New species of plume moths (Lepidoptera: Pterophoridae) from Ecuador

PETR USTJUZHANIN¹,²,５, VASYLY KOVTUNOVICH³ & ALEXANDER STRELTZOV⁴

¹Altai State University, Lenina 61, Barnaul, RU–656049, Russia E-mail: petrust@mail.ru
²Biological Institute, Tomsk State University, Lenina Prospect 36, Tomsk 634050, Russia
³Moscow, RU–143039, Russia. E-mail: vasko-69@mail.ru
⁴Herzen State Pedagogical University of Russia, 48, Moika Emb., Saint-Petersburg, 191186, Russia.
E-mail: streltzov@mail.ru
⁵Corresponding author. E-mail: petrust@mail.ru

Received 15 October 2021 | Accepted by V. Pešić: 1 November 2021 | Published online 2 November 2021.

Abstract
The article describes five new species of plume moths from Ecuador which are new to science: Amblyptilia kara Ustjuzhanin & Kovtunovich sp.nov., Hellinsia diana Ustjuzhanin & Kovtunovich sp.nov., Hellinsia elena Ustjuzhanin & Kovtunovich sp.nov., Hellinsia gielisi Ustjuzhanin & Kovtunovich sp.nov., and Hellinsia wojtusiaki Ustjuzhanin & Kovtunovich sp.nov.

Key words: Biodiversity, Lepidoptera, Pterophoridae, plume moths, Neotropics, Ecuador, new species.

Introduction
Some of the first information on plume moths of Ecuador was published by Meyrick (1913, 1921). An intensive study of the Ecuadorian Pterophoridae began in the end of the 20th century and continues nowadays. The Pterophoridae fauna of Ecuador includes about 130 species (Gielis 1996, 1997, 2002, 2003, 2006, 2011, 2012, 2013, 2014, 2016; Landry & Gielis 1992; Gielis & Matthews 1994; Matthews & Miller 2010; Kovtunovich et al. 2016). The richness and diversity of natural zones in Ecuador together with the equatorial climate, favorable for the plant and animal world, allows suggesting that this region will still be a significant source of faunal findings and of Pterophoridae species new to science. In the materials on Pterophoridae, collected by V. Sinyaev and his assistants in Ecuador, we found five species new to science. The studied specimens are deposited in the collection of the Zoological Institute, St. Petersburg, Russia (ZISP) and in the Collection of P. Ustjuzhanin and V. Kovtunovich, Novosibirsk and Moscow, Russia (CUK).
Taxonomical part

_Amblyptilia kara_ Ustjuzhanin & Kovtunovich _sp. nov._

http://zoobank.org/urn:lsid:zoobank.org:act:3A5D2229-C983-42BF-8F9D-452B3AC685F4
Figs 1–2

**Type material:** Holotype, male (ZISP, gen.pr. Nr. 1971), _Ecuador_, Pichincha prov., Camping Tambo Tanda, 1970m, 0°01'22"S 78°38'48"W, 9-10. I.-2013, V. Sinyaev & O. Romanov leg.

**Description.** External characters. Head with bright-yellow scales. Thorax and tegulae brown. Labial palpi light-grey, directed up, equal to longitudinal eye diameter in length. Antennae light-grey. Wingspan 20 mm. Fore wings light-brown. First lobe apically acute. Distinctive oblique narrow dark-brown stroke on first lobe, on background of white scales. Two small brown spots at cleft base. Second lobe darkened with brown scales. Fringe inside cleft grey-brown with alternating dark-brown portions. Fringe on dorsal edge of fore wing grey with portions of dark-brown bundles of scales. Hind wings unicolorous, yellowish-grey, fringe of the same colour. Hind legs pale-yellow with portions of brown scales at bases of spurs.

