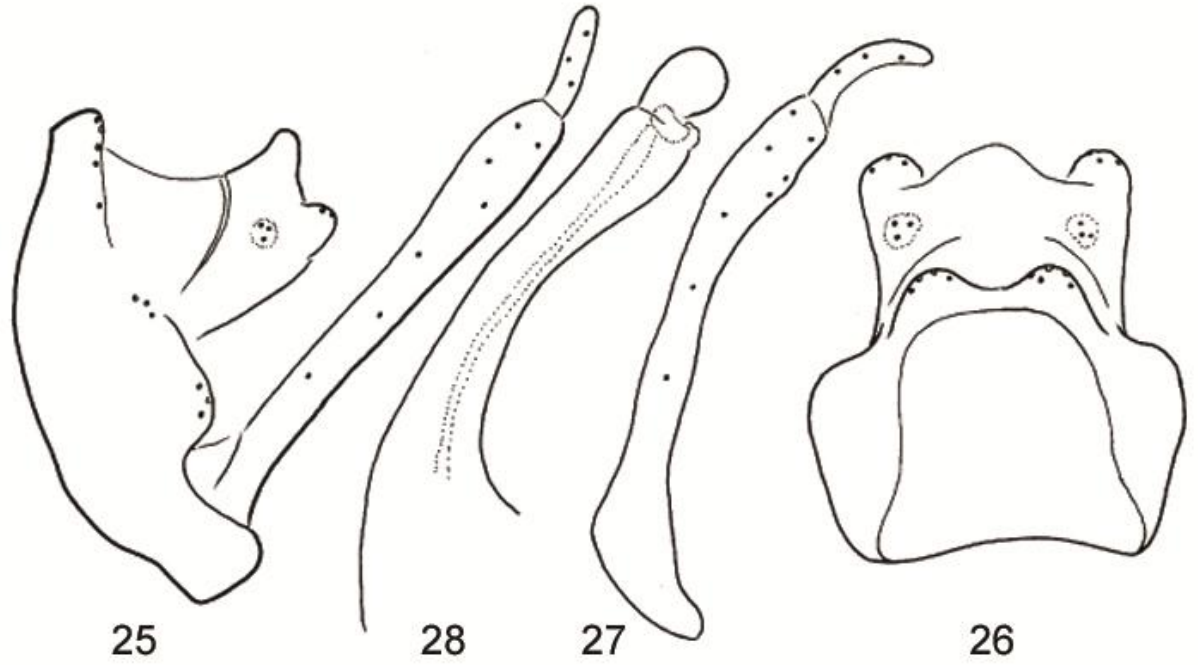
Figs 13-16. *Chimarra hendriki* **spec. nov.** holotype ♂: **13**. genitalia in left lateral view; **14**. genitalia in dorsal view; **15**. gonopod in ventral view; **16**. phallic organ in left lateral view.



Figs 17-20. *Chimarra mendii* **spec. nov.** holotype ♂: **17**. genitalia in left lateral view; **18**. genitalia in dorsal view; **19**. gonopod in ventral view; **20**. phallic organ in left lateral view.



Figs 21-24. *Chimarra befordula* **spec. nov.** holotype ♂: **21**. genitalia in left lateral view; **22**. genitalia in dorsal view; **23**. gonopod in ventral view; **24**. phallic organ in left lateral view.



Figs 25-28. *Cheumatopsyche kitera* **spec. nov.** holotype ♂: **25**. genitalia in left lateral view; **26**. genitalia in dorsal view; **27**. gonopod in ventral view; **28**. phallic organ in left lateral view.

