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Gloora gen. nov. (Lepidoptera: Erebidae: Arctiinae: Arctiini: Ctenuchina) for several *Agylla*-like Arctiinae

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Abstract

Gloora **gen. nov.** is established for *Eucereon alba* (Druce, 1894), *Hyaleucerea mundula* (Berg, 1882), *Agaraea sericeum* (Zerny, 1931), and *Gloora canae* **sp. nov.** These species are (re-)described considering male genitalia in particular and, in case, barcodes. Further species which might fit into *Gloora* gen. nov. are discussed.

Key words: Lithosiini, *Agaraea*, *Agylla*, *Eucereon*, *Hyaleucerea*, *Idalus*, *Theages*, Neotropical, taxonomy, new species

Introduction

Behavioural, morphological, chemical and acoustic studies on a Costa Rican arctiine moth, "*Eucereon alba* (Druce, 1894)" (Figs 1–7, 15–18), uncovered its dubious generic assignment and that the male remains undescribed. Visually and according to the original description it closely resembles *Agylla septentrionalis* Barnes & McDunnough, 1911, *Hyaleucerea mundula* (Berg, 1882), *Eucereon vestalis* (Schaus, 1892a) (Figs 11–13), and *Agaraea sericeum* (Zerny, 1931). The wing venation (Fig. 14) clearly separates it from *A. septentrionalis*, a Lithosiini. Except for *E. vestalis* (see Discussion), the male genitalia are distinct and clearly different from the genera mentioned above, and barcoding separates the species in question from other Arctiini, too. Therefore, we designate a new genus in the Ctenuchina, *Gloora* **gen. nov.**, redescribe the three species named above and describe one new species in *Gloora*.

Materials and methods

Data of specimens used for the (re-)descriptions are mentioned in the text, as are those used for comparison.

Acronyms used for collections: **CNIABM—**Colección Nacional de insectos Alfredo Barrera Marín, Museo de Historia Natural de la Ciudad de México, Mexico City, D.F.; **MUSM—**Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Perú; **NHMUK—**Natural History Museum, London, United Kingdom; **NHMW—**Naturhistorisches Museum, Vienna, Austria; **DZUP**—Universidade Federal do Paraná, Curitiba, Brazil; **NMNH**—National Museum of Natural History, Smithsonian Institution, Washington D.C., USA; **ZMHB—**Zoologisches Museum, Humboldt Universität, Berlin, Germany; **ZSBS**—Zoologische Sammlungen des Bayerischen Staates, München, Germany. In addition, we use **MLC** for the personal collection of Michel Laguerre, Léognan, France, and **FZE** for the collection of Michael Boppré at the Professur für Forstzoologie and Entomologie, Albert-Ludwigs-Universität, Freiburg, Germany.

A slash (/) separates the information of different labels. Terminology of genitalia follows Sibatani *et al.* (1954), Kuznetsov (1967) and Klots (1970).

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FIGURES 1–4. *Gloora alba* **comb. nov.**, habitus female (1, 2) and male (3) and both sexes gathering pyrrolizidine alkaloids from dry roots of *Emilia* sp. (Asteraceae) (4).

Genitalia were prepared by boiling abdomens for 15 min with 2 pellets of potash (KOH) in 5 ml of water. After being washed with water and then alcohol, genitalia were photographed in natural position, suspended in 95 % alcohol; genitalia of type and museum specimens were mounted in Euparal, others stored in glycerol. Photos were taken with a Nikon Coolpix 4500 attached to a trinocular Nikon stereomicroscope SMZ-10A. For genitalia pictures resolution was enhanced using focal planes fusion technique (3 to 6 planes were used generally) with CombineZM software (http://www.hadleyweb.pwp.blueyonder.co.uk). In other cases, a KEYENCE VHX-700FD digital microscope equipped with a VH-Z20R/VH-Z20W zoom lens 20–200x and a polarisation filter OP-87429 was employed.

For barcoding the COI mitochondrial gene (Hebert *et al*. 2003) DNA was extracted, amplified and sequenced at the "Canadian Centre for DNA Barcoding" (CCDB) in Guelph, Ontario, and at the Chair of Forest Botany, University of Freiburg, Germany, starting from legs removed from dry specimens and following standard protocols (Decaëns & Rougerie 2008; Vaglia *et al*. 2008).

Sequences downloaded from BOLDSYSTEMS (2018) were aligned and analyzed using MEGA6 (Tamura *et al*. 2013), neighbor joining (Saitou & Nei 1987) and maximum likelihood estimations (Aldrich 1997). To estimate branch support Bootstrap values (Felsenstein 1985) were calculated in MEGA6 after 1,000 random replications. Distance calculations were performed using the Kimura 2-parameter (K2P) method in MEGA6 (Kimura 1980) including all sites, with the pairwise deletion option and assuming both a homogeneous pattern of divergence among lineages and a uniform rate of substitutions among sites.

Results

Gloora Boppré (Ctenuchina) gen. nov.

(Fig. 14)

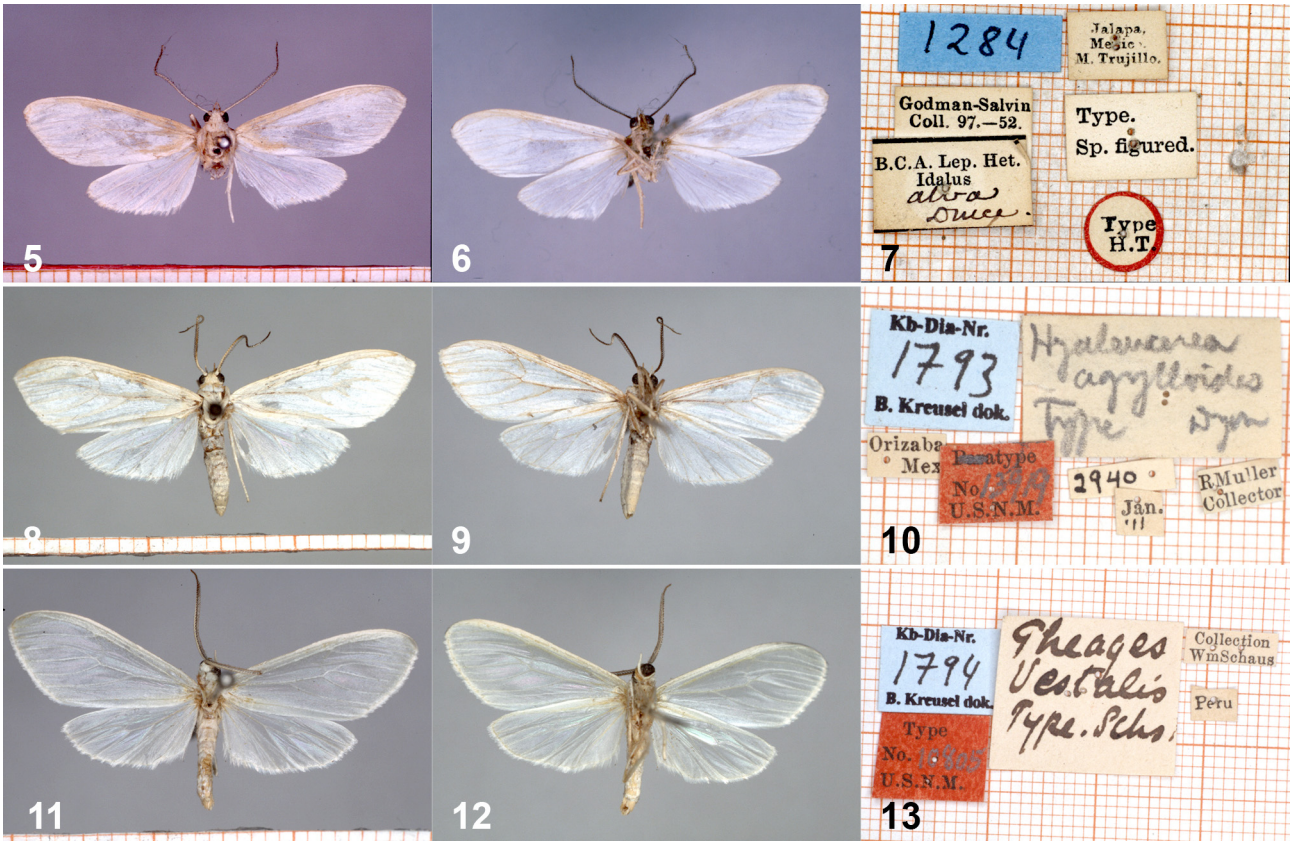
Type species: *Idalus alba* Druce, 1894 by current designation; see below.