_Figure 1. Amblyptilia kara_ Ustjuzhanin & Kovtunovich _sp. nov._, adult (Holotype, male, ZISP)

**Male genitalia:** Valves symmetric, cucullus isolated, slightly narrowing and bluntly rounded on top, with expressed short narrow acute spike. Tegumen bilobed. Saccus ribbon-like, of equal width in all its length. Uncus lanceolate, basally oval, smoothly narrowing to bluntly tapered apex. Saccus with notch on outer edge. Anellus arms narrow, ribbon-like. Aedeagus slightly curved. One end of cornutus narrow, acute, the other end extended. Basal process of aedeagus short, rounded, directed perpendicularly to aedeagus.

**Differential diagnosis.** In the male genitalia, in the wide, rectangular saccus, the valve apex with the expressed short narrow spike and in the shape of the uncus, the new species is similar to _Amblyptilia punoica_ Gielis, 1996, but in the new species, the saccus has a notch on the outer edge while in _A. punoica_ this notch is absent. The uncus of the new species is lanceolate, with a bluntly acute apex, _while in A. punoica_ the apical part of the uncus is isolated and very narrow. Unlike that of _A. punoica_, the aedeagus in the new species has cornuti. Additionally, the new species clearly differs from _A. punoica_ in the wings colour.
Figure 2. Amblyptilia kara Ustjuzhanin & Kovtunovich sp.-nov., male genitalia (Holotype, gen.pr. Nr. 1971).

**Distribution:** Ecuador, Pichincha Province.

**Flight period:** January.

**Etymology:** The species is named after the Indian tribe Kara, which has inhabited Ecuador since ancient times.

**Hellinsia diana** Ustjuzhanin & Kovtunovich sp. nov.

http://zoobank.org/urn:lsid:zoobank.org:act:D9C380CE-913F-4BD5-BE08-25E4EA61A6DB

Figs 3–4

**Type material:** Holotype, female (ZISP, gen.pr. Nr. 1972), Ecuador, Pichincha prov., Camping Tambo Tanda, 1969 m, 0°01'22"S, 78°38'48"W. 25.X.2011, V. Sinyaev leg.

**Description. External characters.** Head with dark-brown scales. Thorax and tegulae light-yellow. Labial palpi thin, directed forward, 1.5 times longer than longitudinal eye diameter, brown from outside, yellow from inside. Antennae cross-striped with alternating yellow and brown segments. Wingspan 21.5 mm. Fore wings yellow up to cleft base, slightly interspersed with red-brown scales. Both lobes of fore wing reddish-brown. First lobe apically with two small bright white portions of scales. Fringe inside cleft brown. Fringe on dorsal edge of fore wing yellow from base to beginning of second lobe, then sharply turning into brown. Hind wings unicolorous, light-brown. Fringe on third and fourth lobes light-brown, on fifth lobe yellow from outside. Hind legs pale-yellow with sputtering of brown scales at bases of spurs. Spurs on hind legs of different length.
Figure 3. Hellinsia diana Ustjuzhanin & Kovtunovich. sp. nov., adult (Holotype, female, ZISP).

**Female genitalia:** Papillae anales oval. Posterior apophyses thin, long. Lamina vaginalis wide, rectangular. Antrum goblet-like, sclerotized, ostium funnel-like. Ductus wide, smoothly narrowing into oval bursa copulatrix. Signa in bursa shaped as accumulation of tiny plaques. Ductus seminalis twice longer than bursa copulatrix, elongated and tapered at end.

**Differential diagnosis.** Externally, the adult of the new species is slightly similar to *Hellinsia hamadryadis* Gielis, 2012, but differs in the completely colored reddish-brown lobes of the fore wing, the absence of the spots at the cleft base and the yellow colour on the wing basally, while in *H. hamadryadis*, the first lobe is not completely unicolorous: it is brown only above the cleft base, while distally it is yellow. Additionally, *H. hamadryadis* has a brown spot at the cleft base, and the fore wing is basally noticeably darkened with brown scales. In the general structure of the female genitalia, the new species is similar to *Adaina primulacea* Meyrick, 1929, but differs in the cluster of tiny signa in the bursa copulatrix, in the wider antrum, in the completely another color of the wings and finally, in the significantly bigger size.

**Distribution:** Ecuador, Pichincha Province.

**Flight period:** October

**Etymology:** The species is named in memory of Diana, the Princess of Wales, a humanist, well-known benefactor, generous and sympathetic woman, the Queen of human hearts (1961–1997).

