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***Cheumatopsyche galapitikanda* species cluster in Sri Lanka with the description of four new species (Trichoptera: Hydropsychidae)**

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Introduction.

The remarkable dark-winged and white-banded species of *Cheumatopsyche*, *C. galapitikanda*, was described by SCHMID (1958) from Ceylon (now Sri Lanka). He found this species commonly both along small rapid streams in the jungle and along large, slowly-flowing rivers. Examination of large collections of hydropsychid material collected by O.S. Flint, Jr., and Smithsonian colleagues in Sri Lanka has shown that these dark-winged, white-patterned animals represent several species. Even among the paratypes of *C. galapitikanda* we have found two species. Unfortunately Schmid did not clear the holotype of the species, and when it was prepared, it was found to be a different species from the one he figured and described. Finally we have found four new species related to *C. galapitikanda* and, together with the almost uniformly colored Sri Lankan species *C. hyppolite* MALICKY, there are six species with similar genital structure. These patterned *Cheumatopsyche* species from Sri Lanka belong to the *Cheumatopsyche lepida* group (OLÁH, et al. 2007) and here we separate them into a new species cluster.

MATERIAL AND METHODS

This study is based primarily on dry, pinned specimens collected by Fernand Schmid in 1954 and by O.S. Flint, Jr. and colleagues between 1970 and 1980, some of which were preserved in 80% ethyl alcohol. Schmid elected to label his collection with Provincial names, of which there are 9 in Sri Lanka. The Smithsonian survey used the 24 District names, as they were deemed more restrictive: both were abbreviated on the labels, but have been fully spelled out here. Pinned specimens of each species, except for one, were relaxed by immersion in 1% solution of Na_3PO_4 for 12-16 hours. The unique holotype of *C. garulupota* n.sp. was kept dry, only the abdomen being removed and cleared. In order to observe details in the genitalia, the entire abdomen was removed and placed in a small glass beaker of 25cm³ volume in a 10% KOH solution and boiled for 5-15 minutes, the duration depending on the effectiveness of the clearing process. The abdomen was subsequently transferred to distilled water and the macerated tissue removed using fine-tipped forceps and needles. The cleared abdomen was transferred to 80% ethyl alcohol, and then to glycerine for microscopic examination. Different sized pins were introduced into the abdomen and used to hold and stabilize the genitalia in lateral, dorsal and ventral positions for drawing. However, the plane of view is never perfect and we used no special procedures of grid, matrix or reflection to produce absolute mirror symmetry in the drawings. Instead, the genital structures are drawn exactly as seen in the microscope. The genital structure was traced in pencil on white paper using a drawing tube mounted on a WILD M3Z microscope at between 260x and 416x magnification. Final illustrations were prepared by enlarging the original pencil drawings and then were redrawn on transparent paper in Black India Ink. The

inked illustrations were scanned on an Epson expression 1680 Pro scanner in grayscale and 800 dpi resolution. The plates were arranged, and brightness and contrast edited in Adobe® Photoshop® 8.0 on a Macintosh G5. Careful studies of wing venation were carried out on the right wings mounted on dry permanent slides or on freshly cut right wings if a permanent preparation was not available. The cut right wings were carefully manipulated under cover slips in a glycerine solution for perfect extension. Studies of the maxillary palpi, various head characters, episternal warts, and claws and spurs of the legs were carried out in glycerine using different sized pins to establish and stabilize the parts in appropriate views. In addition to the spur formula, we have introduced a maxillary palp formula in order to simplify the presentation of the length ratio of the 5 palpal segments. The segment sequence represents the increasing segmental length, with equally long segments given in (brackets). When segment I is the shortest, segments II and IV equally long, but longer than segment I, segment III shorter than II and IV, and segment V the longest, the maxillary palp formula is I-III-(II, IV)-V. species descriptions were standardized to ensure consistently formatted and comparable description in general accord with Evenhus's template principle (2007).

Types of the species described herein and other material examined are deposited, as indicated in the species description, in the following institutions:

NMNH=National Museum of Natural History, Smithsonian Institution, Washington

OPC=Oláh, Private Collection

SMNH=Swedish Museum of Natural History, Stockholm

SYSTEMATICS

***Cheumatopsyche lepida* species group -**

Species of this group frequently have forewing patterns that can be used for separating many of the species (OLÁH et al. 2007). The genital morphology of the species in the group follows the ancestral *Cheumatopsyche* plan. The exception is in the characteristically trilobed segment X with long and upcurving apicoventral lobes. Segment IX rarely bears the apomorphic, ventrocaudal, spiny lobe. The mesocaudal lobe lacks setae and is well developed, triangular, rounded or quadrangular. If this mesocaudal lobe is shortened into a convex margin, the species could be easily misidentified as belonging to the *C. dubitans* species group which has a bilobed segment X. The *C. lepida* group is characterized by a pair of elongate, setose, ventroapical lobes curving dorsad in lateral aspect and curving mesally or laterally in dorsal aspect. The lobes encircle the deep, wide dorsolateral interlobular gap in both dorsal and lateral aspects and dominate the apex of segment X. A wart-like, lateral, setose area, the vestige of the preanal appendages, is usually located distad of the center of segment X. The species group ranges over the Oriental, West and East Palearctic, and Afrotropical biogeographic regions.

***Cheumatopsyche galapitikanda* species cluster**

These white-patterned *Cheumatopsyche* species from Sri Lanka belong to the *C. lepida* species group (OLÁH et al. 2007). The species cluster is distinguished by the apomorphic character combination of possessing a variably developed white forewing pattern and a secondary ventroapical pair of setaless flanges on segment X. These setaless lobes are located ventral and mesad

of the setose ventroapical process, and are strongest in *C. hageni* n.sp and less developed or lacking in *C. hippolyte* MALICKY. The forewing pattern follows a sequence of reduction from the from the strongest, most complete in *C. galapitikanda*, and *C. schmidiana*, through *C. hageni*, *C. tunmodera*, *C. garulupota* to the almost unmarked *C. hippolyte*. In both *C. galapitikanda* and *C. schmidiana* the pattern is present in both the setal covering and subtending membrane, in the other species the wing membrane is unicolored. The forewing patterns shown here are only approximations as there is some variation, and properly spread animals were often not available or they were rubbed.