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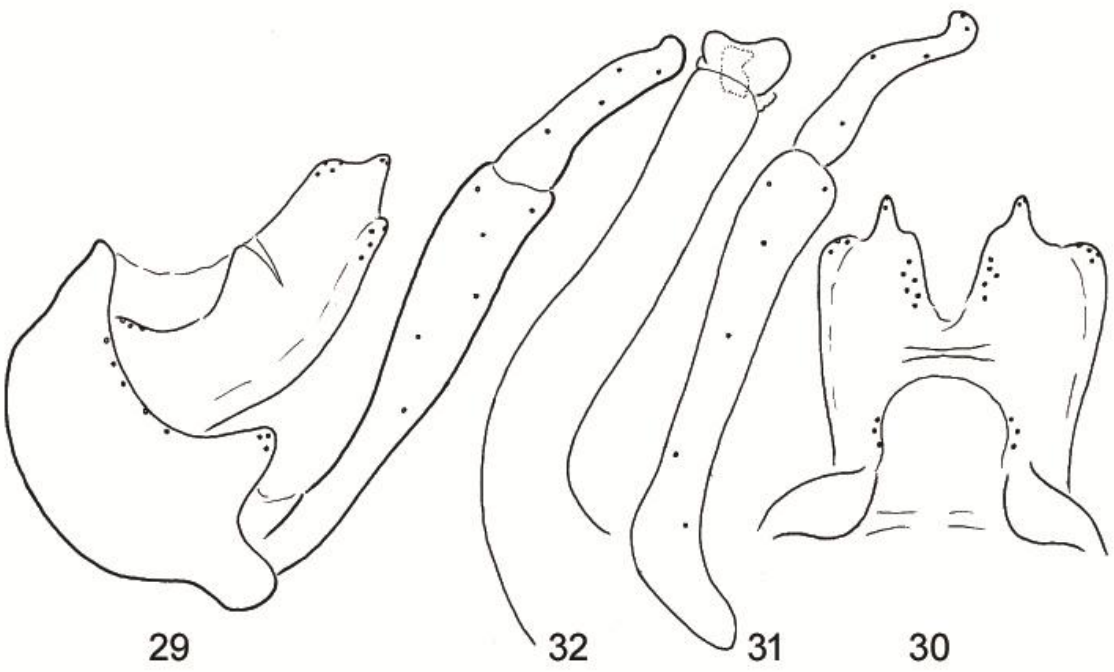
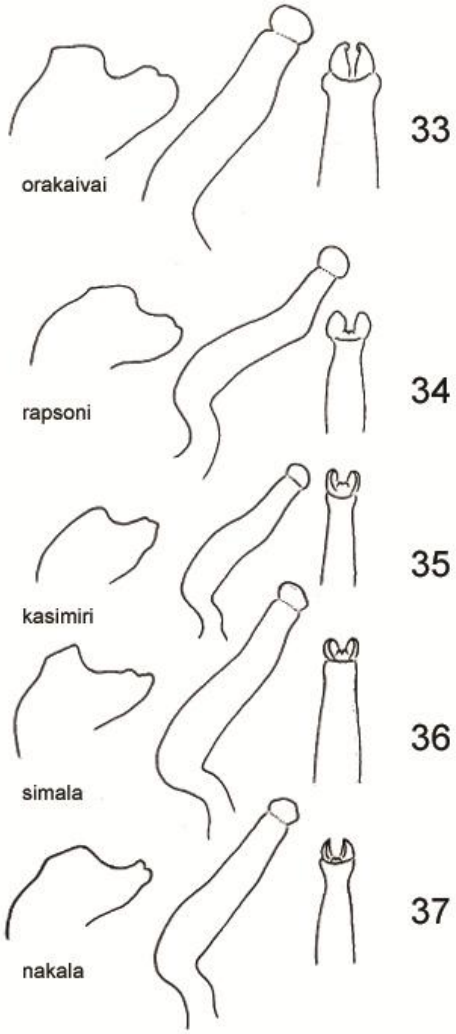
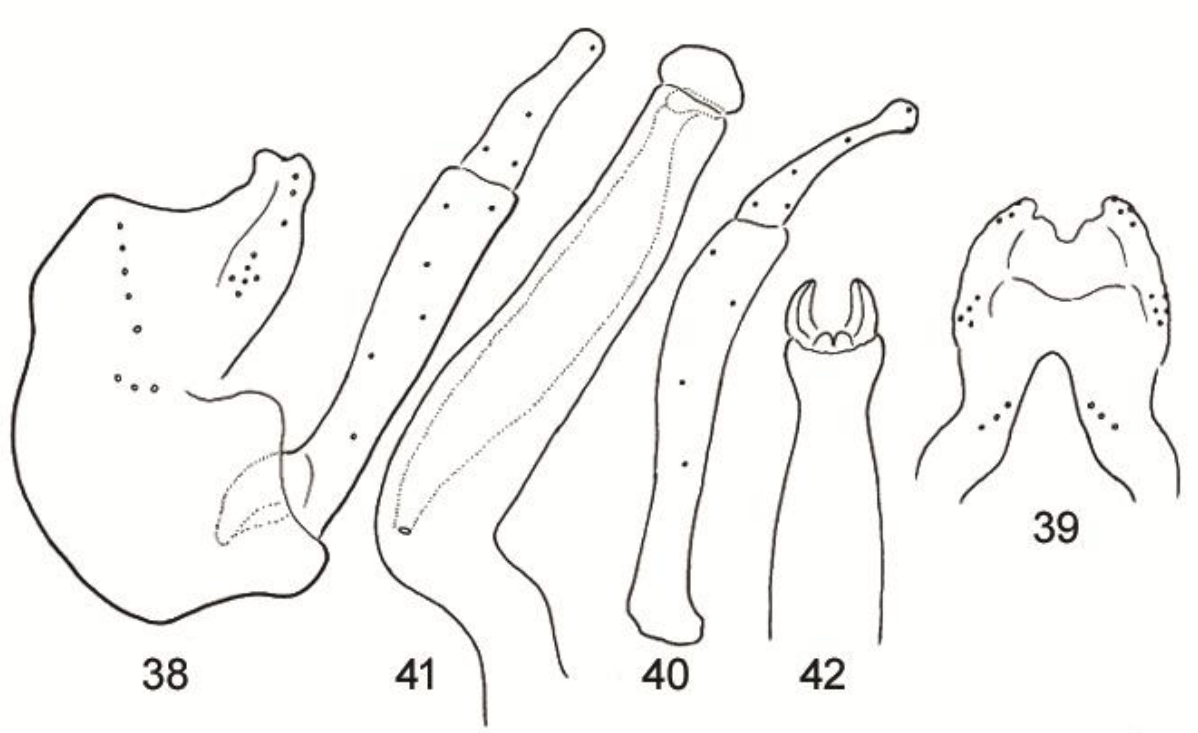


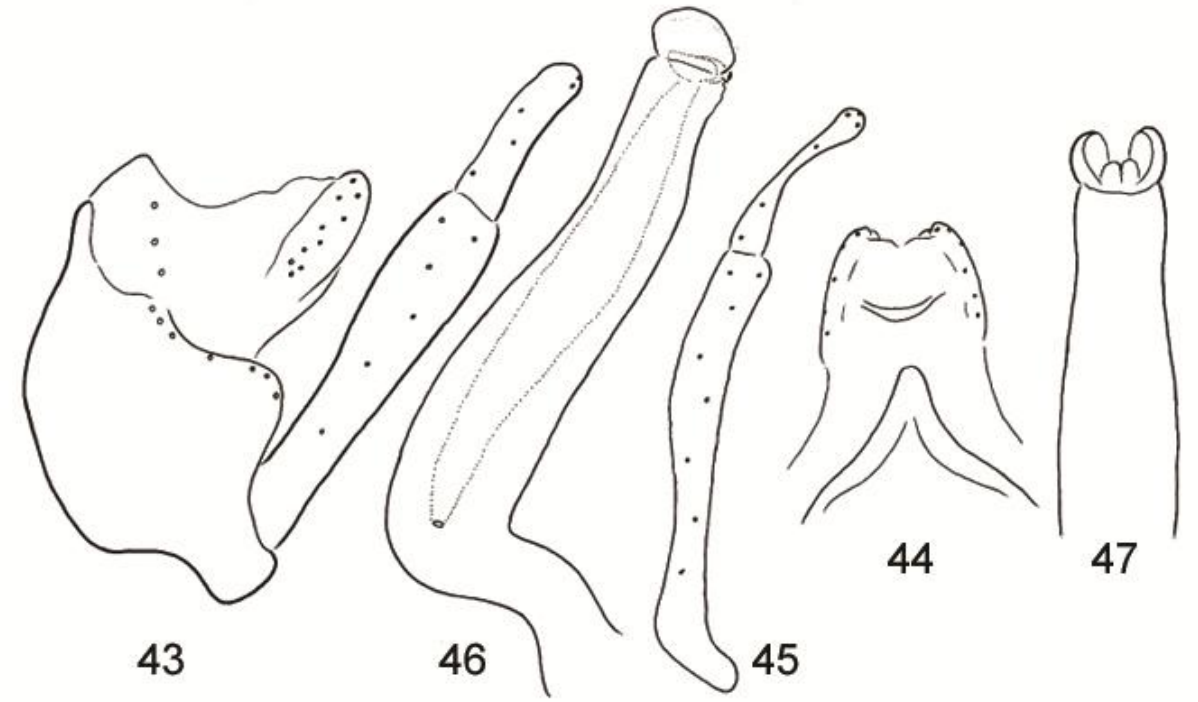
Figs 29-32. *Abacaria kimera* **spec. nov.** holotype ♂: **29**. genitalia in left lateral view; **30**. genitalia in dorsal view; **31**. gonopod in ventral view; **32**. phallic organ in left lateral view.