Diagnosis. A genus of small and fragile species generally silky white or creamy white with some narrow dark brown lines on costa or on veins, some species strikingly similar to white Lithosiini. Females slightly larger than males.

Description. Small, generally silky white or creamy white moths, almost without any pattern except some thin black or dark brown lines along the costa, margin or the veins of forewings (forewing length 11–15 mm), eyes remarkably large, proboscis functional. No or limited sexual dimorphism except that the pectinations of the antennae are shorter in females. Wing venation (Fig. 14) very similar to *Eucereon* and *Hyaleucerea* but not *Idalus*.

Male genitalia. Capsule appears extremely flat, the valvae are symmetrical and narrow, as long as or longer than uncus. There is a small triangular process pointing inwards around the middle of the valvae and a small translucent cucullus covered with hairs near the extremity. Above the uncus there are two small symmetrical tongue-shaped processes reaching the middle of the uncus which is constricted there and its tip is spatulate. In lateral view the uncus is slightly bent downwards with a spine at the extremity. Juxta elongated. Saccus present

from evenly rounded to largely triangular. Phallus cylindrical, long and narrow, straight or slightly sinuous with a single lobed vesica with one or two rows of cornuti. Large coremata are always present together with prominent scale bunches (Figs. 47–50; cf. Boppré *et al*. 2018) at the bases of coremata tubes.



FIGURES 5–13. Holotypes (♀♀) of *Gloora alba* **comb. nov**.: *Idalus alba* Druce, 1894 (5–7) and *Hyaleucerea agylloides* Dyar, 1912 (8–10), and, for comparison, of *Eucereon vestalis*: *Theages vestalis* Schaus, 1892a (11–13).

Female genitalia. Apophyses long, narrow and subequal. Antrum generally U- or V-shaped. Ductus bursa long, narrow and, as a flattened cylinder, slightly sinuous and often bent at the junction with bursa copulatrix. Bursa copulatrix large, pyriform and ornated with sclerotized spicules on the first half or two thirds of its surface.

Etymology. The genus is dedicated to Paul Gloor to honour his contributions to entomology. It is considered to be feminine.

Remarks. Here, we place four species (*E. alba, H. mundula*, *A. sericea, G. canae* sp. nov.) in *Gloora* gen. nov. (see below) but additional species are expected to fit into this genus (see Discussion).

Gloora alba (Druce, 1894) comb. nov.

(Figs. 1–7, 15–18, 31–34, 47–48, 51, 55–56)

Idalus alba Druce, 1894:172 (♀ only); **Type locality:** MEXICO, Jalapa—Figs 5–7. **Type depository:** NHMUK.
Idalus alba—Druce (1881–1900: Tab. 73, 22; 1897: 366).
Eucereon album (Druce)—Hampson (1898: 514), Zerny (1931: 25).
Hyaleucerea agylloides Dyar, 1912: 50; **Type locality:** MEXICO, Orizaba—Figs. 8–10. **Type depository:** NMNH. Synonymized by Hampson (1934: 358) (as *E. alba*).
Eucereum [sic, recte *Euceron*] *album* (= *agylloides* Dyar)—Draudt (1915: 184, fig. 25k).
Eucereon alba—Pliske (1975), Pinheiro & Gaal-Haszler (2015), Beccacece & Zapata (2017), Janzen & Hallwachs (2017).

Material examined. MEXICO, 1 ♂, Vera[Cruz], Misantla, Col. R. Müller No 10961, CNIABM 3199 (CNIABM). VENEZUELA, 1 ♂, [Carabobo], Valencia, Rothschild Bequest B.M. 1939-I (NHMUK). COSTA RICA, 1 ♀, San José, Brade 7-III-09 (NHMW); <30 ♂♂ and <30 ♀♀, Finca Hamadryas nr El Rodeo, Ciudad Colon (9° 54' N, 84°

17' W; 870 m asl) (FZE). [All examined.] Note: at NHMW there are 2 specimens in a row with *alba*: one misidentified as *alba*, the other being obviously *G. sericea* ♀ from Rio Grande do Sul, Brazil. At ZMHB there is also a specimen, misidentified as *alba.*