***Cheumatopsyche galapitikanda* (SCHMID)**

Hydropsychodes galapitikanda SCHMID, 1958: 116-117.

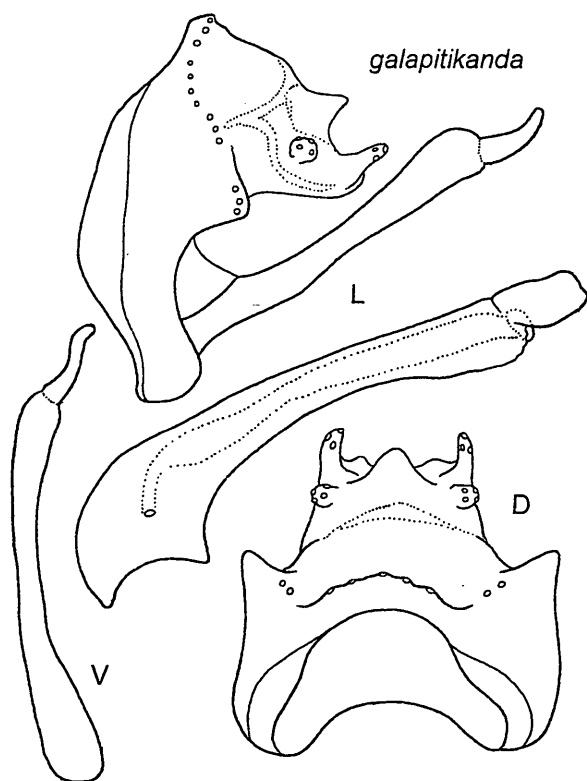
The holotype of this species was not cleared and drawn by SCHMID (1958). The figures and description was clearly based on cleared and slide-mounted paratypes. When the holotype was cleared for this study it was found to differ from those specimens that Schmid had based his description upon. The International Code of Zoological Nomenclature (1999) requires that the identity of the species follows that of the holotype, regardless of the figures and description. We here redescribe *C. galapitikanda* based on the holotype and describe *C. schmidiana* n.sp. based on the paratypes Schmid used for his description.

This is a dark brown, almost fuscous, animal that most resembles *Cheumatopsyche hageni* n.sp.. However, its ventroapical setose lobe of segment X is elongate, and the mesocaudal setaless lobe does protrudes as a triangular lobe in both lateral and dorsal aspects. The phallic apparatus is less slender, the venter with a long subapical broadening, and with a longer, chitinised, endotheal process. However, the most

striking difference is in the forewing pattern. *C. galapitikanda* (SCHMID) has the same pattern of five white bands, but the configuration is more complete and less diffuse, and the pattern is not only in the white setae, but the pattern is present also in the denuded membrane.

Male. Body dark brown, with legs paler brown. Maxillary palpus with segment I shortest, segments III and IV equal, segment II longer than segment III and IV, segment V equal to segments I-IV together, resultant formula: I-(III,IV)-II-V. Dorsum of head dark fulvous with 9 almost indiscernible warts a little paler, visible only as angle of lighting changes; mesolateral warts with small additional warts. Swollen setal wart absent on proepisternum, setal surface present on precoxale. Protarsal claw asymmetrical, flanked laterally by setal bundle; claws of second and third legs also asymmetrical. Spur formula 2,4,4; posteroapical spur on first leg paler and only half length and width of anteroapical spur. Forewing length 5.2mm. Forewing membrane evenly pale fuscous with veins slightly darker, and with five, bright, white bands; these bands are not only a setal pattern, but also in the denuded membrane. Median linear window, a transparent hyaline line on vein M, present and well developed starting just before its first bifurcation and continues well after the first bifurcation along M_{1+2} . Forewing m-cu meets cu, SC and R run free to margin, Cu_2 and A1 run free to margin, not confluent. Hindwing SC and R meet apical of r by 0.3x length of r, r meeting with s in an oblique line, fork 1 absent.

Male genitalia. IXth abdominal segment annular, tergum very short, sternum 3x wider; anterior margin convex; slightly concave dorsad, apical lobe of posterior margin bluntly triangular, almost right-angled, slightly above lightly sclerotized articulation cavity of inferior appendages. Antecosta of IX (ridge on inner surface supporting longitudinal muscles) well developed, wide, gradually narrowed ventrad and abruptly narrowed dorsad, with antecostal suture visible externally. Spine row on posterior margin of IX continuous and heterogeneous, spines on dorsolateral lobe 3x those on apical lobe, peak of apical lobe with 3-4 spines well developed; in dorsal aspect with apical lobes fused, bearing alveoli, serrated. Intersegmental indentation between segments IX and X very small. Segment X medium long both in lateral and dorsal aspects; subtriangular, narrowing slightly apicad in lateral view, with protruding setaless mesocaudal and ventroapical, setose lobes. Segment X in dorsal aspect quadrangular; interlobular gap wide, flanked laterally by ventroapical, setose lobes, filled partially by the triangular, setaless, mesocaudal lobe and secondary, setaless ventroapical flanges. Sutures of segment X well developed, transverse suture crossing obliquely the segment in lateral view, strongly pigmented, strengthened in mid-dorsal area and forming a dorsal ridge; longitudinal suture broad and appearing as a continuation of ventroapical setose lobe meeting the transverse suture, forming a clear Y-shaped pattern, stem short. Setaless mesocaudal lobe triangular in dorsal aspect, protrudent, ventroapical, setose lobe long and slender, obliquely upcurved in lateral and curved slightly mesad in dorsal views; secondary, setaless, ventroapical flange present, smaller than ventroapical, setose lobe. Lateral setose area (preanal appendage) forming an elevated wart on apicocentral position and surrounded by a lightly pigmented, oval window partially embraced by transverse and longitudinal sutures. Coxopodite extends much beyond apex of segment X, cylindrical, dilated toward apex; harpago slender and upcurved in lateral aspect; slightly sinuate in ventral aspect. Phallosome slender, basal section slightly broader and bent at right angles to



stem, midregion slightly arched dorsad and more convex ventrad in lateral aspect, thus narrowing midway, followed by elongate widening of venter apicad. Endophallus narrow, long, extending through almost the entire phallosome, narrowed before gonopore; chitinized endothecal process long and subquadrangular, strongly pigmented; phallosomal sclerite round in lateral aspect.