Figs 33-37. Paraproctal plates in lateral view as well as the phallic organ in lateral and ventral view *Hydropsyche orakaivai* new species complex: **33**. *H. orakaivai*; **34**. *H. rapsoni*; **35**. *H. kasimiri*; **36**. *H. simala*; **37**. *H. nakala*.



Figs 38-42. *Hydropsyche nakala* **spec. nov.** holotype ♂: **38**. genitalia in left lateral view; **39**. genitalia in dorsal view; **40**. gonopod in ventral view; **41**. phallic organ in left lateral view; **42**. phallic organ in ventral view.



Figs 43-47. *Hydropsyche simala* **spec. nov.** holotype ♂: **43**. genitalia in left lateral view; **44**. genitalia in dorsal view; **45**. gonopod in ventral view; **46**. phallic organ in left lateral view; **47**. phallic organ in ventral view.

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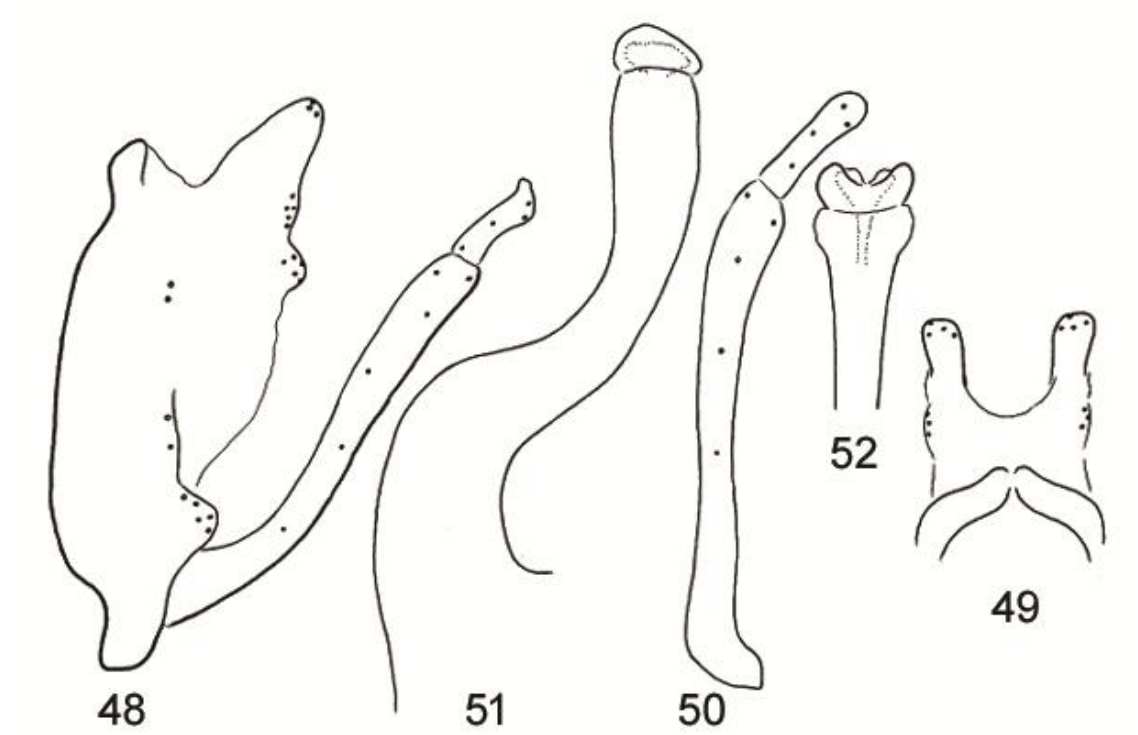
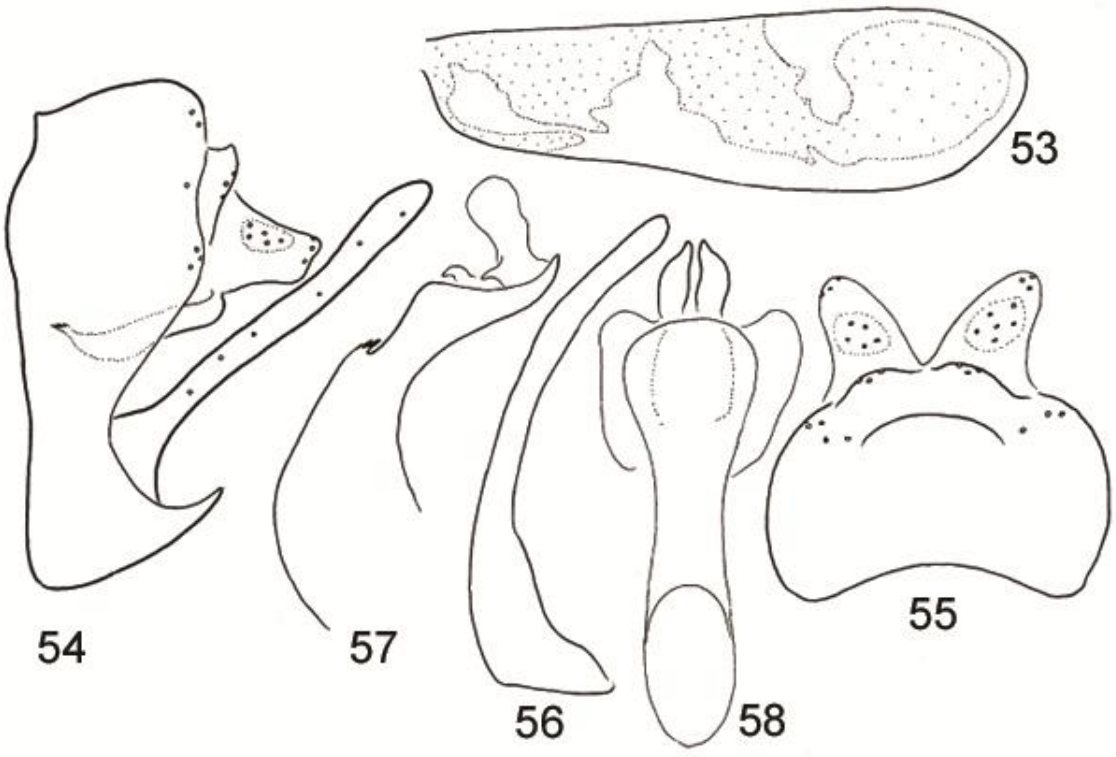
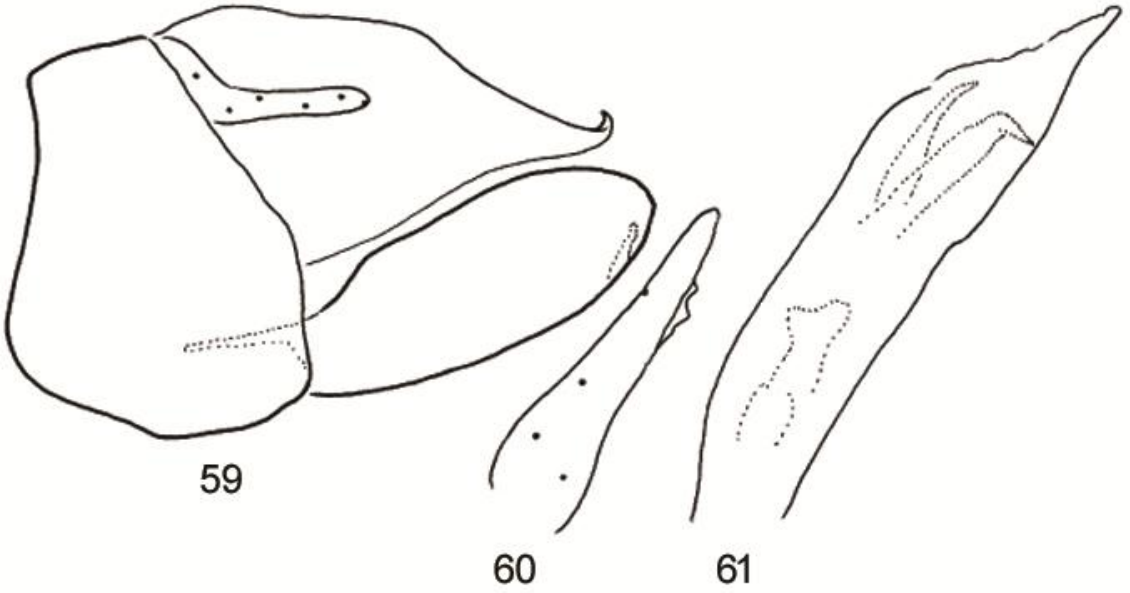


