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Redescription and first illustrations of *Ctenoplusia psileia* Dufay, 1975 (Lepidoptera: Noctuidae)

Szabolcs Sáfián[1, 2*] & László Ronkay[3]

[1] *Hungarian National Museum Public Collection Centre – Hungarian Natural History Museum, Department of Zoology, Lepidoptera Collection, H-1088 Budapest, Baross utca 13, Hungary. E-mail: szsafian@gmail.com*
[2] *Hungarian Natural Heritage Trust, H-9945 Kercaszomor, Fő út 57, Hungary.*
[3] *Heterocera Ltd. H-1137 Budapest, Hungary. E-mail: laszlo.ronkay@gmail.com*

Abstract – *Ctenoplusia psileia* Dufay, 1975 (Lepidoptera: Noctuidae: Plusiinae), a very poorly known species from tropical Africa that has never been reported since its original description, is rediscovered, redescribed, and compared to the potentially closest taxa. Habitus of the species and male genitalia are illustrated for the first time.

Key words – orophilous species, Cameroon, Liberia, Plusiinae

INTRODUCTION

Ctenoplusia psileia Dufay, 1975 (Lepidoptera: Noctuidae: Plusiinae) is an enigmatic African species; its original description was based on a single holotype collected on Mount Kala, Yaoundé in central Cameroon in 1973, and it was not accompanied by any illustration. The species is apparently very rare, since no subsequent records have been published, and no specimens have been found in the major collections of African Lepidoptera. Moreover, the holotype specimen was not found in the type collection of the Muséum National d'Histoire Naturelle, Paris (MNHN) where it should be deposited according to the original description by Dufay (1975).

During the onset of the dry season in December 2015 an extreme activity of Plusiinae was recorded in the Liberian Nimba Mountains, when over 50 specimens of about 10 species were recorded at artificial light just in four nights at the altitude of 1100 m at the treeline. Among many widely distributed and common species, three fresh males of a small-sized, light-coloured species

* Corresponding author.

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(pink-golden sheen on yellowish brown ground colour) were collected. They flew in by about 5.00 in the morning just before dawn and were very agile at the light.

It was only later discovered that two very worn specimens were already collected at light in December 2012 in the Putu Range, eastern Liberia, in upland evergreen forest (cc. 550 m a.s.l.). The specimens were donated to the Hungarian Natural History Museum, Budapest (HNHM), however their poor physical condition prevented their identification, and only after capturing fresh males in the Nimba Mountains they were recognised to be conspecific with that species.

This peculiar species (Fig. 1A, 1C, 1D) resembles most closely the Papua New Guinean *Ctenoplusia eugrapha* (Hampson, 1913) (Fig. 1B). For a long time it was considered to represent an undescribed species, until the thorough study of its male genitalia and comparison to the original description of *C. psileia* (Dufay 1975). The description of *C. psileia* unambiguously indicates that the holotype has a very similar size and pattern on the upperside of wings (translated from French): "Wingspan: 24.5 mm; forewing length: 12.5 mm. Pubescence of palpi, head and body yellow-brown, mixed with pinkish brown. Forewings of general whitish-pink, sprinkled with olive-brown scales, denser in the median space, under the costa and in the subterminal space, with a more marked metallic reflection, golden or bronzed, along the subterminal line. Suborbicular spots [= stigma] not very distinct, metallic, appearing as an irregular gamma located parallel with lower edge of cell. Transverse lines not very apparent, postmedian scalloped, subterminal strongly sinuous, bordered by a wide dark band of metallic reflection; a fine pink anteterminal line, widened in the middle of the external edge into a small thicker pink dash bordering internally a dark, brown lunule, between veins 3 and 4. Hindwings grey, lightened with yellowish at their base."