Holotype, male: Designated by SCHMID (1958): **CEYLON:** Central Province, Ulapane, 24.i.1954 (F. Schmid) (NMNH).

Paratypes: Designated by SCHMID (1958): Same data - 1 female allotype, 1 female (NMNH). **CEYLON:** Sabaragamuwa Province, Ratnapura, 03.ii.1954 (F. Schmid) - 1 male (NMNH). **CEYLON:** Sabaragamuwa Province, Kitulgala, 02.iii.1954 (F. Schmid) - 1 male, 1 female (NMNH).

New Records: **SRI LANKA:** Ratnapura District, 2 mi S Weddagala, Sinharaja Jungle, 8-12.ii.1977, blacklight trap (K.V. Krombein, P. Fernando, D.W. Balasooriya, V. Gunawardane) - 2 males (NMNH). **SRI LANKA:** Ratnapura District, Kudava Ganga, 2000ft., 16.iv.1973 (Baumann & Cross) - 1 male, 1 female (NMNH). **SRI LANKA:** Ratnapura District, Ratnapura, 7.ii.1977 (K.V. Krombein, P. Fernando, D.W. Balasooriya, V. Gunawardane) - 1 male (NMNH). **SRI LANKA:** Ratnapura District, Kalu Ganga, Induruwa Jungle, 1000ft., 23.iii.1973 (Baumann & Cross) - 1 male, 3 females (NMNH). **SRI LANKA:** Ratnapura District, Kukla Ganga, 1000ft., 16.iv.1973, at blacklight (Baumann & Cross) - 1 male (NMNH). **SRI LANKA:** Ratnapura District, Gilimale, 17-18.vi.1976, light trap (K.V. Krombein, P.B. Karunaratne, S. Karunaratne) - 1 male, 2 females (NMNH). **SRI LANKA:** Ratnapura District, Gilimale, Induruwa Jungle, 5-7.ii.1977 (K.V. Krombein, P. Fernando, D.W. Balasooriya, V. Gunawardane) - 2 females (NMNH). **SRI LANKA:** Ratnapura District, Gilimale, Kalu Ganga, 27-28.i.1978 (M.D. Hubbard & T. Wijesinhe) - 1 male (NMNH), 1 male (OPC). **SRI LANKA:** Kegalla District, Kitulgala Rest House, 150m., 15-17.x.1976 (K.V. Krombein, T. Wijesinhe, M. Jayaweera, P.A. Panawatta) - 1 male (NMNH); same, but 3-6.ii.1979, Malaise trap (K.V. Krombein, P.B. Karunaratne, T. Wijesinhe, S. Siriwardane, T. Gunawardane) - 1 male (NMNH). **SRI LANKA:** Galle District, Kanneliya, 200ft., 15-17.x.1976 (G.F. Hevel, R.E. Dietz IV, S. Karunaratne, D.W. Balasooriya) - 9 males, 10 females (NMNH); same, but 500ft., 21-22.iv.1973 (Baumann & Cross) - 6 males, 19 females (NMNH); same, but 6-15.viii.1975 (Panawatte) - 4 males (NMNH). **SRI LANKA:** Galle District, Kanneliya, Sinharaja Jungle, 9-10.xi.1977, Malaise trap (K.V. Krombein, P.B. Karunaratne, T. Wijesinhe, M. Jayaweera) - 6 males, 1 female (NMNH); same, but 24-26.i.1979 - 1 female (NMNH); same, but 2-5.x.1980, blacklight - 10 males, 2 females (NMNH); same, but 13-16.vii.1978, Malaise trap - 3 males, 4 females (NMNH). **SRI LANKA:** Galle District, Kanneliya Jungle, 14-16.i.1975, white light (K.V. Krombein, P.B. Karunaratne, P. Fernando, N.V.T.A. Weragoda) - 11 males, 4 females (NMNH); same, but 11-16.i.1975, blacklight - 14 males, 7 females (NMNH); same, but 300ft., 28.vii.1973, blacklight (G. Ekiş) - 19 males, 11 females (NMNH). **Sri Lanka:** Udugama, Kanneliya Jungle, 400ft., 6-12.x.1973, at black light (K.V. Krombein, P.B. Karunaratne, P. Fernando, J. Ferdinando) - 31 males, 41 females (NMNH); same, but 11mi. E Udugama, [no elevation], 11.x.1973 - 7 males, 7 females (NMNH); same, but 4mi. E Udugama, 7.x.1973, in Malaise trap - 1 female (NMNH).

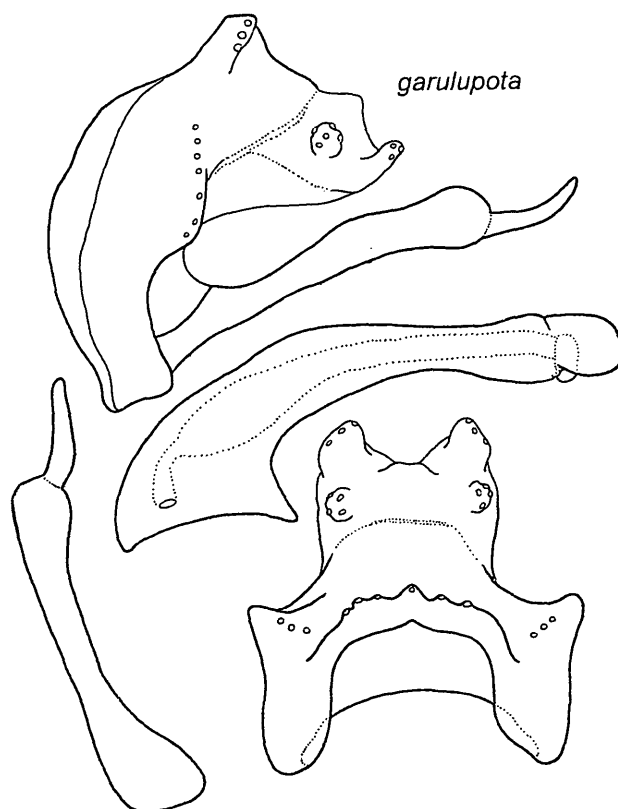
Distribution: Sri Lanka.