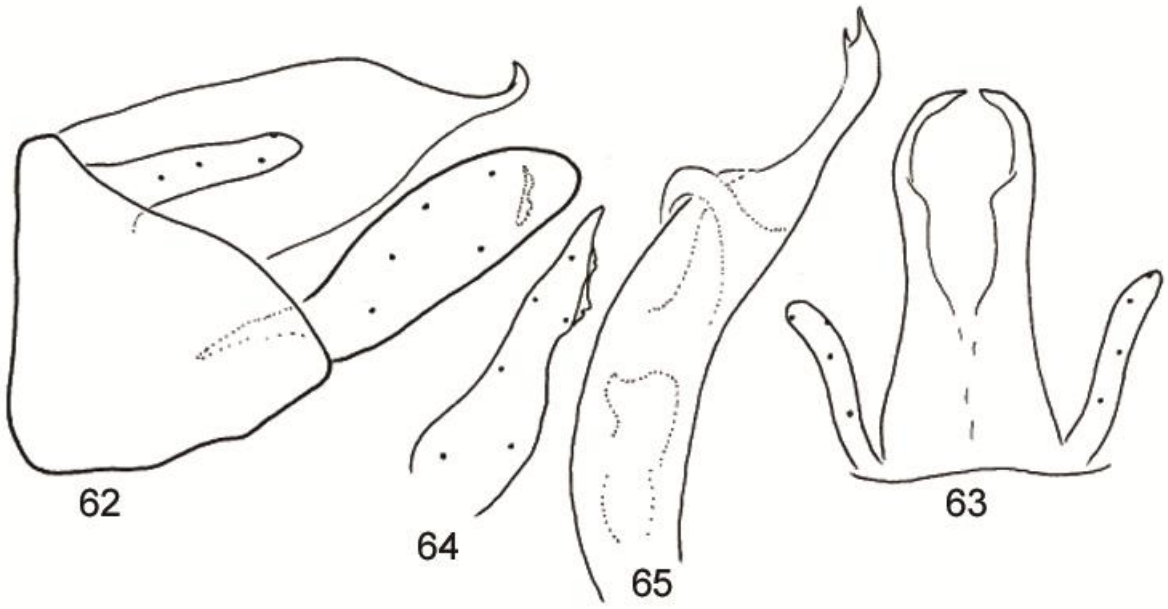
Figs 48-52. *Hydropsyche tompula* **spec. nov.** holotype ♂: **48**. genitalia in left lateral view; **49**. genitalia in dorsal view; **50**. gonopod in ventral view; **51**. phallic organ in left lateral view; **52**. phallic organ in ventral view.



Figs 53-58. *Baliomorpha maninae* **spec. nov.** holotype ♂: **53**. forewing pattern; **54**. genitalia in left lateral view; **55**. genitalia in dorsal view; **56**. gonopod in ventral view; **57**. phallic organ in left lateral view; **58**. phallic organ in ventral view.



Figs 59-61. *Agapetus ives* **spec. nov.** holotype ♂: **59**. genitalia in left lateral view; **60**. gonopod in ventral view; **61**. phallic organ in left lateral view.



Figs 62-65. *Agapetus villas* **spec. nov.** holotype ♂: **62**. genitalia in left lateral view; **63**. genitalia in dorsal view; **64**. gonopod in ventral view; **65**. phallic organ in left lateral view.