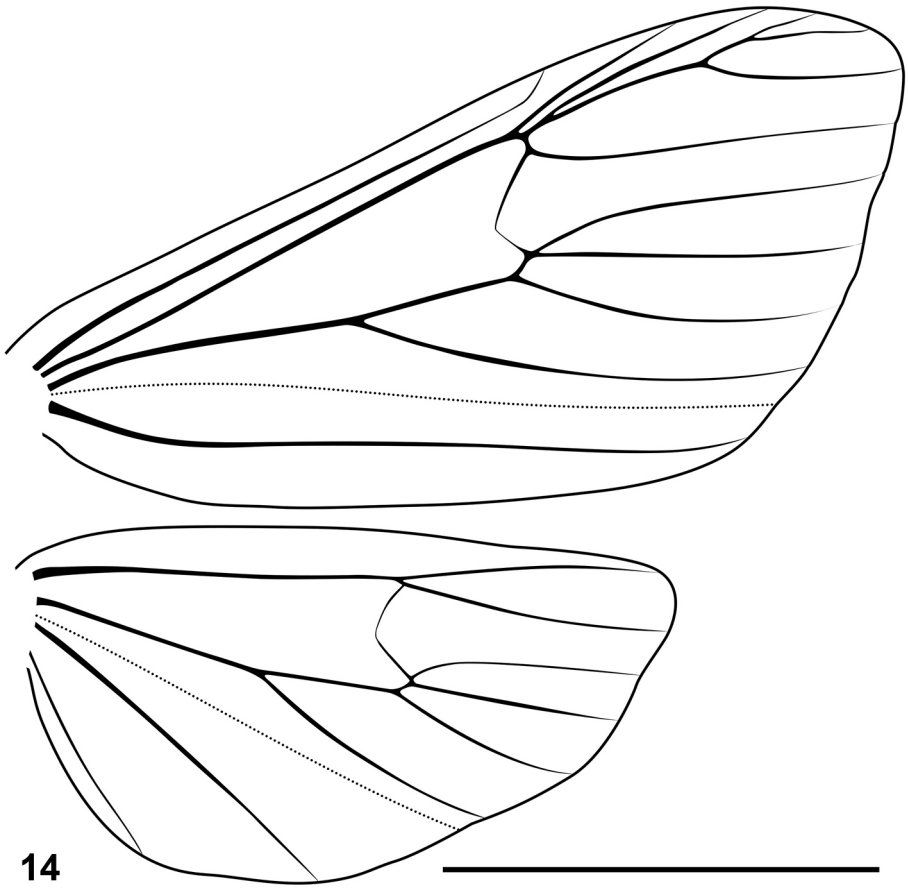
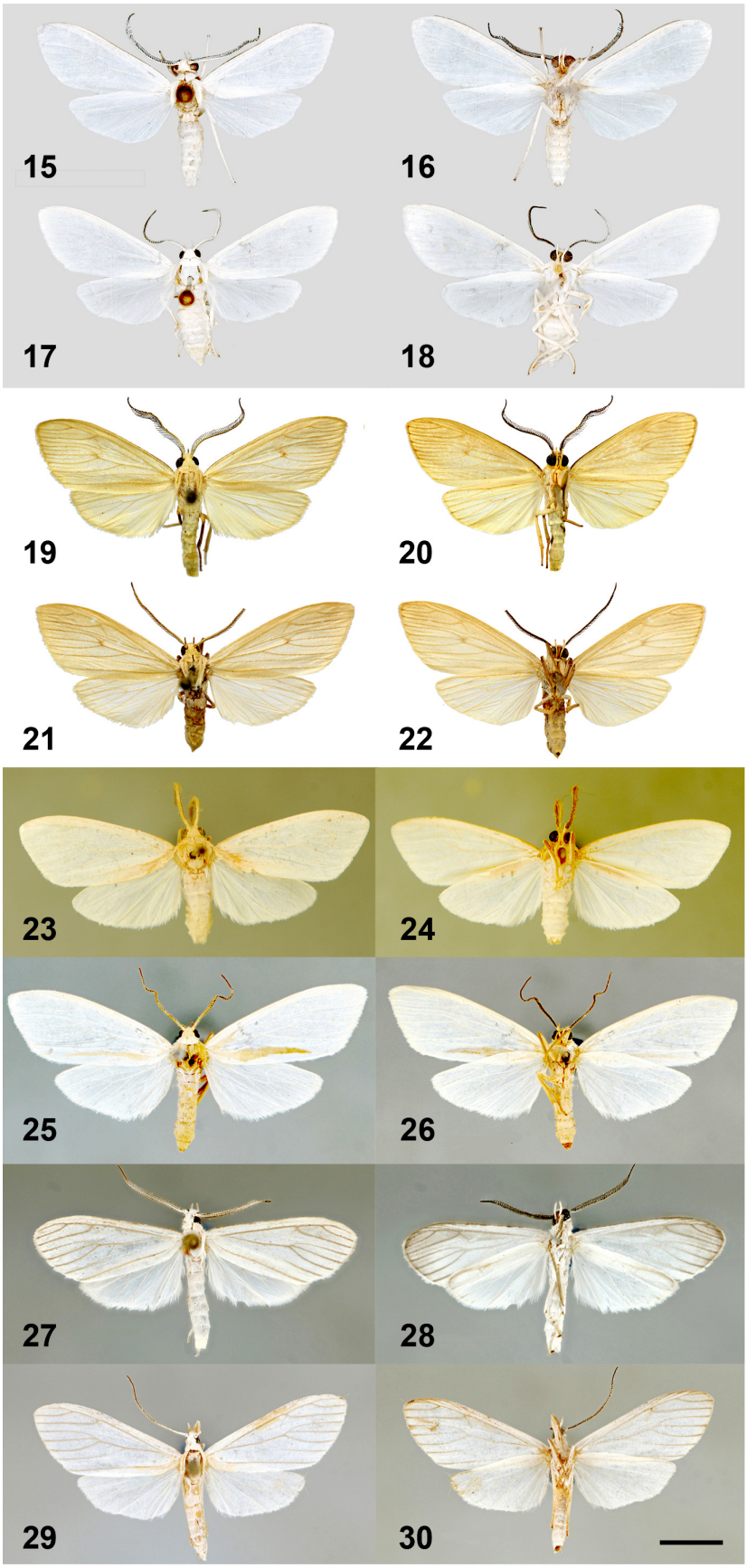


FIGURE 14. *Gloora* **gen. nov.**, wing venation. Scale bar: 5 mm.

Voucher material of FZE will be deposited at ZSBS, ZMHB, NHNH, MUSM and NHMW.

Diagnosis. A small and fragile species entirely silky white with the costa narrowly lined with dark brown scales in males. In male genitalia valvae largely longer than uncus.

Description. Male. Head. Proboscis light brown. Palpi entirely covered with white scales, the first segment very hairy ventrally. Frons and vertex hairy and pure white. Eyes very large and black. Antennae bipectinate, scape, rami and shaft dorsally covered with white scales but ventrally the shaft is brown and rami are very dark brown. **Body and wings.** The whole body (collar, thorax and abdomen) is entirely pure silky white. Ventrally there are some scattered yellowish scales on the abdomen. All legs pure white except the claws which are dark brown and some rows of brownish hairs on the tarsi. All wings pure silky white and veins concolorous with background. Forewing length 11–12 mm (n = 8). There is a thin dark brown line along the forewing costa, darker at base and becoming lighter toward the apex. Fringes pure white. Ventrally all wings are pure white except a thin dark brown line along the forewing costa from base to apex. **Genitalia** (Figs. 31–34). Uncus cylindrical slightly spatulate in the terminal half and with a sharp spine on tip. Above uncus two symmetrical processes, tongue shaped, reaching almost the tip of the uncus. Valvae subrectangular, long and narrow, slightly undulate in ventral view and extending beyond the tip of the uncus. The tip well sclerotized, pointed and bent inwards. A small translucent cucullus covered with hair in ventral position. Hardly noticeable triangular expansion pointing inwards just after the middle of valvae. Vinculum wide with a small pointed and triangular saccus. Juxta well developed, sclerotized and shaped as a long tongue almost reaching the base of uncus. In lateral view the genitalic capsule appears extremely flat. Phallus cylindrical, slightly sinuate, long and narrow. Vesica with a unique and large ventral lobe with longitudinal wrinkles and a patch of well-developed cornuti.