The structure of the male genitalia clearly indicates the specific distinctness of the Liberian species from the Papuan *C. eugrapha* but fits well with that of *C. psileia* as interpreted by Dufay (1975). The main features of the copulatory organ (long and curved, slender uncus, very long vinculum with well-developed saccus, the long valva with rounded and somewhat dilated cucullus having narrower neck and more or less straight proximal ventral margin, the long tubular vesica with numerous small basal and medial cornuti arranged into a long spiral, and the sinuous, medium-long terminal cornutus) are typical of the *C. dorfmeisteri* (Felder et Rogenhofer, 1874) species group (see Behounek *et al*. 2010: 64). The specific features of *C. psileia* listed by Dufay (1975), in comparison with those of *C. dorfmeisteri* and *C. aurisuta* (Dufay, 1968), are easily recognisable in our Liberian material; therefore, these specimens are considered as conspecific with the holotype of *C. psileia* collected in Cameroon.

Here we provide a detailed redescription of the species with illustrations of the adult and male genitalia. Unfortunately, the holotype of *C. psileia* could not be located in the MNHN, so we cannot provide the images of the holotype and its genitalia.

Abbreviations – AFPL = Unique code of the specimens added to, and cross-referenced in the African Plusiinae DataBase; BJ = genitalia slide of János Babics; BMNoct = serial number of the Noctuidae genitalia slides of the NHM; CD = genitalia slide of Claude Dufay; ENNR = East Nimba Nature Reserve, Liberia; GB = scientific reference collection of Gottfried Behounek, Munich, Germany; HNHM = Hungarian National Museum Public Collection Centre – Hungarian Natural History Museum, Budapest, Hungary; MHNG = Muséum d'Histoire Naturelle de Genève, Switzerland; MNHN = Muséum National d'Histoire Naturelle, Paris, France; NHM = Natural History Museum, London, UK; RL = genitalia slide by László Ronkay; ZSM = Zoologisches Museum der Bayerischen Staates, München, Germany.

MATERIAL AND METHODS

All specimens listed below from Liberia and Ghana were captured by the first author at artificial light sources set against white sheet. The lamp was equipped with 250W blended bulb. All specimens are deposited in the Lepidoptera Collection of the HNHM.

Besides *C. psileia* (detailed below in Taxonomy section), the following material of congeneric species has been examined:

Ctenoplusia dorfmeisteri (Felder et Rogenhofer, 1874): 2 males, 1 female, Ghana, Eastern Region, Bunso Arboretum, 22–27.XI.2009, leg. Szabolcs Sáfián, unique code AFPL000400–401 (HNHM).

Ctenoplusia laqueata Dufay, 1968: holotype male, Madagascar, "Madagascar Est, env. de Perinet alt. 910 m, forêt d'Analamazoatra, P. Viette le 17–I–1955" (MNHN); 1 male, Madagascar, Perinet, 4.X.1975, leg. Paul Dubief (MHNG); 1 male, Madagascar, Anosibé, 2.IX.1978, leg. Paul Dubief (MHNG).

Ctenoplusia aurisuta Dufay, 1968: holotype male, Madagascar, "Madagascar Est, env. de Perinet alt. 910 m, forêt d'Analamazoatra, P. Viette le 19–IV–1955", slide No. C. Dufay 2233 male; 1 female, "Madagascar Centr., Ambalarondra, 11.I.[19]31, coll. Dr. G. Audéoud" (MHNG); 1 male, "Madagascar, domaine de l'est, Périnet, 24.V.1965, coll. J. Plante (MHNG).

Ctenoplusia eugrapha (Hampson, 1913): syntype male, Papua New Guinea, "Fak Fak, Dutch New Guinea, Nov'07 (Pratt)" (NHM); syntype male, "Fak Fak, Dutch New Guinea, Jan and Feb'08, 1700 feet (Pratt)" (NHM); 2 males, Papua New Guinea, West Highland, Mt. Munmil 58 km 73° von Mt. Hagen, Secondary forest, 1980 m, S05.72453°, E144.84128°, 23.IV.1996, LF, leg. Mario Graul (GB, ZSM).

Genitalia dissections were made by the technique published by Robinson (1976), with modifications by Fibiger (1997). 15% solution of potassium hydroxide (KOH) was used to macerate the abdomen. The cleaned genital

capsule, everted vesica were dehydrated in 96% ethanol; the weakly sclerotised structures were stained with eosine, then mounted in Euparal.