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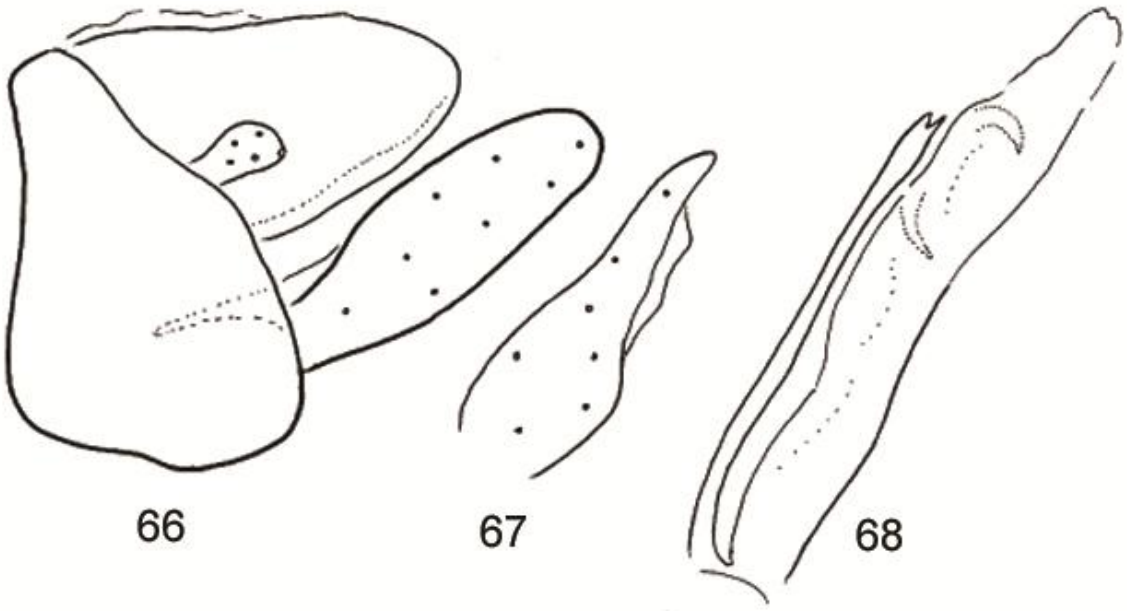
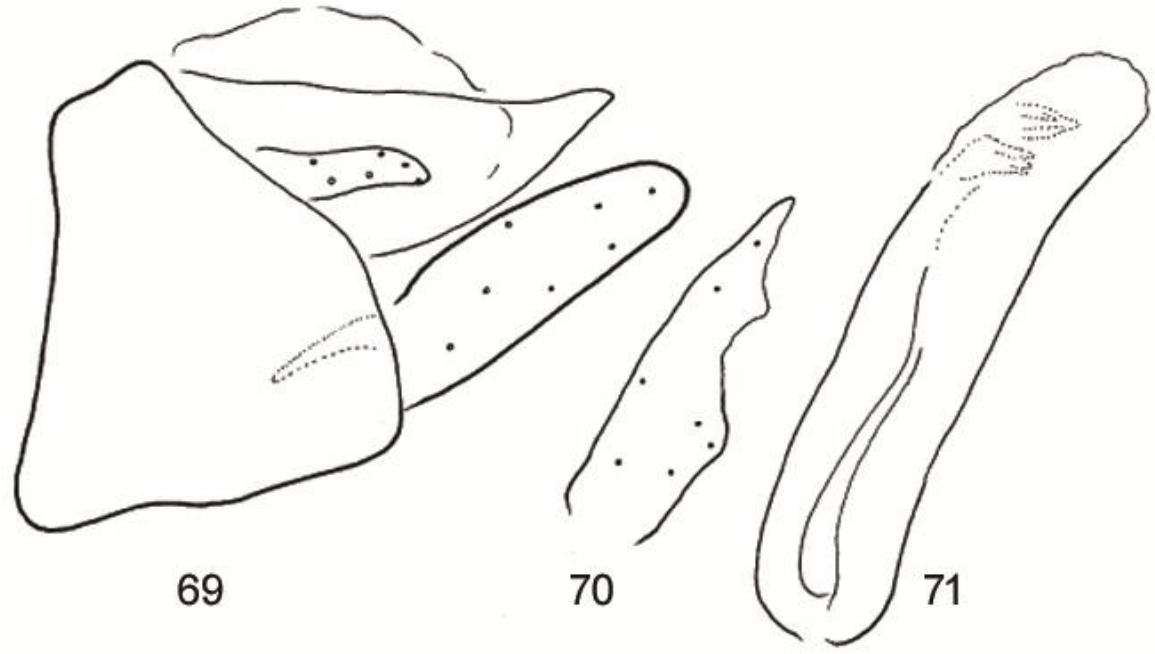
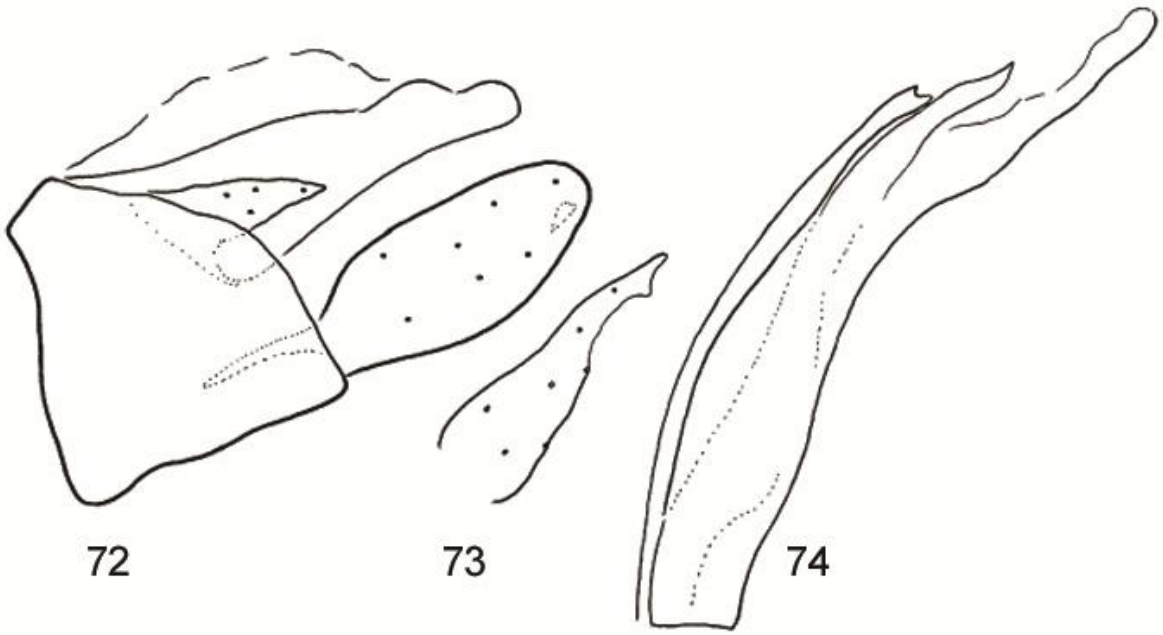