*Hellinsia elena* Ustjuzhanin & Kovtunovich sp. nov.

http://zoobank.org/urn:lsid:zoobank.org:act:44537696-B1C5-43DE-8457-5EEA09EDB580

Figs 5–7

**Type material:** *Holotype*, male (ZISP, gen.pr. Nr. 1973), **Ecuador**, Pichincha prov., Camping Bella Vista, 2230m, 0°00'41"S, 78°41'17"W. 27.X.2011, V. Sinyaev & O. Romanov leg.; **Paratypes:** 1 female (ZISP, gen.pr. Nr. 1974), same data as holotype; 1 specimen without abdomen (CUK), **Ecuador**, Carchi prov., El. Angel Ecological Reserve, Road Tulcan-El Chical, 3300 m, 0°48'46"N, 78°00'40"W. 14.XI.2012, R. Brechlin & V. Sinyaev leg.; 1 specimen without abdomen (CUK), **Ecuador**, Road Loja-Zamora, 2700 m, 03°58'45"S, 79°08'28"W, 22.II.2012, R. Brechlin & V. Sinyaev leg.
Description. External characters. Head, thorax and tegulae green. Labial palpi also green, their third segment thin, narrow, second segment wide. Labial palpi slightly longer than longitudinal eye diameter. Antennae cross-striped, with alternating green and brown segments. Wingspan 27–33 mm, in holotype – 27 mm. Fore wings light-green. Brown spot at cleft base. Two brown spots on first lobe along costal edge. Second lobe interspersed with tiny brown scales. Fringe inside cleft with alternating portions of green and brown hairs. Hind wings unicolorous, light-grey with glittering. Fringe on third and fourth lobes greyish-brown, on fifth lobe green at base, from outside, medially and distally mottled: with grey, brown and light-green hairs. Hind legs pale-green, interspersed with brown scales, ends of spurs brown.

Male genitalia: Uncus narrow, slightly curved, apically acute. Valves asymmetric, left slightly wider than right. Saccular process on left valve arched, apically acute, reaching middle of valve in length. Saccular process on right valve short, wide, also reaching only middle of valve. Anellus arms short, wide. Saccus with small notch on outer edge. Aedeagus almost straight, sharply bent on end, almost at right angle, 1.5 times shorter than right valve in length.

Figure 4. Hellinsia diana Ustjuzhanin & Kovtunovich. sp. nov., female genitalia (Holotype, gen.pr. Nr. 1972).
Figure 5. *Hellinsia elena* Ustjuzhanin & Kovtunovich sp. nov., adult (Holotype, male, ZISP).

Figure 6. *Hellinsia elena* Ustjuzhanin & Kovtunovich sp. nov., male genitalia (Holotype, ZISP, gen.pr. Nr. 1973).
**Female genitalia:** Papillae anales oval. Posterior apophyses long. Lamina vaginalis wide, sclerotized. Antrum short, tubulate. Ductus short, membranous. Bursa copulatrix pear-shaped, without signa.

**Differential diagnosis.** In the male genitalia, in the shape of the saccular process on the left valve, the new species is similar to *Hellinsia sucrei* Gielis, 2011, but differs in the wider and shorter saccular process on the right valve and in the other shape of the anellus and aedeagus. In the apically curved aedeagus, the new species slightly resembles *Hellinsia glochinias* (Meyrick, 1908) and *Hellinsia cordobae* Gielis, 2013, but is the new species the aedeagus is apically curved almost at a right angle, while in *H. glochinias* and *H. cordobae* it is smoothly curved at a blunt angle. Additionally, the new species clearly differs in the shape of the saccular process on both valves and in the wings colour.