Mounted slides were photographed either using a Nikon Eclipse 80i compound microscope connected to a Nikon DS-Fi1 digital camera (by courtesy of Martin Lödl and Sabine Gaal-Haszler, NHMW) or digitised using a GT Vision Prime Scan Microscope Slide Scanner.

TAXONOMY

Ctenoplusia psileia Dufay, 1975
(Figs 1A, 1C, 1D, 3A)

Material examined – 3 males, Liberia, Nimba Mountains, Camp site, Cellcom road, ENNR, 7°31'53.12"N, 8°31'41.92"W, 1115 m, 8–14.XII.2015, leg. Sz. Sáfián, slide No.: RL11697m (deposited in the HNHM); 2 males, Liberia, Mt. Ghi Ridge, Putu Range, 5–17.XII.2012, leg. Sz. Sáfián & R. Tropek (HNHM).

Diagnosis – No externally similar species are known to occur in the Afrotropical Region; the congeners resembling mostly *C. psileia* belong to the subgenus *Acanthoplusia* Dufay, 1970 and occur in southeastern Asia (*C. mutans* (Walker, 1865), *C. indica* (Ronkay, 1986) (see Behounek *et al.* (2010): plates 117–119, Ronkay *et al.* (2013): plate 15), or in Papua New Guinea (*C. eugrapha*, Fig. 1B). These species have, in comparison with *C. psileia*, less complex and less brilliant golden suborbicular stigma, differently shaped antemedial and postmedial crosslines, and less darkened inner part of marginal area with weaker metallic reflexion. *Ctenoplusia psileia* can be distinguished from the African species of the *C. furcifera* (Walker, 1857) species group (*C. furcifera ogovana* (Holland, 1894) and *C. porphyrea* Dufay, 1970) by its broader forewings with paler colouration, with strong pinkish irroration and sheen but without a rather broad darkened area between orbicular stigma and postmedial line, and the differently shaped and more shining golden suborbicular stigma. Last but not least, *C. psileia* is easily separable from its closest relatives, the other members of the *C. dorfmeisteri* species group by their striking external differences (Figs 2A–D).

In male genitalia, *C. psileia* differs significantly from the Asiatic members of the subgenus *Acanthoplusia* by the different shape of valvae, the thin and weakly sclerotised, long harpes, and the completely different armature of the vesica (see Fig. 3A–B, Behounek *et al.* (2010): figs 66–82, Ronkay *et al.* (2013): figs 122, 124, 126). The clasping apparatus of *C. psileia* is more similar to that of the species of the *C. furcifera* species group (see Behounek *et al.* (2010): figs 60–63, Ronkay *et al.* (2013): figs 112, 114, 116), but lacks the characteristic ventral marginal scale-hairs forming the comb-like structure which is typical of most lineages of the genus ("Cteno"-plusia), and the armature of vesica is much

more complex, composed of numerous small basal and medial cornuti and a sinuous terminal cornutus while the vesica of the *C. furcifera* group is armed by a single, long and straight, stick-like terminal cornutus.

The armature of the vesica indicates the close relationship of *C. psileia* with the *C. dorfmeisteri* species group: the characteristically coiling row of small but strong, acute subbasal and medial cornuti is apparently a strong synapomorphy which cannot be found in other Plusiinae clades. The length of this row and the shape and size of cornuti are specific features (Fig. 3A, C–D). These cornuti are larger, basally more bulbed in *C. psileia* than in the other species of the *C. dorfmeisteri* group. The clasping apparatus of *C. psileia* is more similar to that of the *C. furcifera* group than to that of the *C. dorfmeisteri* group due to the longer and straighter valvae with more foot-shaped cucullus, the large dorsomedial process of juxta and the less angular ventral end of vinculum; moreover, it lacks the ventral row of scale-like setae.

Redescription – Male.