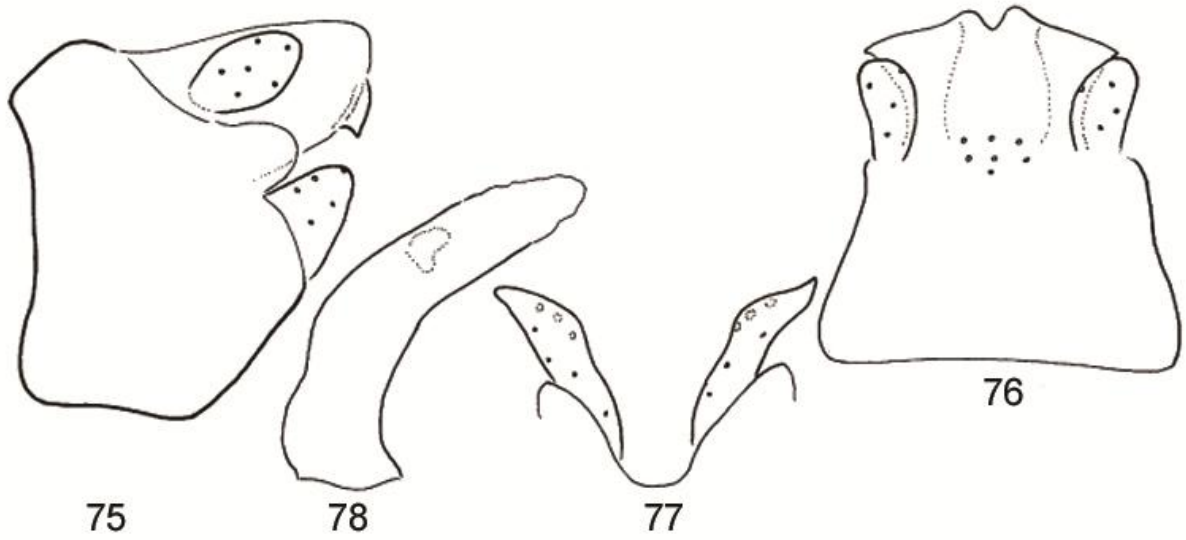
Figs 66-68. *Agapetus hullamos* **spec. nov.** holotype ♂: **66**. genitalia in left lateral view; **67**. gonopod in ventral view; **68**. phallic organ in left lateral view.



Figs 69-71. *Agapetus picin* **spec. nov.** holotype ♂: **69**. genitalia in left lateral view; **70**. gonopod in ventral view; **71**. phallic organ in left lateral view.



Figs 72-74. *Agapetus tus* **spec. nov.** holotype ♂: **72**. genitalia in left lateral view; **73**. gonopod in ventral view; **74.** phallic organ in left lateral view.



Figs 75-78. *Anisocentropus cyclopicus* **spec. nov.** holotype ♂: **75**. genitalia in left lateral view; **76**. genitalia in dorsal view; **77**. gonopod in ventral view; **78**. phallic organ in left lateral view.