Etymology: The name was given by the author, Fernand Schmid, without explanation.

***Cheumatopsyche garulupota* n.sp.**

This brown-winged animal with reduced wing pattern is questionably placed in the *C. galapitikanda* species cluster due to its rather vestigial, secondary setaeless, ventroapical flange of the X segment. The truncate mesal margin of the setaeless, mesocaudal lobe of this small sized species, allies it most closely to *C. hageni* n.sp., however, its ventroapical, setose lobes are more robust and the phallosome is more strongly arched. The antecosta of the IXth segment is narrow, not wide. Male. Body dark brown, legs paler brown. Maxillary palpus segment I shortest, segments III and IV equal, segment II longer than segment III and IV, segment V equal to segments I-IV together, resultant formula: I-(III,IV)-II-V. Dorsum of head brown, intact, not denuded, warts indiscernible due to dense setae. Swollen setal wart absent on proepisternum, setal surface present on precoxale. Protarsal claw on dried, pinned holotype seems asymmetrical, flanked laterally by setal bundle; claws of second and third legs also asymmetrical. Spur formula 2,4,4; posteroapical spur on first leg pale and only half length and width of anteroapical spur. Forewing length 4.2mm. Forewing brown with veins slightly darker, and with remnants of five pale bands without any clear pattern; membrane without any pattern. Forewing SC and R run free to margin, Cu₂ and A1 run free to margin, not confluent. Hindwing SC and R met at r, r basad of s by 0.5x length of s, fork 1 absent.

Male genitalia. IXth abdominal segment annular, tergum very short, sternum 2x wider; anterior margin convex; deeply concave dorsad, apical lobe of posterior margin bluntly rectangular, slightly above lightly sclerotized articulation cavity



of inferior appendages. Antecosta of IX (ridge on inner surface supporting longitudinal muscles) narrow, gradually narrowing ventrad and with antecostal suture visible externally. Spine row on posterior margin of IX with a break subdorsally, spines on dorsolateral lobe 4x those on apical lobe, peak of apical lobe with 3-4 spines well developed; in dorsal aspect with apical lobes fused, bearing alveoli, serrated with a minute triangular projection centrally. Intersegmental indentation between segments IX and X a gradual slope. Segment X medium long both in lateral and dorsal aspects; subtriangular in lateral view, narrowing slightly apicad, terminating distally by slightly produced setaless mesocaudal lobe and upcurved, ventroapical setose lobe. Segment X in dorsal aspect quadrangular, interlobular gap broadly triangular, setaless mesocaudal lobe with posterior margin truncate; ventroapical, setose lobe obliquely upcurved in lateral and short and broad in dorsal views; secondary, setaless, ventroapical flange visible only in dorsal aspect. Sutures of segment X well developed, transverse suture crossing obliquely the segment in lateral view, strongly pigmented, strengthened in the mid-dorsal area and forming a small dorsal ridge; longitudinal suture appearing as a continuation of apicoventral setose lobe meeting the transverse suture, forming a clear Y-shaped pattern, stem short. Lateral setose area (preanal appendage) forming an elevated wart on apicocentral position and surrounded by a lightly pigmented, oval window partially embraced by transverse and longitudinal sutures. Coxopodite extends much beyond apex of segment X, cylindrical, slightly bowed at midlength, barely dilated at apex; harpago slender and upcurved in lateral aspect; slightly sinuate in ventral aspect. Phallosome slender, basal section slightly broader and bent at right angles to stem, midregion slightly arched in lateral aspect, with a pronounced narrow section after midpoint, followed by apex broadening into a distinctive, ventral bulge. Endophallus long, extending through almost the entire phallosome, ending at a narrow gonopore; chitinized endothelial process short and subcircular, strongly pigmented; phallosomal sclerite rounded in lateral aspect.

Holotype, male: CEYLON: Kandy District, Garulupota near Hasalaka, 800 ft., 22.xi.1970 (O.S. Flint, Jr.) (NMNH).

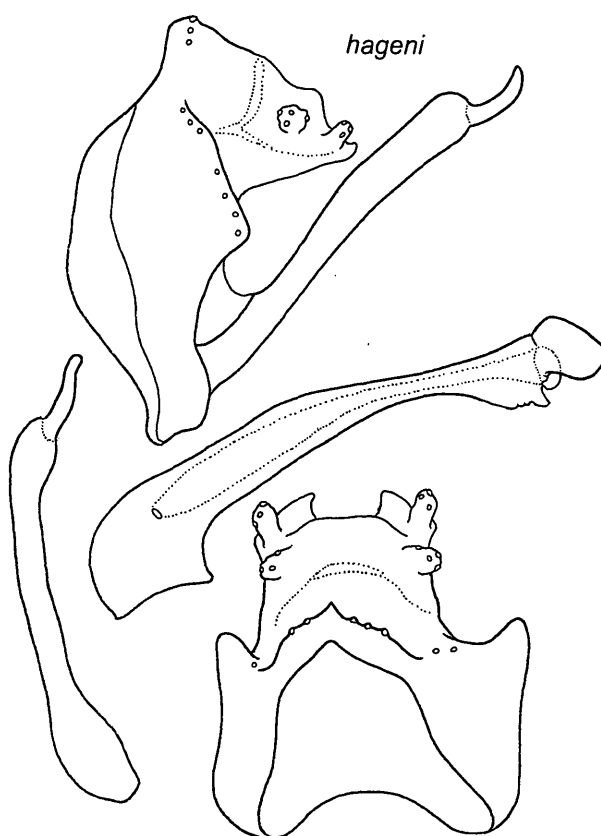
Distribution: Sri Lanka.

Etymology: Named after its type locality.

Cheumatopsyche hageni n.sp.

This is a dark brown, almost fuscous, animal that most resembles *Cheumatopsyche galapitikanda* (SCHMID). However, its ventroapical, setose lobe of segment X is not elongate, and the mesocaudal, setaless lobe does not protrude as a triangular lobe in either lateral and dorsal aspects. The phallic apparatus is more slender, the venter more strongly broadened subapically, and with a shorter, chitinized, endothelial process. However, the most striking difference is in the forewing pattern. *C. hageni* n.sp. has the same pattern of five white bands, but the configuration is less complete and more diffuse, and the pattern is only in the white setae, the membrane being almost without pattern except for the middle band being paler in the costal and subcostal cells.