FIGURES 15–30. *Gloora alba* **comb. nov.** (15–18), *G. mundula* **comb. nov.** (19–22), *G. sericea* **comb. nov.** (23–26), and *G. canae* **sp. nov.** (27–30), habitus male (15, 16, 19, 20, 23, 24, 27, 28) and female (17, 18, 21, 22, 25, 26, 29, 30), dorsal (left) and ventral (right) view. Scale bar: 5 mm.

FIGURES 31–34. *Gloora alba* **comb. nov.**, male genitalia; dorsal (31), ventral (32), lateral (33), phallus (34). Scale bar: 1 mm.

Female. Identical to male but slightly larger and without a dark forewing costa. Antennae similar to male but just ciliate. Abdomen with a slightly yellowish tinge dorsally. Forewing length 12–13 mm (n = 9). **Genitalia** (Fig. 51). Genitalia generally slightly sclerotized, apophyses anteriores and posteriores subequal, thin and long. Ductus bursae as a narrow cylindrical tube strongly bent and sinuous in the last third where it is strongly sclerotized. Bursa copulatrix, first almost cylindrical and smooth then large and almost spherical, strongly sclerotized at the narrow end near the junction with ductus bursae. Bursa covered with spicules on its entire surface except near the junction with the ductus bursae.

Barcode. See Discussion.

Early stages. Janzen & Hallwachs (2017) provide photographs of larvae and list *Rhipidocladum racemiflorum* (Steud.) McClure, a New World bamboo (Poaceae) with wide distribution in Central and South America (Clayton *et al.* 2006) as well as *R. pittieri* and *Senna papillosa* (Fabaceae) as larval hostplants of *Eucereon alba*. Paul Gloor (pers. comm.) has reared *G. alba* on *R. racemiflorum*.

Biology. *Gloora alba* exhibits pharmacophagy with respect to pyrrolizidine alkaloids (PAs); it has been reported to be attracted to *Heliotropium indicum*, a source of PAs, in Venezuela at 1,100 m by Pliske (1975; as *Eucereon alba*); strong attraction of both sexes to various pure PAs and PA-containing plants in evenings has also been found in Costa Rica by P. Gloor (MB unpubl., cf. Fig. 4). Both sexes are attracted to artificial light, too. Males possess interesting tymbal (see Figs. 55–57) and androconial organs and emit pheromones which are detectable with the human nose—details will be reported elsewhere (Boppré *et al.* in prep.).

Distribution. COSTA RICA, MEXICO, VENEZUELA.

Remarks. Because of the great similarity of *G. alba* to *Agylla septentrionalis* Barnes & McDunnough, 1911, "*G. agylloides*" would be a more appropriate name but *alba* has priority.

Gloora mundula (Berg, 1882) comb. nov.

(Figs. 19–22, 35–38, 52)

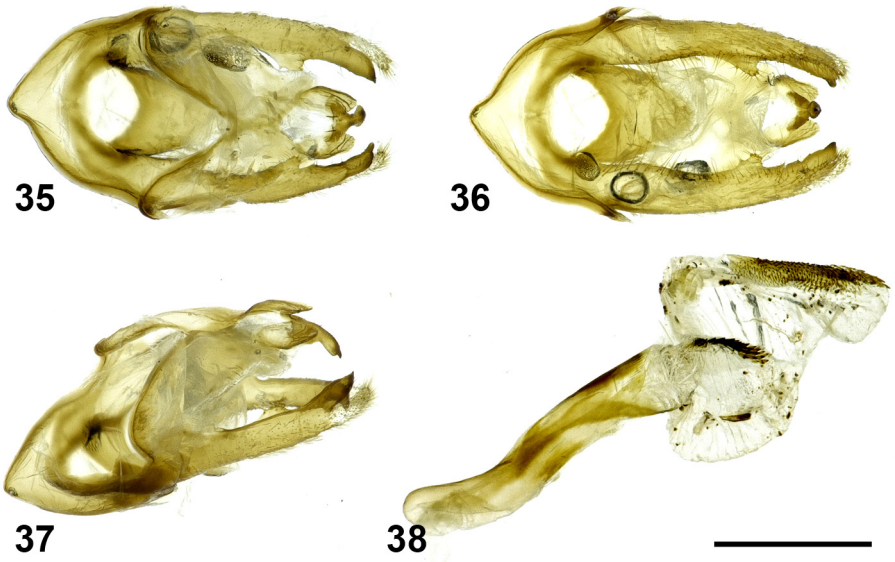
Halysidota mundula Berg, 1882: 216 (♀ only). **Type locality:** ARGENTINA, Corrientes. Type apparently lost (H. Beccacece, pers. comm. to ML).

Hyaleucerea mundula—Hampson (1914: 381; pl. 22, fig. 8), Draudt (1915: 195, fig. 31l), Teston & Corseuil (2004), Ferro & Teston (2009), Pinheiro & Gaal-Haszler (2015), Beccacece & Zapata 2017.

Material examined. PARAGUAY, 2 ♂♂, Cordillera, Tacuara Renda, 5-8-VIII-2011, 180 m, 25°39' S, 56°55' W, U. Drechsel *leg*., one has been dissected and sequenced. / Gen. ML2829 (blue manuscript label) / MILA 1636 (yellow printed label) /, Sample ID MILA 1636, BOLD Proc ID ARCTD511-12; 1 ♀, same data as before but 10–14-IX-2011. BRAZIL, 1 ♀, Rio Grande do Sul, Morro Reuter, 26-27-III-2005, 550 m, dissected / Gen. ML2834 (blue manuscript label) /. All in MLC. BRAZIL, 1 ♂, 1 ♀, Rio Grande do Sul, ex Collection Staudinger (ZMHB). PARAGUAY, 1 ♂, Sapucay (NHMUK). BRAZIL, 4 ♂♂, 4 ♀♀, Alto de Serra (NHMUK). [All examined.]

Diagnosis. Entirely white with a slight ochreous tinge, veins slightly darker than foreground. Below a black streak along the costa of forewings and the veins more contrasting in the distal part of wings. Females larger than males.

Description. Male. **Head.** Proboscis light beige. Palpi entirely covered with white scales. Frons and vertex dirty white. Antennae bipectinate, scape and shaft dorsally covered with white scales but ventrally the shaft and pectinations are dark brown. **Body and wings.** The whole body and wings are entirely white with a slight ochreous tinge. Forewing length 11–12 mm (n = 2). The veins appear slightly darker than foreground. There is a slight ochreous spot at the end of forewing cell. Collar, thorax and abdomen concolorous with wings. Fringes of the wings white. Ventrally the markings are more contrasted. There is a black streak along the costa of forewings and the veins are more contrasting in the distal half of all wings, also a thin black line on the outer margin more distinct near apex. Ventral part of thorax and abdomen white, the collar appears yellowish. **Genitalia** (Figs. 35–38). Uncus cylindrical slightly spatulate in the terminal half and with a sharp spine on tip. Above uncus two symmetrical processes, tongue shaped, reaching the middle of uncus. Valvae subrectangular, long and narrow reaching the tip of uncus. The tip well sclerotized, pointed and bent inwards. A small translucent cucullus covered with hairs in ventral position. A triangular process pointing internally just beyond the middle of valvae. Vinculum wide with rounded and triangular saccus well developed. Juxta extended, sclerotized and shaped as Λ. In lateral view the genitalic capsule appears extremely flat. Phallus cylindrical, slightly sinuate, long and narrow. Vesica with a unique and large ventral lobe with longitudinal wrinkles and two patches of cornuti: an ovoid and dense patch of small spines near entry and a longitudinal row of small spines on the total lobe.