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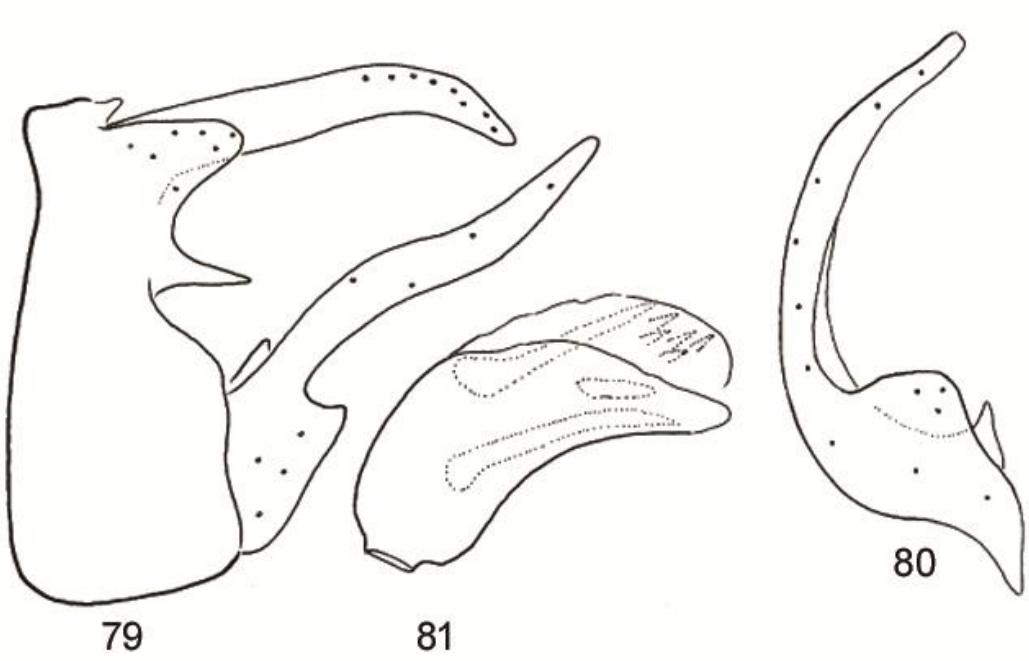
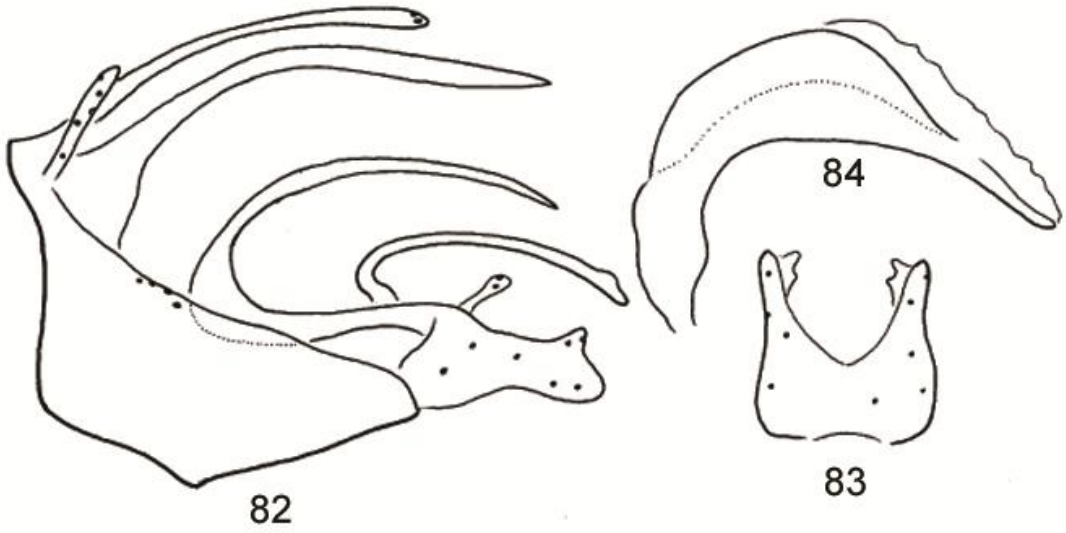
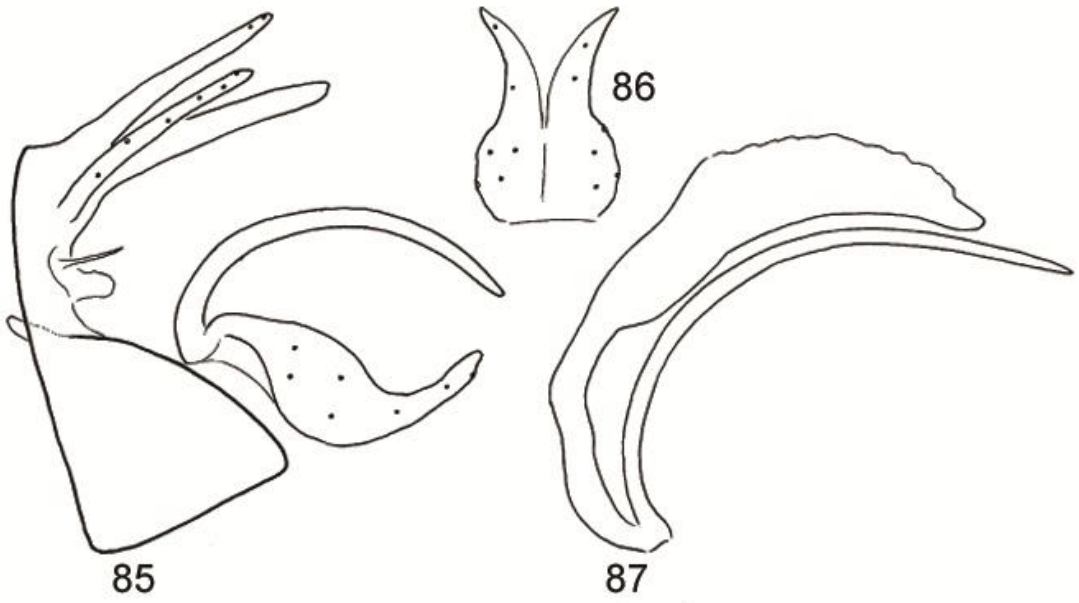


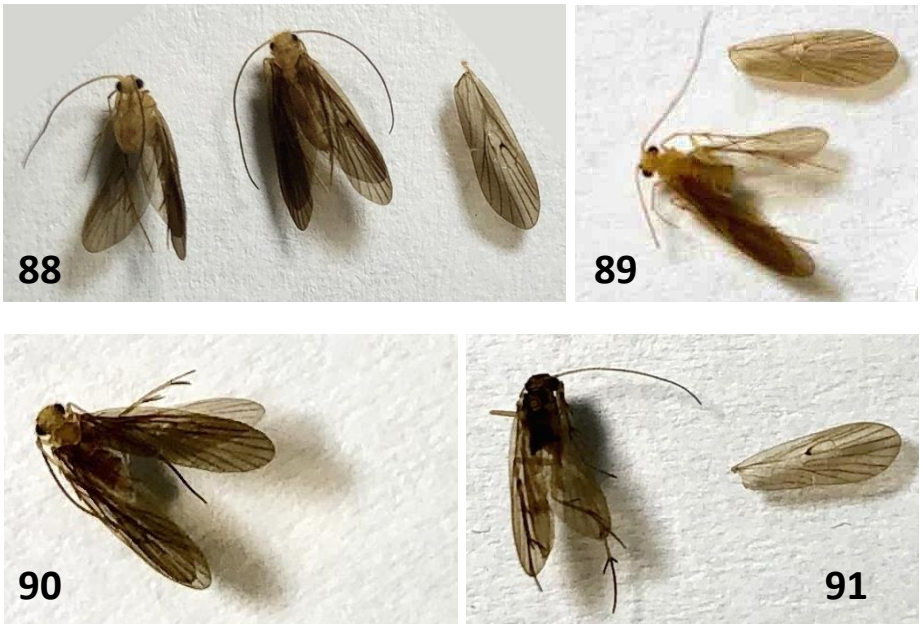
Figs 79-81. *Oecetis josievriesae* **spec. nov.** holotype ♂: **79**. genitalia in left lateral view; **80**. gonopod in ventral view; **81**. phallic organ in left lateral view.



Figs 82-84. *Triaenodes aikevriesi* **spec. nov.** holotype ♂: **82**. genitalia in left lateral view; **83**. gonopod in ventral view; **84**. phallic organ in left lateral view.



Figs 85-87. *Triaenodes davidvriesi* **spec. nov.** holotype ♂: **85**. genitalia in left lateral view; **86**. gonopod in ventral view; **87**. phallic organ in left lateral view.