External morphology (Figs 1A, C, D): Small to medium-sized species, wingspan 24–27 mm, forewing length 11.5–12.5 mm. Head small, eyes large, globular, palpi short, upturned, third joint short, apically finely pointed, antennae filiform, light brown, finely ciliate, dorsum covered by ochreous-white scales. Vestiture of thorax deep red-brown, tips of collar, edges of tegulae and large metathoracic tuft pinkish-white. Abdomen slender, pubescence dense, ochreous-brown, dorsal crest consists of large deep red-brown tufts with pinkish-ochreous tips, anal tuft ochreous grey-brown. Legs brown with whitish rings on tibiae and tarsi, spurs large. Forewing rather broad and relatively short, with apex finely pointed, outer margin convex with small concavity below apex, tornal scale-lobe small, triangular, inner margin slightly sinuous; ground colour pale brown, with intense pinkish irroration and golden sheen; antemedial and postmedial crosslines double, dark brown filled with pinkish, both sinuous and defined by lighter areas on both sides; subbasal line double, interrupted, filled with pinkish, defined by tiny black dots and a short black streak at inner margin; median fascia indistinct, represented by a narrow and diffuse, more or less ragged shadow; subterminal line strongly sinuous, ochreous-pink, defined by a wide, brilliant zone between postmedial and subterminal lines; anteterminal line thin, whitish; terminal line represented by a row of dark brown dots and short streaks; cilia as ground colour, chequered by brown, apex and medial section with larger brown patches; orbicular stigma very small, rounded, with tiny pink dot in centre; stigma reniform, narrow, oblique, encircled with dark brown and filled with pinkish-brown; suborbicular stigma ("gamma mark") pale golden with a characteristic shape (resembling mostly that of *Syngrapha interrogationis* (Linnaeus, 1758) species group), composed by a little "u" or "o"-shaped mark under orbicular stigma, and an ω-shaped outer part, these two parts more or less fused. Hindwing light brown, its outer half slightly darker, marginal band not well defined, veins covered by somewhat darker brown scales.

Male genitalia (Fig. 3A): Uncus long, slender, evenly curved, its tip finely hooked. Tegumen small and rather narrow, penicular lobes weakly developed. Juxta large, dorsally protruding, with acute dorsomedial tip. Vinculum very long, more or less infundibular, with well-developed saccus containing a bundle of long hair-pencils, its ventral edge rounded triangular, medial section with two tiny ventromedial prominences. Valva long, distally tapering towards neck of cucullus; cucullus more or less foot-shaped with rounded apex, ventral surface densely setose in apical third. Sacculus short, clavus fine, medium-long, stick-like; harpe digitiform, slightly longer than clavus. Aedeagus cylindrical, finely arched, ventral part with Y-shaped sclerotisation running towards ventral end of carina. Vesica long, tubular, everted forward and rather straight; basal section with large, partly cartilaginous dorsal sclerotisation consisting of minute spiculi; medial section somewhat dilated and armed by a row of small but strong, bulbed cornuti of acute apex arranged into a complete coil along the longitudinal axis of vesica; terminal section membranous, tapering towards ductus ejaculatorius, terminal cornutus strong, medium-long, sinuous, directed backwards, having basally thicker, apically thinner.

Female: Unknown.

DISCUSSION

Beside the type locality (Mount Kala in Central Cameroon) *C. psileia* is known only from two localities in Liberia (Nimba Mountains and Putu Range). Both Liberian localities host Lepidoptera species, mostly Rhopalocera, with upland or sub-montane affinities (e.g. *Acraea kraka* Aurivillius, 1893, *Abantis ja usheri* Collins & Larsen, 2008 for Putu Range, e.g. *Uranothauma belcastroi* Larsen, 1997*, Vanessula milca angustifascia* Joicey & Talbot, 1928 for Nimba Mountains) (Larsen 2005, Collins & Larsen 2008, Sáfián 2021), and at least two of them are known only from the same two localities: *Pilodeudorix putu* Sáfián, 2015, *P. intermedia* Sáfián, 2015 (Sáfián *et al.* 2015, Sáfián 2021). It is possible that *C. psileia* is also associated with upland forests and might occur in other mountainous areas in the Guinea Highlands inside the Liberian sub-region, e.g., Wologizi Mountains (Liberia), Simandou (Guinea), and Loma Mountains (Sierra Leone) as described in detail by Sáfián (2021). The type locality, Mount Kala is also similar in altitude to the Nimba Mountains locality (1150 m as indicated in the original description (Dufay 1975)); therefore, the moth is expected to occur in the extensive mountainous areas in Cameroon, possibly also in the few mountainous or upland localities between the two countries such as Afi Mountains in Nigeria and Atewa Range in Ghana. Nevertheless, *C. psileia* is apparently very rare and potentially strongly seasonal. All specimens were found in December, during the onset of the dry season despite extensive collecting across Liberia by the first author between 2010 and 2024.