FIGURES 35–38. *Gloora mundula* **comb. nov.**, male genitalia; dorsal (35), ventral (36), lateral (37), phallus (38). Scale bar: 1 mm.

Female. Identical to male but slightly larger. Forewing length 13 mm (n = 2). Antennae ciliate. **Genitalia** (Fig. 52). Genitalia generally slightly sclerotized, apophyses anteriores and posteriores subequal, thin and long. Ductus bursae as a narrow cylindrical tube strongly bent and sinuous in the last third where it is strongly sclerotized. Bursa copulatrix large and pyriform, strongly sclerotized at the narrow end near the junction with ductus bursa. The bursa is entirely covered with spicules on the basal two thirds of the length, the last distal third being smooth and the ductus seminalis emerges laterally in that area.

Barcode. See Discussion.

Biology. Unknown.

Distribution. BRAZIL, PARAGUAY, ARGENTINA.

***Gloora sericea* (Zerny, 1931) comb. nov.**
(Figs. 23–26, 39–42, 49, 53)

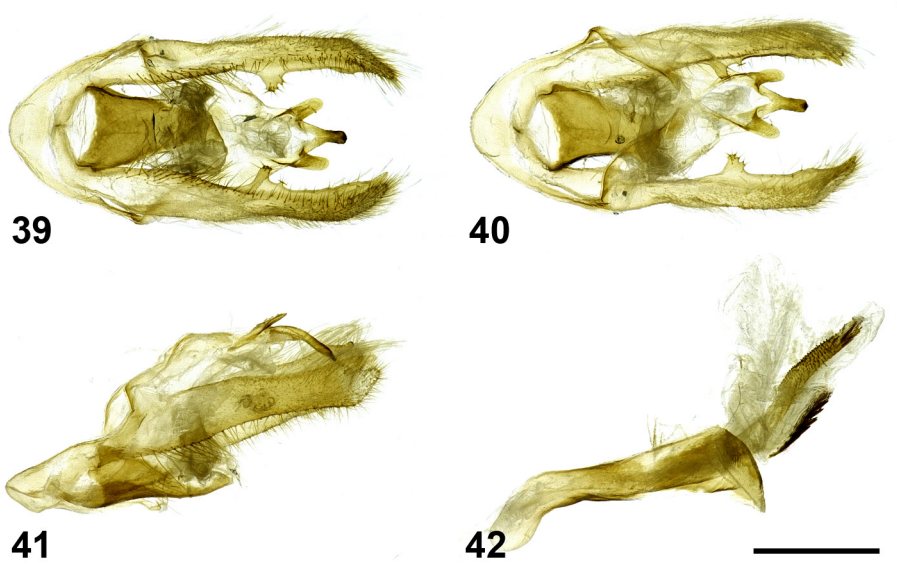
Eucereon sericeum Zerny, 1931: 25; Tafel 1, fig. 5. **Type locality:** BRAZIL, Rio de Janeiro, Neu-Freiburg (Semper 1873).
Type depository: NHMW.
Eucereon sericeum—Hoffmann (1936: 449), Pinheiro & Gaal-Haszler (2015; figs 22, 62).
Agaraea sericeum (Zerny, 1931)—Beccacece & Zapata (2017).

Lectotype: BRAZIL, 1 ♂, with three labels: Stieglmayr, Rio Gr. do Sul / Ende August / Eucereon sericeum Zerny ♂ Type. Designated by Pinheiro & Gaal-Haszler (2015).

Paralectotypes: BRAZIL, 1 ♂, Stieglmayr Rio Gr. do Sul / Ende August / Eucereon sericeum Zerny ♂ Type; 1 ♂, Stieglmayr Rio Gr. do Sul / Anf. August / Eucereon sericeum Zerny ♂ Type; 1 ♂, Semper Nea Freiburg 1873 / Eucereon sericeum Zerny ♂ Type; 1 ♀, Stieglmayr Rio Gr. do Sul / Mitte Septb. / Eucereon sericeum Zerny ♂ Type; 1 ♀, Stieglmayr Rio Gr. do Sul / Jänner / Eucereon sericeum Zerny ♂ Type. All specimens in NHMW.

Additional material examined: BRAZIL, 1 ♂, São Paulo, Alto de Serra, IX.1923 (R. Spitz) (Rothschild/Bequest/B.M. 1939-1) (NHMUK); 1 ♂, idem except, VI.1926; 1 ♀, idem except, VII.1928; 1 ♂, idem except, VIII.1928; 1 ♀, idem except, IX.1928; 1 ♂, Paraná, Curitiba, 920 m, 25.X.1975 (V.O. Becker col.) (NHMUK). BRAZIL, 1 ♂, Santa Catarina, Neu Bremen, 31.i.1932 (Fr. Hoffmann); 1 ♂, idem except, 250 m (NHMW). BRAZIL, a series of ♂♂ and ♀♀ from Castro Paraná, is pinned in row with the type of *G. alba* in NHMUK. BRAZIL, 1 ♂, 1 ♀, Paraná, Estrada da Graciosa, 2-XII-2011, 873 m, M. Zenker *leg*. Both specimens are sequenced: Sample ID MMZ1080, BOLD Proc ID LEMMZ1080-12 and MMZ1082, BOLD Proc ID LEMMZ1082-12. 1 ♀, same data but 700 m and Sample ID MMZ1081, BOLD Proc ID LEMMZ1081-12. All in DZUP. [All examined.]

Diagnosis. Head and patagia creamy. Tegulae and dorsal surface of thorax and abdomen, white. All wings silky white. In males a creamy androconial patch in the costal cell dorsally. Valvae symmetrical, longer than the uncus. Saccus evenly rounded.



FIGURES 39–42. *Gloora sericea* **comb. nov.**, male genitalia; dorsal (39), ventral (40), lateral (41), phallus (42). Scale bar: 1 mm.