Male. Body dark brown, almost fuscous, with legs paler brown. Maxillary palpus with segment I shortest, segments III and IV equal, segment II longer than segment III and IV, segment V equal to segments I-IV together, resultant formula: I-(III,IV)-II-V. Dorsum of head dark fulvous with 9 almost indiscernible warts a little paler, visible only as angle of



lighting changes. Swollen setal wart absent on proepisternum, setal surface present on precoxale. Protarsal claw asymmetrical flanked laterally by setal bundle; claws of second and third legs also asymmetrical. Spur formula 2,4,4; posteroapical spur on first leg paler and only half length and width of anteroapical spur. Forewing length 5.7mm. Forewing membrane evenly pale fuscous with veins slightly darker, and with paler elongate band extending from the costal margin to first fork of SR, almost reaching distal end of median linear window. Median linear window, a transparent hyaline line on vein M, present and well developed starting just before its first bifurcation and continues well after the first bifurcation along M_{1+2} . Intact forewing with well defined pattern of 5 white bands, remnant of the 5 *galapitikanda* bands; this pattern is due only to white setae, and is lacking in the membrane and easily lost in rubbed specimens. Forewing m-cu apicad of cu by 0.5x length of crossvein, SC and R run free to margin, Cu_2 and A1 run free to margin, not confluent. Hindwing SC and R met apicad of r by 0.4x length of r, r meeting with s in an oblique line, fork 1 absent.

Male genitalia. IXth abdominal segment annular, tergum very short, sternum 1.5x wider; anterior margin convex; slightly concave dorsad, apical lobe of posterior margin bluntly triangular, slightly above lightly sclerotized articulation cavity of inferior appendages. Antecosta of IX (ridge on inner surface supporting longitudinal muscles) well developed, wide, narrowed ventrad and with antecostal suture visible externally. Spine row on posterior margin of IX with a break subdorsally, spines on dorsolateral lobe 3x those on apical lobe, peak of apical lobe with 3-4 spines well developed; in dorsal aspect with apical lobes fused, bearing alveoli, serrated, with a minute triangular projection centrally. Intersegmental indentation between segments IX and X, lacking. Segment X medium long

both in lateral and dorsal aspects; subtriangular in lateral view, narrowing slightly apicad, terminated distally by the setaless, mesocaudal lobe and the small, upcurved, ventroapical, setose lobe. Segment X in dorsal aspect quadrangular with laterally curved, ventroapical, setose lobes; interlobular gap almost gone, filled partially by the truncate, setaless, mesocaudal lobe and secondary, setaless, ventroapical flange, secondary, setaless ventroapical lobe about size of ventroapical, setose lobe. Sutures of segment X well developed, transverse suture crossing obliquely the segment in lateral view, strongly pigmented, strengthened in mid-dorsal area and forming a dorsal ridge; longitudinal suture broad and appearing as a continuation of apicoventral, setose lobe, meeting the transverse suture, forming a clear Y-shaped pattern, stem short. Lateral setose area (preanal appendage) forming an elevated wart on apicocentral position and surrounded by a lightly pigmented, oval window partially embraced by transverse and longitudinal sutures. Coxopodite extends much beyond apex of segment X, cylindrical, slightly bowed at midlength barely dilated at apex; harpago slender and upcurved in lateral aspect, slightly sinuate in ventral aspect. Phallosome slender, basal section slightly broader and bent at right angles to stem, mid region slightly arched in lateral aspect, with a pronounced narrow section after midpoint, followed by apex broadening into a distinctive ventral bulb. Endophallus long, extending through almost the entire phallosome, ending at a narrow gonopore; chitinized endothelial process short and subcircular, strongly pigmented; phallosomal sclerite rounded in lateral aspect.

Holotype, male: CEYLON: Kandy District, Jambugastenne, near Laksapana, 1000 ft., 27.ix.1970 (O.S. Flint, Jr.) – (NMNH).

Paratypes: Same data, 1 male (NMNH), 1 male (OPC), 1 male (SNHM).

Distribution: Sri Lanka.

Etymology: Named after Herman A. Hagen who carried out the first studies on the Ceylonese neuropteroids in the years 1858-1859.

Cheumatopsyche hippolyte MALICKY 1997

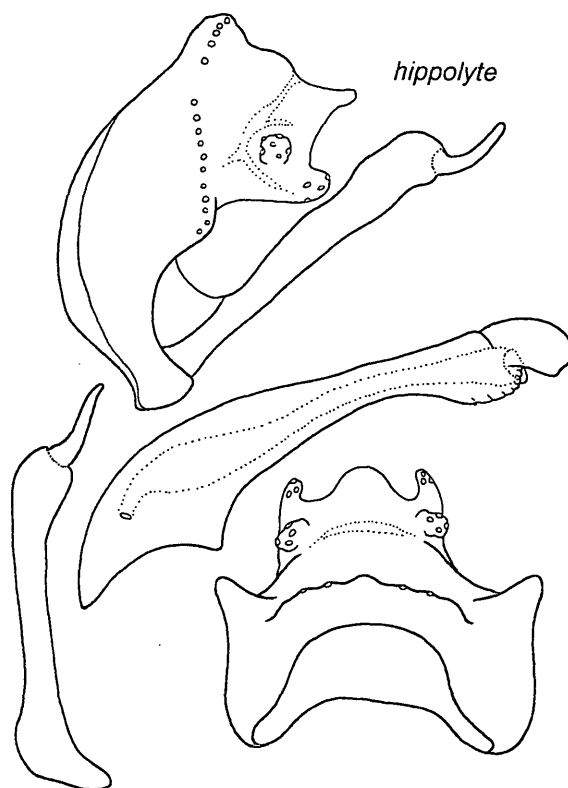
Cheumatopsyche hippolyte MALICKY 1997: 1025-1026, pl.4.