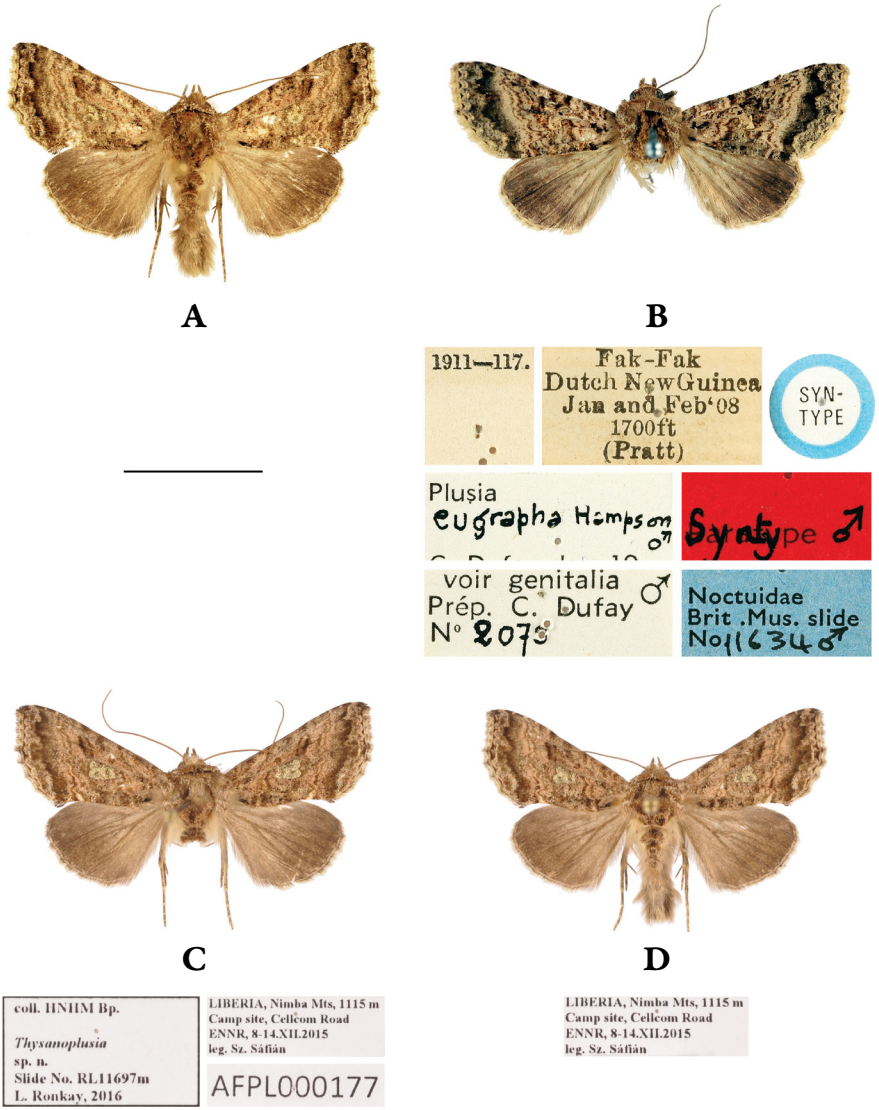

Fig. 1. *Ctenoplusia* adults. A, C, D = *Ctenoplusia psileia* Dufay, 1975, males, Liberia, Nimba Mountains, B = *Ctenoplusia eugrapha* (Hampson, 1913), syntype male, Papua New Guinea. Scale bar = 10 mm (photos by Gábor Ronkay)