Re-description. Male. Head. Proboscis light brown. Palpi creamy, not exceeding vertex in length. First and second palpomeres with brown scales dorsally. Frons creamy, slightly longer than wide. Ocular ring brown with bluish hue. Vertex, scales immediately posterior to the antennal sockets and occiput creamy. Antennae creamy with brown scales along the shaft of flagellomere. Medial rami approximately two times the width of the shaft of flagellomere. Rami decreasing in length gradually towards the tip of the antennae. Distal flagellomeres lacking rami. **Thorax.** Patagia creamy. Dorsal surface of meso- and metathorax, including tegulae, white. Foreleg coxae

creamy white on the anterior side, white on the posterior side. Foreleg femora, tibia and tarsi light brown, with white scales on the outer surface. The epiphysis light brown. Mid- and hindleg coxae white. Mid- and hindleg femora, tibia and tarsi light brown, with white scales on the outer surface. **Forewings.** Forewing length 13–14 mm (n = 4) (no types). Dorsal and ventral surfaces identical in color pattern, covered by white scales. The costal margin brown, fading towards the apex. Retinaculum white. **Hindwings.** Dorsal and ventral surfaces almost identical, covered with white scales. Presence of a creamy androconial patch in the costal cell upper side. **Abdomen.** Countertympana, dorsal and ventral side, white. **Genitalia** (Figs. 39–42). Saccus developed. Tegumen narrower than vinculum, glabrous. Anterior margin of tegumen with a deep U-shaped invagination. Posterior margin of tegumen thinning, in the middle membranous, from which two structures emerge in the form of tongues, sclerotized. Uncus unilobed, acute. Juxta extended, sclerotized, basally two times wider than distally. Valvae symmetrical, longer than the uncus; in lateral view, thin and slightly curved, covered with setae. Ventral process membranous covered with setae. Dorsal process slender, slightly sclerotized and acute. Phallus widening distally. Vesica membranous with two patches of cornuti: the first in the basal area of the right side, the second in the distal area of the left side. Coremata with additional scale bunches (Fig. 49) at the bases of coremata tubes (as in *alba*, above).

Female. Forewing length 14–15 mm (n = 2) (no types). As males, but medial rami as long as the shaft width. The costal margin brown, but less pronounced than males. The frenulum with two bristles. **Genitalia** (Fig. 53). Ninth tergite slightly sclerotized. Papillae anales with relatively long setae. Anterior and posterior apophyses subequal. Ostium and antrum centralized. Antevaginal and postvaginal lamellae sclerotized. Ductus bursae wide, flattened, sinusoid, membranous in the distal half, sclerotized in the basal half. Corpus bursae oval and membranous, with sclerotized spicules on more than half its surface. Ductus seminalis emerging from the first third of the bursa.

Barcode. See Discussion.

Biology. Unknown.

Distribution. In the Southeast and South of BRAZIL, including the states of Rio de Janeiro, Rio Grande do Sul (Zerny 1931), Santa Catarina (Hoffmann 1936), Paraná and São Paulo (NHMUK).

Remarks. *Gloora sericea* is easily confused with some Lithosiini, including *Agylla* and *Cyptonychia flaviceps* Druce (Hoffmann 1936).

Pinheiro & Gaal-Haszler (2015) asserted that the habitus and genitalia are certainly not part of a monophyletic concept of *Eucereon*, also mentioning that the species may be related to *Hyaleucerea mundula*, *Eucereon alba* and *E. vestalis*. With the last two they share similarities in the color of adults males and females. Greater similarities in relation to external morphology and genitalia are found with *H. mundula* and *E. alba*; for *E. vestalis* see Discussion.

Eucereon sericeum was recently erroneously transferred to the genus *Agaraea* Herrich-Schäffer, [1855] (Beccacece & Zapata (2017) which belongs to the Phaegopterina. The genitalia of *Agaraea* (Beccacece & Zapata (2017: figs. 11–14) are very different and *E. sericeum* is a Ctenuchina.

Gloora canae Grados sp. nov.

(Figs. 27–30, 43–46, 50, 54)

Holotype. PERU, 1 ♂, Junin, 2 km SSE de Puerto Ocopa, 11°09'32"–10'19" S, 74°18'32–48" W, 430–680 m, 28.iv–02.v.2012, C. Espinoza & I. Galindo. **Type depository:** MUSM.

Paratypes. PERU, 1 ♂, Cusco, Campamento Paratori, 12°03' S, 72°58' W, 690 m, 25.x.2002 (J. Grados). 1 ♂, Junin, 2 km SSE de Puerto Ocopa, 11°09'32"–10'19" S, 74°18'32–48" W, 430–680 m, 28.iv.–02.v.2012 (C. Espinoza & I. Galindo) (genitalia # JGA 417 MUSM); 1 ♂, 1 ♀, idem; 1 ♂, 2 km SSE de Puerto Ocopa, 11°09'11" S, 74°18'28" W, 363 m, 22.iii.2015 (J. Grados) (genitalia # JGA 431 MUSM); 1 ♀, idem except (genitalia # JGA 432 MUSM). All in MUSM. [All examined.]

Diagnosis. Head, patagia, tegulae and dorsal surface of thorax and abdomen, white. Forewing white with the veins brown. Hindwing white. Valvae slightly longer than the uncus. Saccus as a large triangle. Phallus elongated, slightly sinusoidal and somewhat sclerotized. Vesica membranous with presence of one row of strongly sclerotized cornuti.

Description. Male. Head. Proboscis light brown. Palpi predominantly white, not exceeding vertex in length.

Frons white, longer than wide. Vertex, occiput and scape white. Ocular ring brown with a bluish hue. Antennae white with brown scales at the base of each flagellomere. Medial rami length approximately three times the width of the shaft. Rami decreasing in length gradually towards the tip of the antennae, being absent distally. **Thorax.** Dorsal surface of meso- and metathorax, including patagia and tegulae, white. Foreleg coxae white. Foreleg femora, tibia and tarsi white and the inner surface brown. Epiphysis light brown. Midleg coxae and femora white, tibia and tarsi white and the posterior surface brown. Hindlegs white. **Forewings.** Forewing length 11–12 mm (n = 5). Dorsally white with light brown veins and a brown costal margin. Ventrally white, with grey scales in the anterior area of the discal cell, on radial veins and in the distal half of median and cubital veins. The brown veins are more contrasting in the distal half, toward the termen. **Hindwings.** Dorsal and ventral surfaces almost identical, predominantly covered with white scales. On the ventral side, grey scales present between the costal margin and the radial veins. **Abdomen.** Countertympana on dorsal and ventral side white. **Genitalia** (Figs. 43–46). Saccus developed. Tegumen as wide as the vinculum, glabrous. Anterior margin of tegumen with a deep U-shaped invagination, slightly sclerotized. Posterior margin of tegumen straight, membranous in the middle, from which two structures in the form of sclerotized tongues emerge. Uncus unilobed, glabrous, wide at base, acute toward the distal end. Juxta extended, sclerotized, wide at base. Valvae symmetrical, slightly longer than the uncus; in lateral view thin and slightly curved. Toward the distal end, dorsal and ventral processes present. Ventral process membranous and covered with setae. Dorsal process slender, sclerotized and acute. Phallus cylindrical, slightly sinusoidal and somewhat sclerotized. Vesica membranous with a row of strongly sclerotized cornuti. Coremata with additional scale bunches (Fig. 50) at the base of coremata tubes (as in *alba* and *sericea*, above).

FIGURES 43–46. *Gloora canae* **sp. nov.**, male genitalia; dorsal (43), ventral (44), lateral (45), phallus (46). Scale bar: 1 mm.