**Distribution:** Ecuador (Pichincha and Carchi Provinces).

**Flight period:** February, October–November.

**Etymology:** The species is named after Elena N. Nikolaeva (Berezovo, Novosibirsk Region, Russia), a school teacher of biology and chemistry, naturalist, Honorary Worker of Education of the Russian Federation.
**Hellinsia gielisi** Ustjuzhanin & Kovtunovich sp. nov.

http://zoobank.org/urn:lsid:zoobank.org:act:04E02155-272C-4BB2-AB4A-6F583C33C1F3

Figs 8-10

**Type material:** **Holotype**, male (ZISP, gen.pr. Nr. 1975), **Ecuador**, Morono Santiago, 62 km Road Rio Bamba-Macas, 2°12'40"S, 78°23'51"W, 27.III.2012, 2700 m, R. Brechlin & V. Sinyaev leg.; **Paratypes**, 1 female (ZISP, gen.pr. Nr. 1976), **Ecuador**, Napo prov., Rio Papalacta, Guyuja, 2525 m, 0°25'17"S, 78°01'19"W, 19.XII.2012–07.I.2013, V. Sinyaev & O. Romanov leg.; 1 male (CUK), **Ecuador**, Pichincha prov., Camping Bella Vista, 2230 m, 0°00'41"S, 78°41'17"W, 19.XII.2012–07.I.2013, V. Sinyaev & O. Romanov leg.; 2 males (ZISP, CUK) **Ecuador**, Pichincha prov., Camping Bella Vista, 2230 m, 0°00'41"S, 78°41'17"W, 05–19.III.2012, R. Brechlin & V. Sinyaev leg.; 1 male (CUK) **Ecuador**, Pichincha prov., Camping Bella Vista, 2230 m, 0°00'41"S, 78°41'17"W, 27.X.2011, V. Sinyaev & O. Romanov leg.; 6 males, 1 female (ZISP, CUK), **Ecuador**, Pichincha prov., Camping Bella Vista, 2230 m, 0°00'41"S, 78°41'17"W, 20.XII.2012, R. Brechlin & V. Sinyaev leg.

**Description. External characters.** Thorax and tegulae light-brown. Collar on head with brown sticking out hairs. Labial palpi thin, yellowish-brown, straight, equal to longitudinal eye diameter in length. Antennae yellow, interspersed with tiny brown scales. Wingspan 21-24 mm, in holotype – 24 mm. Fore wings light-brown. Small, round, poorly expressed spot at cleft base. Costal edge of fore wing darkened. Distinct dark-brown almost black elongated stroke on first lobe above cleft along costal edge, followed by white stroke and further to apical part of lobe there are tiny black strokes. Bright dark brown spots and dots along outer edge of fore wing. Hind wings unicolorous, slightly lighter than fore wings. Small dark-brown dots on hind wings along outer edge of three lobes. Fringe on all wings yellowish-brown. Hind legs light-yellow.

**Male genitalia:** Uncus narrow, slightly curved, apically acute. Valves asymmetric, left valve slightly wider than right valve. Saccular process on left valve smoothly bent into ring. Saccular process on right valve narrow, rod-like, apically acute and slightly bent, basally wide. Anellus arms basally wide, gradually

---

**Figure 8. Hellinsia gielisi** Ustjuzhanin & Kovtunovich sp. nov., adult (Paratype, male, ZISP).
narrowing to apices, left arm slightly shorter than right arm. Saccus arched. Aedeagus smoothly arched, twice shorter than right valve.

Figures 9. *Hellinsia gielisi* Ustjuzhanin & Kovtunovich sp. nov. Male genitalia (Holotype, ZISP, gen.pr. Nr. 1975).

**Female genitalia:** Papillae anales narrow, elongated. Posterior apophyses thin, long. Antrum goblet-like. Ductus short, wide, smoothly passing into relatively short oval bursa copulatrix. Ductus seminalis long, more than three times longer than bursa copulatrix. No signa.

**Differential diagnosis.** In the male genitalia, in the shape of the saccular process on the left valve, the new species is similar to *Hellinsia savrasovi* Kovtunovich & Ustjuzhanin, 1918, but differs in the shape of the saccular process on the right valve and in the wings colour.

**Distribution:** Ecuador (Morono Santiago, Napo and Pichincha Provinces).

**Flight period:** January, March, October, December.

**Etymology:** The species is named after Dr. Cees Gielis, a Dutch prominent specialist on Pterophoridae of the world fauna, who made a great contribution to the study of plume moths of the Neotropical region including Ecuador.