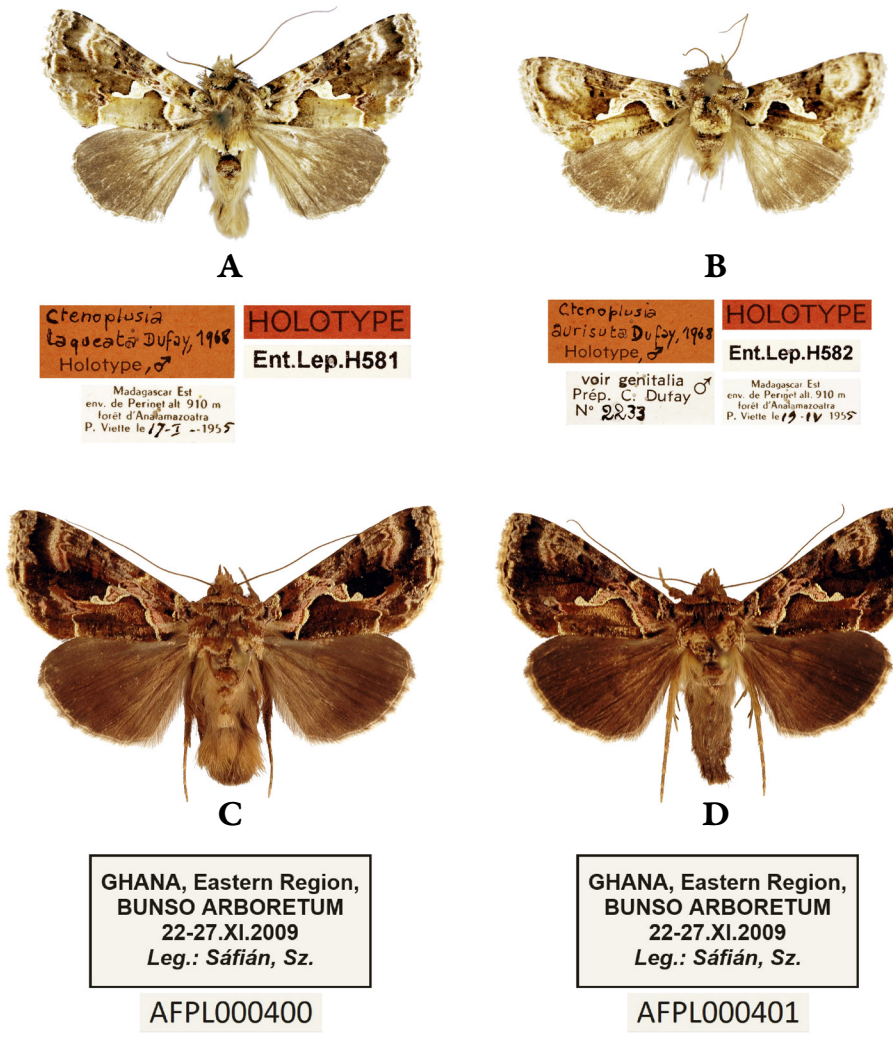

Fig. 2. *Ctenoplusia* adults. A = *Ctenoplusia laqueata* Dufay, 1968, holotype male, Madagascar, B = *Ctenoplusia aurisuta* Dufay, 1968, holotype male, Madagascar, C = *Ctenoplusia dorfmeisteri*, male, Ghana, Bunso Arboretum, D = *Ctenoplusia dorfmeisteri* (Felder et Rogenhofer, 1874), female, Ghana, Bunso Arboretum. Scale bar = 10 mm (photos by Gábor Ronkay)