Remarks: This species, described by MALICKY from Sri Lanka, is a member of the *C. galapitikanda* species cluster. The character combination of reduced, forewing pattern and poorly developed, secondary, setaless flange of the X tergum are diagnostic. It is easily distinguished from the rest of the cluster by its almost unicolored forewing. It is most close to *C. tunmodera* n.sp., however, its ventral half of the IXth segment is not as narrow nor as parallel-sided. The setaless, mesocaudal lobe of segment X is rather blunt, not acutely triangular as in *C. tunmodera* n.sp. The transparent, hyaline window surrounding the preanal appendage is rounded, not horizontally elongate. The most distinctive feature of *C. hippolyte* MALICKY is the forewing without strong pattern, with only a few, small, paler spots or irrorations visible only on dry, pinned animals.

Type locality: Sri Lanka.

New Records: Ceylon: Kandy District, Kobonella estate near Loolooowatte, 3200ft., 25.xi.1970 (O.S. Flint, Jr.) – 1 male (NMNH). **Ceylon:** Kandy District, Kiriwan Eliya, Sigira-Alle, 3000ft., 28.ix.1970 (O.S. Flint, Jr.) – 1 male, (NMNH). **Ceylon:** Nuwara Eliya District, Great Western Estate, near Talawakele, 4200ft., 5.x.1970 (O.S. Flint, Jr.) – 1 female (NMNH). **Sri Lanka:** Matale District, Elkaduwa, Hunas Falls, 3000ft.,

5.iv.1973, at black light (Baumann & Cross) – 2 males (NMNH). **Sri Lanka:** Badulla District, Koslanda, Diyaluma Falls, 3000ft., 19.iii.1973 (Baumann & Cross) – 1 male (NMNH).

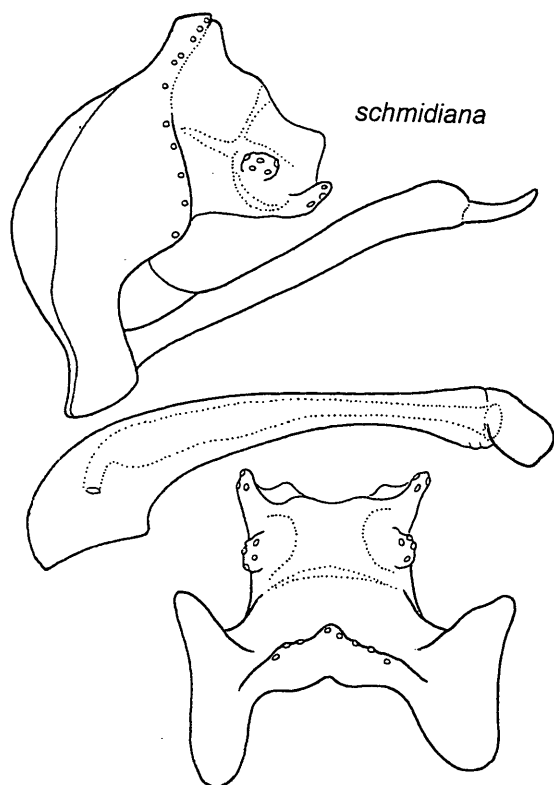


Cheumatopsyche schmidiana n.sp.

Hydropsychodes galapitikanda SCHMID, 1958: 116-117, pl. 21, figs. 1, 2 [misidentification]..

This new animal was found among the paratypes of *Cheumatopsyche galapitikanda* (SCHMID). It is dark brown, almost fuscous, and most resembles *C. hageni* n.sp. However, its apicoventral, setose lobe of segment X is directed more laterad, and the setaless, apicoventral flange is less well developed. The phallosome is less constricted, its ventral, subapical widening not so pronounced, and the chitinized endothelial process is longer. The most striking difference is in the forewing pattern. *C. hageni* has the same pattern of five white bands, but they are more diffuse and, moreover, the pattern is due to the setae, the denuded membrane only shows a paler area at the middle band in the costal and subcostal cells. *C. schmidiana* n.sp. has the densest pattern of five white bands, and this pattern is present also in the membrane. In this characteristic it resembles *C. galapitikanda* (SCHMID), but the pattern is less compact.

Male. Body dark brown, legs paler brown. Maxillary palpus segment I shortest, segments III and IV equal, segment II longer than segment III and IV, segment V equal to segments I-IV together, resultant formula: I-(III,IV)-II-V. Dorsum of head dark brown with 9 clearly visible warts of lighter color. Swollen setal wart absent on proepisternum, setal surface present on precoxale. Protarsal claw asymmetrical, with lateral setal bundle; claws of second and third legs also asymmetrical. Spur formula 2,4,4; posteroapical spur on first leg pale, only



schmidiana

half length and half width of anteroapical spur. Forewing length 5.4mm. Forewing dark brown; denuded membrane with five , white, distinct, transverse bands of differing configurations; apical and subapical bands reaching from costa only to mid-wing. Median linear window, a transparent hyaline line on vein M, present and well developed, starting just before its first bifurcation and continuing along M_{1+2} , no other pattern visible in the membrane. Forewing m-cu and cu continuous in a straight line, SC and R run free to margin, Cu_2 and A1 run free to margin, not confluent. Hindwing SC and R met apicad of r by 0.4x length of r, r meeting with s in an oblique line, fork 1 absent.

Male genitalia. IXth abdominal segment annular, tergum very short, sternum 2x wider; anterior margin convex; more deeply concave dorsad than ventrad, apical lobe of posterior margin broadly rounded, slightly above lightly sclerotized articulation cavity of inferior appendages. Antecosta of IX (ridge on inner surface supporting longitudinal muscles) narrow, strongly narrowing dorsad and ventrad and with antecostal suture visible externally. Spine row on posterior margin of IX intermittent, with a small break subdorsally, spines on dorsolateral lobe 3x those on apical lobe, in dorsal aspect with apical lobes fused, bearing alveoli, serrated with a small triangular projection centrally. Intersegmental indentation between segments IX and X shallow, obsolete. Segment X short, quadrangular slightly narrowed apicad in lateral aspect, apex formed by rectangular, setaless, mesocaudal lobe, slightly concave dorsally and small, upcurved, ventroapical setose lobe; in dorsal aspect quadrangular with ventroapical lobes curved laterad; interlobular gap wide and shallow filled partially by truncate, setaless, mesocaudal lobe and setaless, ventroapical flange. Sutures of segment X well developed, transverse suture crossing obliquely the segment in lateral view, strongly pigmented, strengthened in the mid-dorsal area and forming a dorsal ridge; longitudinal suture broad, appearing as a