*Hellinsia wojtusiaki* Ustjuzhanin & Kovtunovich sp. nov.
http://zoobank.org/urn:lsid:zoobank.org:act:DCFE3FFE-4080-47B8-B647-9FC8546689B5
Figs 11−13

**Type material:** Holotype, male (ZISP, gen.pr. Nr. 1977), Ecuador, Pichincha prov. Camping Tambo Tanda, 1970 m, 0°01′22″S, 78°38′48″W, 09−10. I.2013, V. Sinyaev leg. Paratypes: 1 female (CUK), same data as holotype; 2 males, 4 females (ZISP, CUK), Ecuador, Pichincha prov. Camping Bella Vista, 2230 m, 0°00′41″S, 78°41′17″W, 19.XII.2012− 07.I.2013, V. Sinyaev & O. Romanov leg.; 1 female (ZISP), Ecuador, Pichincha prov, Camping Bella Vista, 2230 m, 0°00′41″S, 78°41′17″W, 05−19.III.2012, R. Brechlin & V. Sinyaev leg.; 1 female (ZISP, gen.pr. Nr. 1978), Ecuador, Pichincha prov, Camping Bella Vista, 2230 m, 0° 00′S, 78° 41′W, 20.XII.2012, leg. V. Sinyaev.
Description. External characters. Head, thorax and tegulae yellowish-brown. Labial palpi light-brown, twice longer than longitudinal eye diameter. Third segment apically acute. Antennae yellow, interspersed with tiny brown scales. Wingspan 18–23 mm, in holotype 18 mm. Fore wings split almost up to middle of wing, yellowish-brown, interspersed on all wing area with tiny brown scales. Brown spot at cleft base. Distinct elongated brown spot along costal edge of fore wing on first lobe. Fringe inside cleft yellowish-grey. Fringe on outer edge of fore wing light-brown with portions of dark-brown hairs. Hind wings unicolorous, slightly darker than fore wings. Fringe on hind wings grey. Hind legs yellow, with portions of brown scales.

Figure 10. Hellinsia gielisi Ustjuzhanin & Kovtunovich sp. nov., female genitalia (Paratype, ZISP, gen.pr. Nr. 1976).
Figure 11. *Hellinsia wojtusiaki* Ustjuzhanin & Kovtunovich sp. nov., adult (Paratype, female, ZISP).

Figure 12. *Hellinsia wojtusiaki* Ustjuzhanin & Kovtunovich sp. nov., male genitalia (Holotype, ZISP, gen.pr. Nr. 1977).
Male genitalia: Uncus narrow, slightly curved, apically acute. Valves asymmetric, left valve wider than right one. Saccular process on left valve sharply bent at 180° to hook, distally narrow and acute. Saccular process on right valve short, finger-like, located basally. Anellus arms short, rod-like, equal in length. Saccus smooth on outer edge, without notches. Aedeagus straight, twice shorter than right valve.

Female genitalia: Papillae anales short, oval. Posterior apophyses thin, long. Anterior apophyses short, slightly bent. Antrum short, funnel-like, located horizontally. Ductus also short, sharply bent, passing into long, narrow, oval bursa copulatrix. Ductus seminalis membranous, oval, twice shorter than bursa copulatrix. No signa.

Figure 13. Hellinsia wojtusiaki Ustjuzhanin & Kovtunovich sp. nov., female genitalia (Paratype, ZISP, gen.pr. Nr. 1978).
**Differential diagnosis.** The publication of Arenberger and Wojtusiak (2001) on plume moths of Venezuela provides the male genitalia image of the species indicated as *Hellinsia? pelodactyla* (Berg, 1885) (in the article it is indicated in question), which corresponds in all respects to our new species. Indeed, when comparing the external features of the specimen *H. pelodactyla*, indicated by Arenberger and Wojtusiak (2001) and the lectotype *H. pelodactyla*, illustrated in the Gielis (1991), there is a significant difference both in color and in the width of the second lobe of the fore wing. Later, Gielis (2011) contracted *Hellinsia pelodactyla* to a synonym of *Hellinsia surinamensis* (Sepp, 1855). The structure of the adult and of the genitalia in *H. surinamensis*, shown in the publication of Gielis (2011), has no resemblance to our new species and, accordingly, to the species depicted as *H.?pelodactyla* in the article of Arenberger and Wojtusiak (2001). From which it follows that our new species is not *H. surinamensis*, but corresponds to the wrongly defined *H? pelodactyla*, published in the study of Arenberger and Wojtusiak (2001). In the male genitalia, in the sharply curved saccular process on the left valve, the new species is similar to *Hellinsia puruha* Gielis, 2011, but differs in another shape of the aedeagus and anellus and in the totally different wings color.