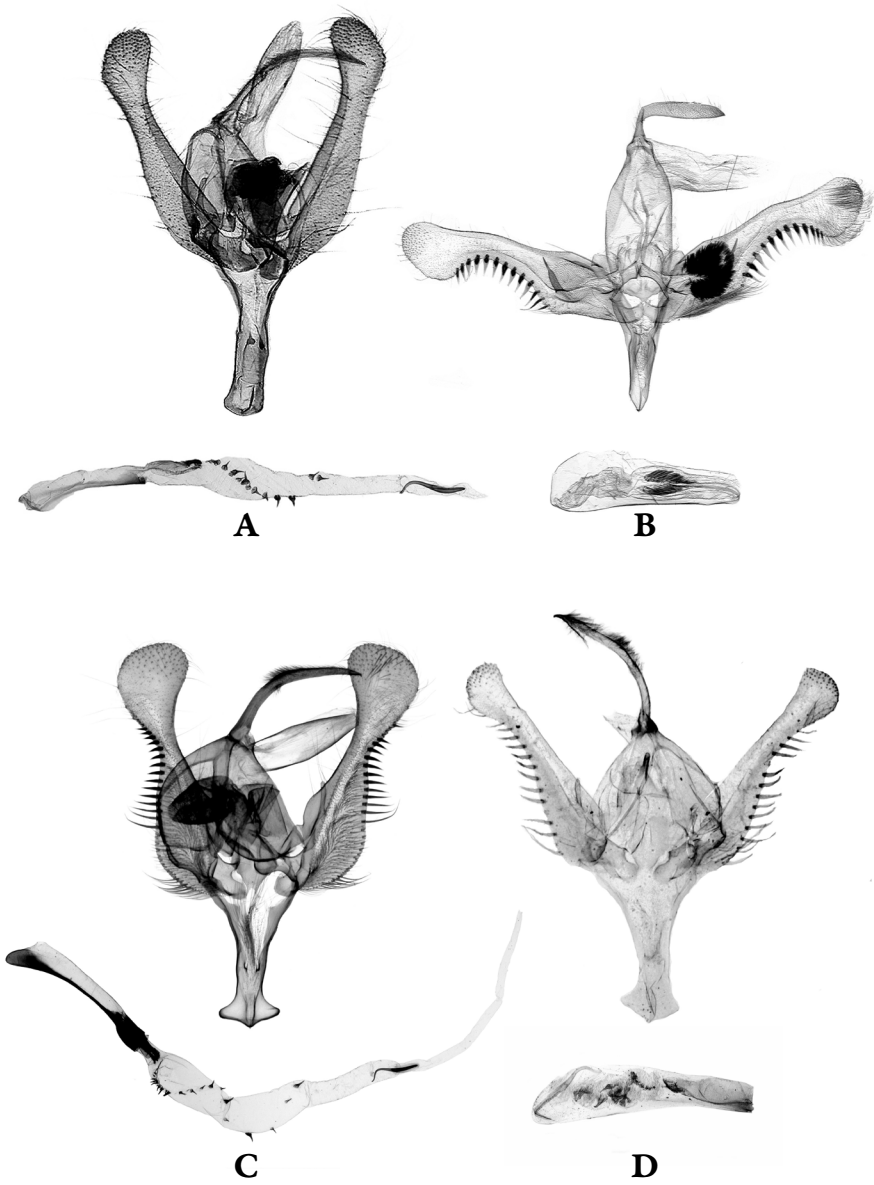

Fig. 3. Male genitalia of *Ctenoplusia* species. A = *Ctenoplusia psileia* Dufay, 1975, Liberia, Nimba Mountains, slide No. RL11697m, B = *Ctenoplusia eugrapha* (Hampson, 1913), syntype, Papua New Guinea, Fak Fak, slide No. BMNoct11634, C = *Ctenoplusia dorfmeisteri* (Felder et Rogenhofer, 1874), Ghana, Bunso Arboretum, slide No. BJ979m, D = *Ctenoplusia aurisuta* Dufay, 1968, holotype, Madagascar, slide No. CD2233m (photos by Gábor Ronkay)

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