Figs 88-91. Adults of new Trichoptera species, habitus. **88.** *Chimarra aikei* **spec. nov.**; **89.** *C. davidi* **spec. nov.**; **90.** *C. josieae* **spec. nov.**; **91.** *C. hendriki* **spec. nov.**

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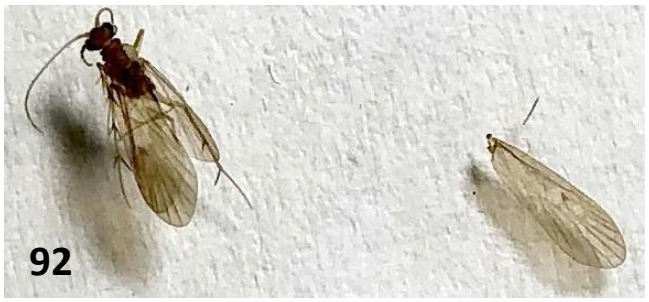

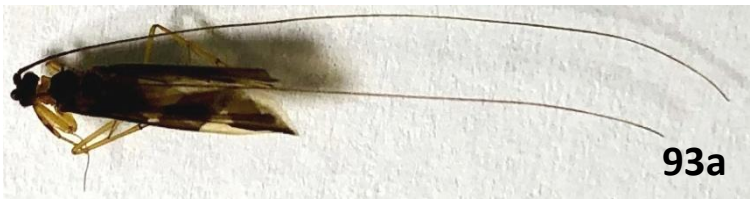

Figs. 92-96. Adults of new Trichoptera species, habitus. **92.** *Chimarra mendii* **spec. nov.**; **93.** *Baliomorpha maninae* **spec. nov.**, **a.** adult with removed right wing, **b.** right wing; **94.** *Oecetis josievriesae* **spec. nov.**; **95.** *Triaenodes aikevriesi* **spec. nov.**; **96.** *T. davidvriesi* **spec. nov.**

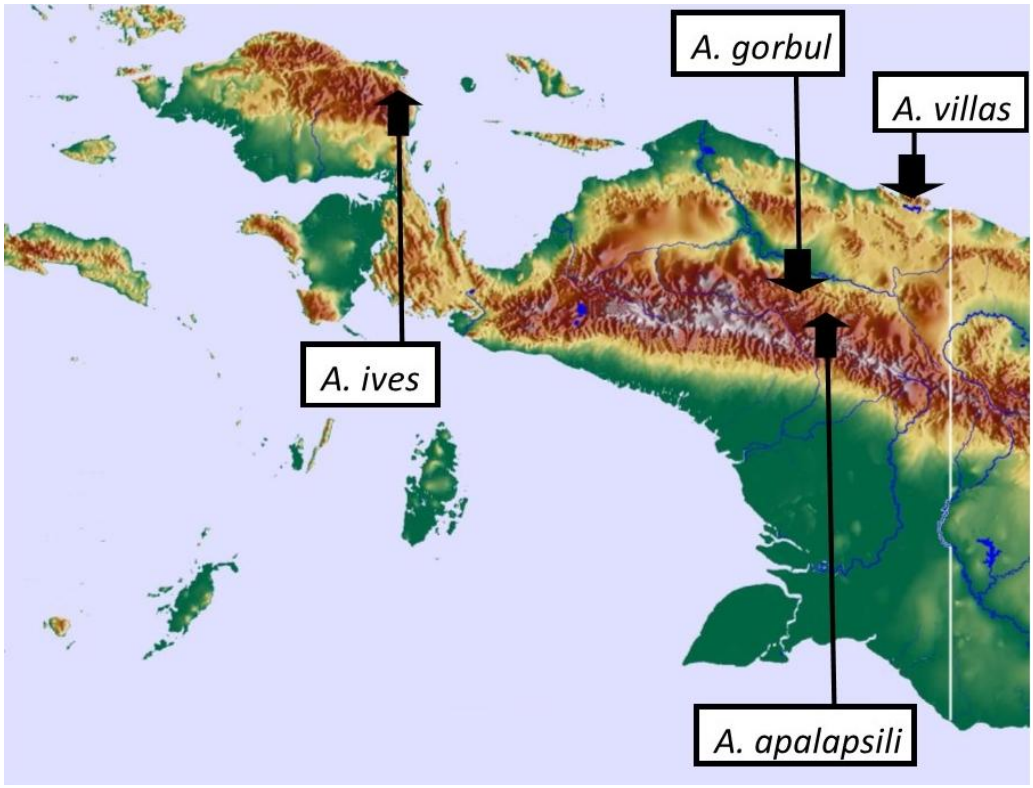

Fig. 97. Distribution of the known species in the *Hydropsyche orakaivai* new species complex.

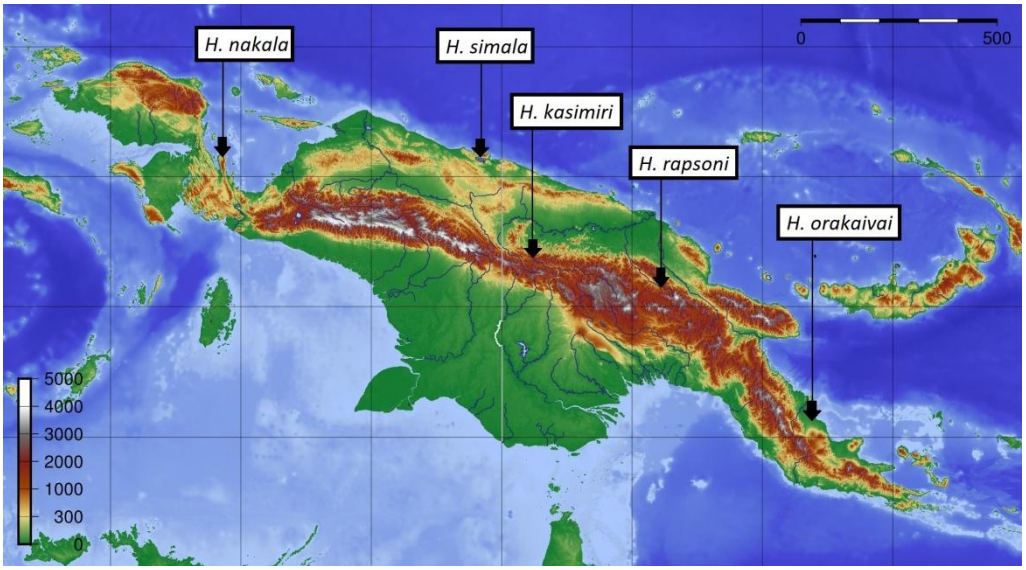

Fig. 98. Distribution of the known species in the *Agapetus gorbul* new species complex.

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Fig. 99. Pos 7, waterfall below at the slope of the Cyclops Mountains where many new species were collected

Fig. 100. View at the Cyclops Mountains from Sentani Airport