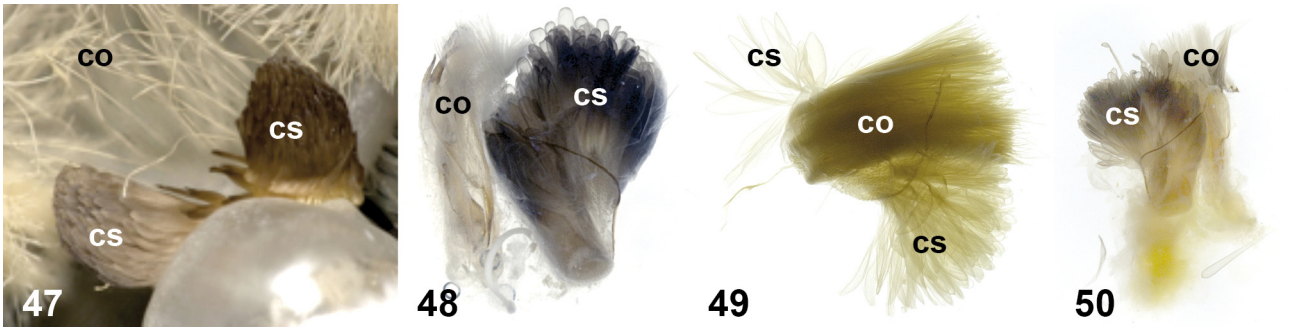
Female. Forewing length 13 mm (n = 2). Similar to males, but medial rami as long as the shaft width. In the forewings the costal margin is white. **Genitalia** (Fig. 54). Ninth tergite slightly sclerotized. Papillae anales with relatively long setae. Anterior and posterior apophyses of the same size. Ostium and antrum centralized. Antevaginal lamella membranous and postvaginal lamella sclerotized. Ductus bursae wide, flattened, sinusoidal and membranous, except for the distal third of the dorsal side, which is sclerotized. Corpus bursae oval and membranous with small spicules on more than half its surface. Ductus seminalis emerging at the end of the ventral side.

Biology. Unknown.

Distribution. PERU; present in the departments of Junin and Cusco, i.e., in the low montane forest of the Eastern slope of the Andes, 430–690 m.

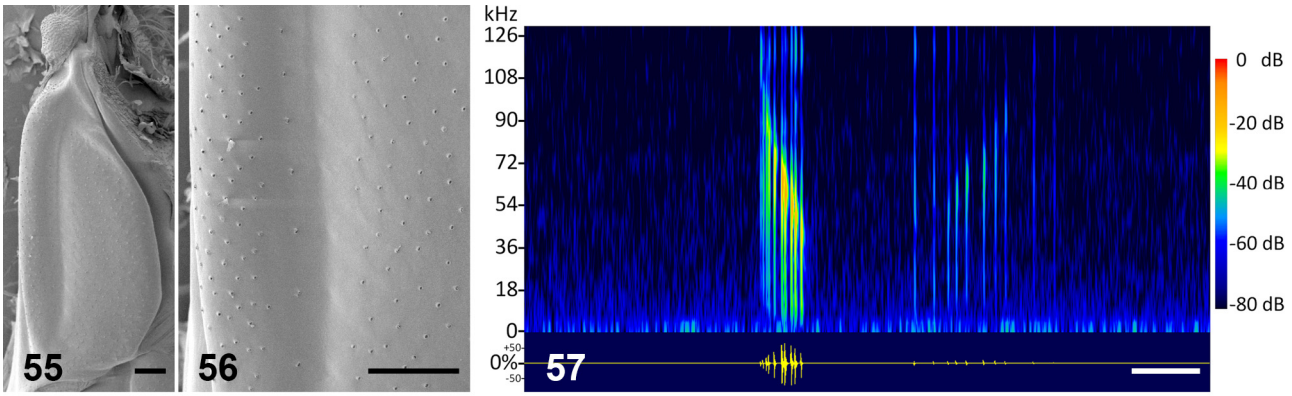
Etymology. *canae* is a feminine adjective in singular genitive which means "of the white".

Remarks. *Gloora canae* shows some similarity to *G. alba, G. sericea* and *Eucereon vestalis* (Schaus, 1892b). However, *G. canae* has brown veins. *Gloora alba* occurs from Mexico to Venezuela and *G. sericea* in South-East Brazil, Argentina and Paraguay; *E. vestalis* co-occurs with *G. canae* in Peru.



FIGURES 47–50. Dense clusters of scales, representing crystal scales (**cs**)(sensu Boppré *et al.* 2018) at the base of coremata (**co**) as seen in a freshly killed specimen in which coremata were artificially protruded (47) and in a KOH abdominal preparation of *Gloora alba* **comb. nov.** Same structures in KOH preparations of *G. sericea* **comb. nov.** (49) and *G. canae* **sp. nov.** (50).

FIGURE 51–54. *Gloora alba* **comb. nov.** (51), *G. mundula* **comb. nov.** (52), *G. sericea* **comb. nov.** (53), *G. canae* **sp. nov.** (54), female genitalia (bursae). Scale bars: 1 mm.



FIGURES 55–57. *Gloora alba* **comb. nov.**, scanning electron micrographs of a female tymbal organ after brushing off the overlying scales (55, 56) and a spectrogram (57) showing a modulation cycle with ten clicks in the active and passive modulation half cycle. The acoustic structure of sounds produced in response to manual stimulation meets the general assumptions on arctiine sound production (Blest *et al.* 1963; Fullard & Fenton 1977) but differ insofar as the passive modulation half cycles are in comparison to the respective active cycles less emphasized, i.e. with lower overall amplitude of the click trains. Courtesy of Philipp Klein, FZE, Freiburg (cf. Klein *et al.* 2018). Scale bars: 100 µm / 5 msec.

Neighbour-joining distance tree

Figure 58 provides a neighbour-joining distance tree, based on 21 barcodes, 12 for species of *Gloora* gen. nov. and 9 for close relatives (see Discussion).