continuation of ventroapical setose lobe while encircling the preanal appendages ventrally meeting the transverse suture, forming a clear Y-shaped pattern. Lateral setose area (preanal appendage) forming an elevated wart on central position and surrounded by a lightly pigmented, circular window partially embraced by transverse and longitudinal sutures. Coxopodite extends much beyond apex of segment X, cylindrical, slightly bent ventrad subapically, without dilation at apex; harpago slender and upcurved in lateral aspect; slightly curved mesad in ventral aspect. Phallosome broad, basal section broader and bent at right angles to stem, midregion convex dorsally and concave ventrally in lateral aspect, narrowed beyond midlength followed by apex broadening into ventral bulge. Endophallus long, extending through almost the entire phallosome, ending at a narrow gonopore; chitinized endothelial process elongate and subquadrangular, strongly pigmented; phallosomal sclerite rounded in lateral aspect.

Holotype, male: [SCHMID (1958) designated paratype of *C. galapitkanda*] **CEYLON:** Sabaragamuwa Province, Niriella, 04.ii.1954 (F. Schmid) (NMNH).

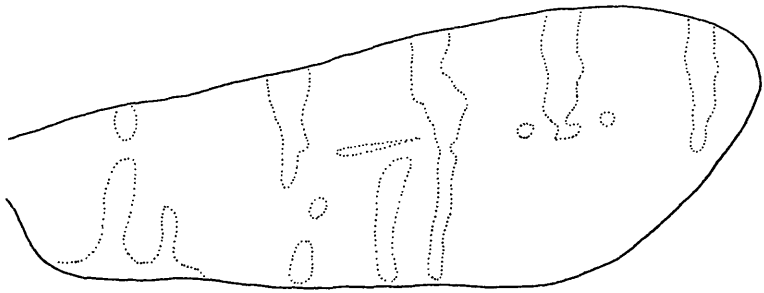
Paratypes: [originally paratypes of *C. galapitkanda*] **CEYLON:** Same data, - 2 males (NMNH). **Sri Lanka:** Matara District, Deniyaya, 1000ft., 20.iv.1973, at black light (Bauman & Cross) - 2 males (NMNH).

Cheumatopsyche tunmodera n.sp.

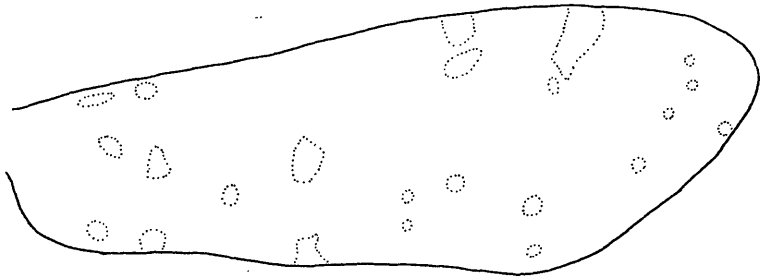
This small brown and white patterned species is closest to *C. hippolyte* MALICKY. It is distinguished by having the ventral half of segment IX narrow and parallel-sided. The setaless, mesocaudal lobe of segment X is sharp and acutely angled in lateral aspect, not right angled, and the transparent hyaline window surrounding the wart of the preanal appendage is an elongate, horizontally oval, not circular. The most striking distinguishing feature is the white patterned forewing, which in *C. hippolyte* at most shows only a few cream-colored small spots.

Male. Body dark brown, legs paler brown. Maxillary palpus segment I shortest, segments III and IV equal, segment II longer than segment III and IV, segment V equal to segments I-IV together, resultant formula: I-(III,IV)-II-V. Dorsum of head dark fulvous with 9 almost indiscernible warts a little paler, visible only as angle of lighting changes. Swollen setal wart absent on proepisternum, setal surface present on precoxale. Protarsal claw symmetrical, no lateral setal bundle; claws of second and third legs also symmetrical. Spur formula 2,4,4; posteroapical spur on first leg pale and smaller than anteroapical spur. Forewing length 5.2mm. Forewing brown with veins slightly darker. Median linear window, a transparent hyaline line on vein M, present and well developed starting just before its first bifurcation and continues well after the first bifurcation along M_{1+2} , no other pattern visible in the membrane. Forewing with four, well-defined, white bands (remnant of five typical bands); pattern present only in setae; membrane without any pattern. Forewing m-cu apicad of cu by 0.5x length of crossvein and oblique, SC and R run free to margin, Cu_2 and A1 run free to margin, not confluent. Hindwing SC and R met apicad of r by 0.5x length of r, r meeting with s in an oblique line, fork 1 absent.

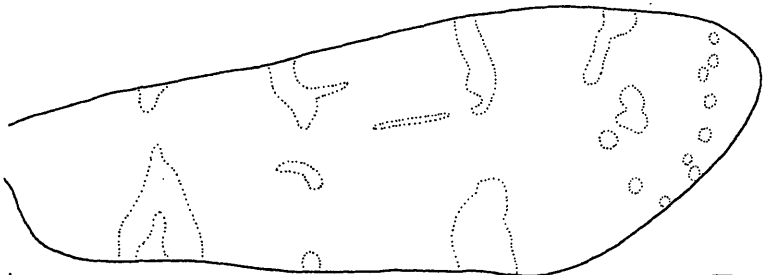
Male genitalia. IXth abdominal segment annular, tergum very short, sternum 3x wider; ventral half of segment parallel-sided in lateral aspect; anterior margin convex; equally concave dorsad and ventrad, apical lobe of posterior margin almost acutely angled, slightly above lightly sclerotized articulation



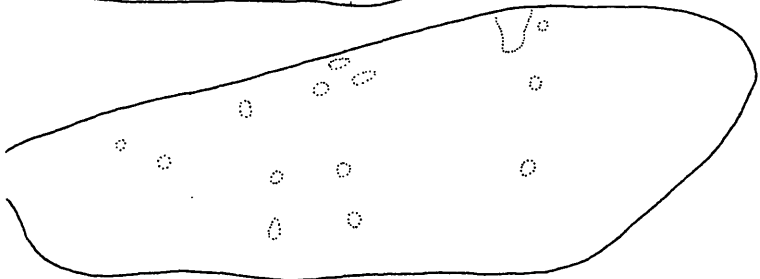
galapitikanda



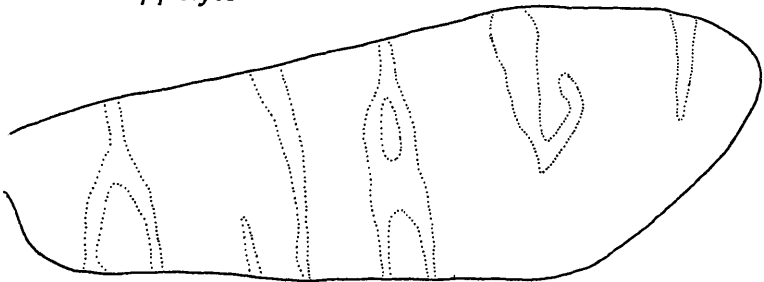
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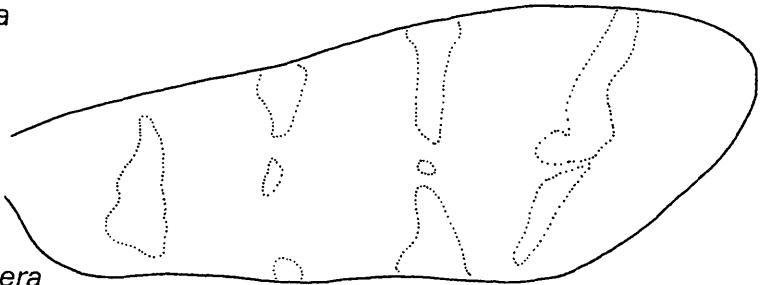
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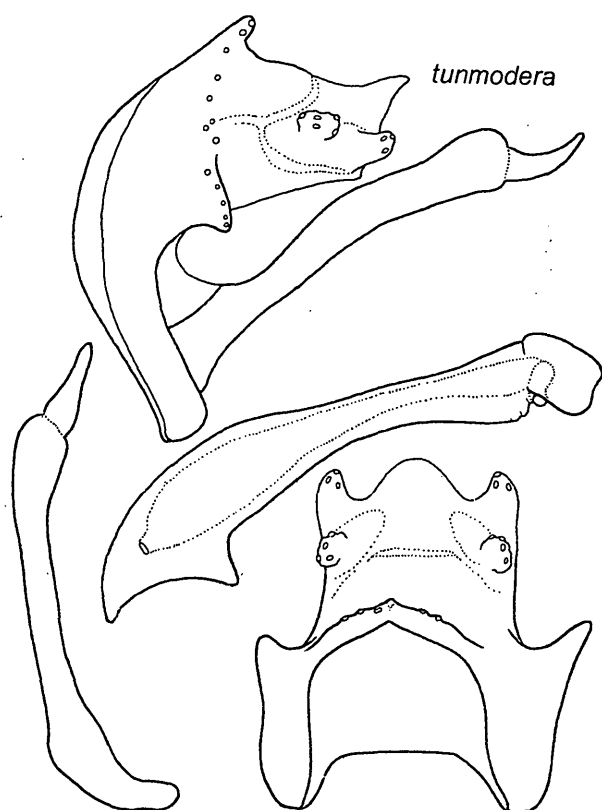
hippolyte



schmidiana



tunmodera



Holotype, male: CEYLON: Colombo District, Tunmodera, 200 ft., 17.xi.1970 (O.S. Flint, Jr.) – (NMNH).

Paratypes: CEYLON: Central Province, Kandy, 14.i.1954 (F. Schmid) – 1 male, paratype of *H. galapitikanda*, with cleared abdomen in Canada balsam mount (NMNH). **Ceylon:** Colombo District, Padukka, 300ft, 15.xi.1970 (O.S. Flint, Jr.) – 1 male (NMNH). **Ceylon:** Kegalla District, Kitulgala, 150ft., 30.xi.1970 (O.S. Flint, Jr.) – 1 male (NMNH). **Ceylon:** Kandy District, Kandy, 21.ii.1971 (Piyadasa & Somapala) – 1 male (NMNH).

Distribution: Sri Lanka.

Etymology: named after its type locality.

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cavity of inferior appendages. Antecosta of IX (ridge on inner surface supporting longitudinal muscles) narrow, gradually narrowing ventrad and with antecostal suture visible externally. Spine row on posterior margin of IX continuous, with a small break subdorsally, spines on dorsolateral lobe 2x those on apical lobe, peak of apical lobe with 3-4 spines well developed; in dorsal aspect with apical lobes fused, bearing alveoli, serrated with a minute triangular projection centrally. Intersegmental indentation between segments IX and X deep, step-like. Segment X medium long, quadrangular both in lateral and dorsal aspects, ventroapical, setose lobes elongate, directed posteriad, segment X in dorsal aspect with interlobular gap obsolete, filled partially by broadly triangular, setaless, mesocaudal lobe. Sutures of segment X well developed; transverse suture crossing obliquely the segment in lateral view, strongly pigmented, strengthened in the mid-dorsal area and forming a dorsal ridge; longitudinal suture broad appearing as a continuation of apicoventral setose lobe meeting the transverse suture, forming a clear Y-shaped pattern, stem short. Lateral setose area (preanal appendage) forming an elevated wart on central position and surrounded by a lightly pigmented, hyaline, oval window partially embraced by transverse and longitudinal sutures. Coxopodite extends much beyond apex of segment X, cylindrical, slightly bowed at midlength, moderately dilated at apex; harpago slender and upcurved in lateral aspect; straight and evenly tapering in ventral aspect. Phallosome broad, basal section broader and bent at right angles to stem, mid region flat dorsally and concave ventrally in lateral aspect, followed by apex broadening into ventral bulge. Endophallus long, extending through almost the entire phallosome, ending at a narrow gonopore; chitinized endothecal process short and circular, strongly pigmented; phallosomal sclerite rounded in lateral aspect.

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