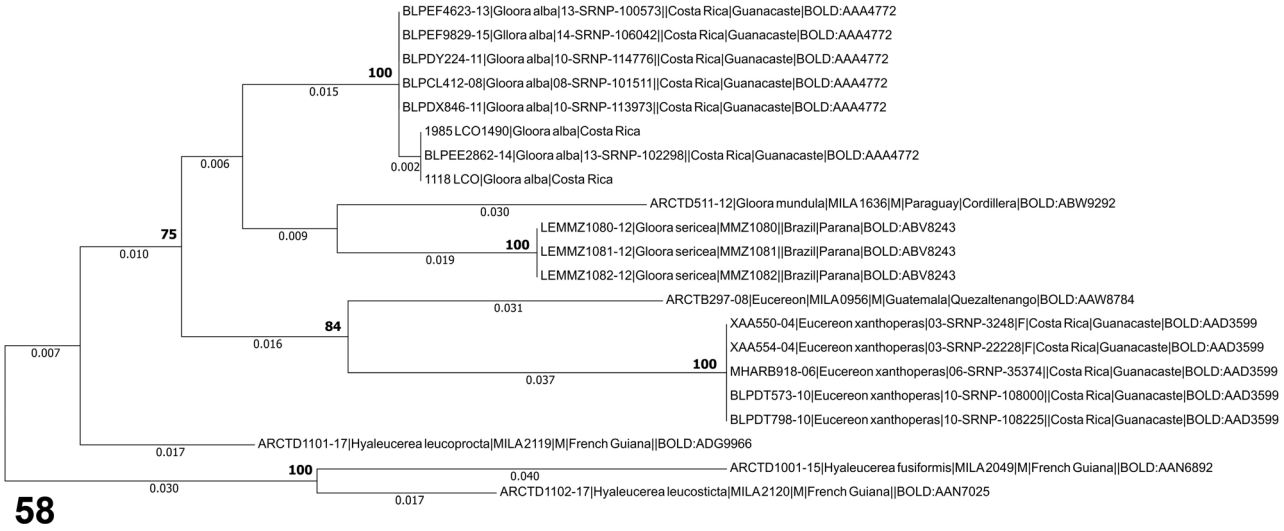


FIGURE 58. Neighbour-joining distance tree for *Gloora* **gen.nov.** obtained from the analysis of 19 DNA barcode sequences from BOLDSYSTEMS plus 2 new ones of *G. alba*; from BIN BOLD:AAA4772 6 out of <100 identical barcodes were selected. Distances in % and bootstrap supports (in bold and only if larger than 70 %) are given near each branch (obtained with MEGA6, cf. Tamura *et al*. 2013).

Discussion

Describing a new genus and using names from fairly undiagnostic old descriptions of individual females only (*alba*, *mundula*) is debatable, however, we see no alternative to how we handled the problem. We are aware of several additional apparently undescribed species which might well fall into the new genus; unfortunately, they are females only, morphologically they cannot be allocated without doubt, and material for barcoding is unavailable; thus we refrain from discussing them here. Before adding additional species in *Gloora*, male genitalia need to be studied; in particular, sequencing will be decisive for generic allocation.

From the project "Neotropical Arctiidae" within the framework of "Lepidoptera barcode of life" (www.lepbarcoding.org) more than 26,000 sequences of Arctiinae are available which we used for comparison with barcodes of the species in question. The BOLDSYSTEMS (2018) database provides numerous barcodes identical to ours of *G. alba*, as *Eucereon alba*, all from Costa Rica, Guanacaste (BIN BOLD:AAA4772). *G. mundula* from Paraguay, Cordillera was misidentified as *Biturix* sp. (BIN BOLD:ABW9292), *G. sericea* from Brazil, Parana, as *Agylla* (BIN BOLD:ABV8243). See Figure 58.

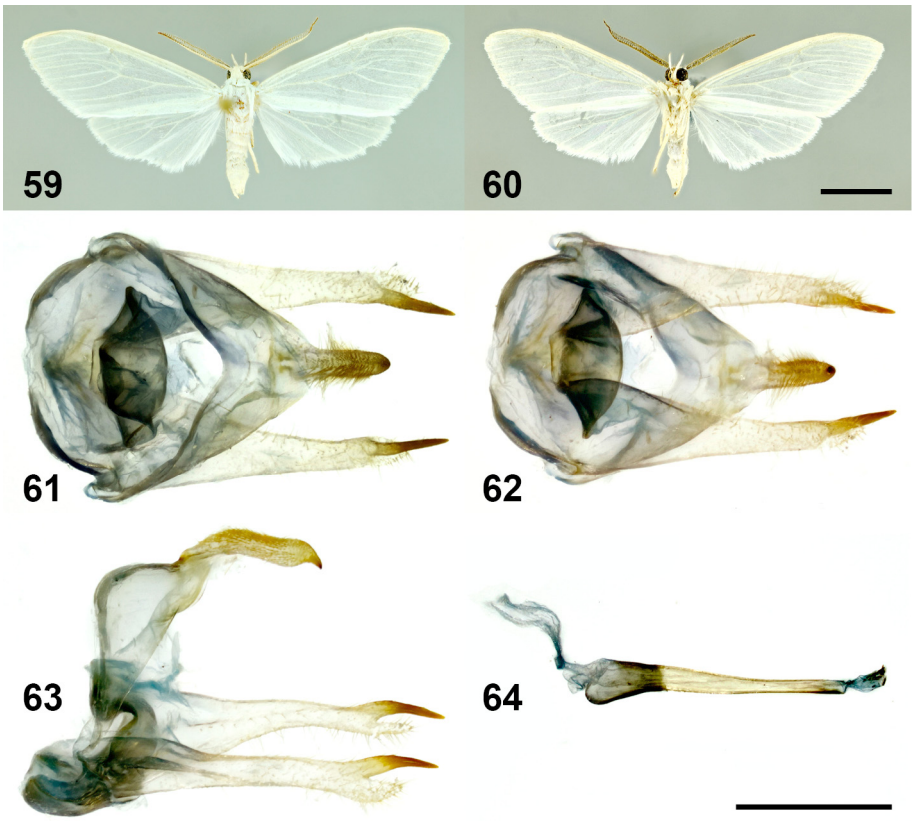
The three sequenced *Gloora* species (*G. canae* pending) fit nicely into a narrow cluster (Fig. 58). The maximum distance between the three species is less than 5.5%, and the intraspecific variability is low.

The nearest cluster in BOLDSYSTEMS contains *Eucereon xanthoperas* (Hampson, 1898) (BIN BOLD:AAD3599) and an undescribed *Eucereon* species from Guatemala (BIN BOLD:AAW8784). However, some differences in the genitalia associated with a large difference in the COI gene sequences (6.8–9.8 %) convince us to exclude these species from the genus *Gloora;* it will be necessary to find a genus to accommodate these species, and that genus cannot be *Eucereon*. For the moment, the closest genus to *Gloora* is *Hyaleucerea* Butler, 1875 especially with the species "*H. leucoprocta*" (BIN BOLD:ADG9966) or "*H. leucosticta*" (BIN BOLD:AAN7025); these entities display very different habitus and genitalia.

Eucereon vestalis (Schaus, 1892a,b; Figs. 11–13, 59–60; as *Eucereum vestale* [sic, recte *Eucereon*] in Draudt

(1915: 184, fig. 25k)) is confused with *Gloora alba* in several collections. However, its male genitalia (Figs. 61–64) are very different and there are no coremata present. This species is definitely neither a *Gloora* nor an *Eucereon* and further study is required to find an appropriate genus.

Some *Gloora* species are or were considered as species of the genera *Biturix* Walker, 1855 or *Agaraea* Herrich-Schäffer, 1855, but these are heterogeneous Phaegopterina genera clustering at a large distance from *Gloora,* lacking coremata and showing very different genitalia.



FIGURES 59–62. *Eucereon vestalis* (Schaus, 1892a), habitus male (59, 60), dorsal (left) and ventral (right) view; male genitalia; dorsal (61), ventral (62), lateral (63), phallus (64). Scale bars: 0.5 / 1 mm.

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