**Distribution:** Ecuador (Pichincha Province); Venezuela.

**Flight period:** December–March.

**Etymology:** The species is named after the well-known Polish entomologist Janusz Wojtusiak (1942–2012), who made a great contribution to the study of Microlepidoptera. Janusz Wojtusiak was the first who collected this species in Venezuela, but in the study of Arenberger and Wojtusiak (2001) the species was erroneously identified.

**Acknowledgments**

We are sincerely grateful to the organizers of the expeditions, Dr. Ronald Brechlin (Pasewalk, Germany) and Viktor Sinyaev (Moscow, Russia) and to the expedition member Oleg Romanov (Santa Crus, Bolivia). The authors are grateful to Anna Ustjuzhanina (Tomsk, Russia) for language improvements. We also thank Sergei Reshetnikov (Novosibirsk, Russia) for the photographs of the adult specimens.

**References**

Arenberger, E. & Wojtusiak, J. (2001) Pterophoridae aus Venezuela. *Quadrifina* 4, 65–76.

Gielis, C. (1996) Neotropical Pterophoridae 12: New species. *SHILAP Revista de Lepidopterologia* 24, 81–110.

Gielis, C. (1997) Neotropical Pterophoridae 14: The species complex *Platyptilia thellopola* Meyrick, 1926. *Entomologische Berichten, Amsterdam*, 57, 38–41.

Gielis, C. (2002) Neotropical Pterophoridae 18: The genus *Bipunctiphorus* Gibeaux, 1994. *SHILAP Revista de lepidopterologia*, 30, 297–300.

Gielis, C. (2003) Pterophoroidea & Alucitoidea (Lepidoptera). [In] *World Catalogue of Insects*, 4, 198 s. Apollo Books, Stenstrup.

Gielis, C. (2006) Review of the Neotropical species of the family Pterophoridae, part I: Ochyroticinae, Deuterocopinae, Pterophorinae (Platyptiliini, Exelastini, Oxyptilini). *Zoologische Mededelingen, Leiden*, 80, 1–290.

Gielis, C. (2011) Review of the Neotropical species of the family Pterophoridae, part II: Pterophorinae (Oidaematophorini, Pterophorini). *Zoologische Mededelingen, Leiden*, 85, 589–824.

Gielis, C. (2012) Review of the Neotropical species of the family Pterophoridae, part III: Additions from Chile, Ecuador and Paraguay (Lepidoptera). *Boletín de la Sociedad Entomológica Aragonesa (S.E.A.)*, 51, 105–124.

Gielis, C. (2013) Review of the Neotropical species of the family Pterophoridae, part IV: Additions from Argentina, Bolivia, Chile, and Uruguay (Lepidoptera). *Boletín de la Sociedad Entomológica Aragonesa (S.E.A.)*, 53, 95–109.

Gielis, C. (2014) Review of the Neotropical species of the family Pterophoridae, part V: Additions from Peru, Ecuador, Colombia, Venezuela and the Guyanas (Lepidoptera). *Boletín de la Sociedad Entomológica Aragonesa (S.E.A.)*, 55, 67–91.
Gielis, C. (2016) Review of the Neotropical species of the family Pterophoridae, part VI: Additions from Brazil (Lepidoptera). *Boletín de la Sociedad Entomológica Aragonesa (S.E.A.)*, 58, 33–52.

Gielis, C. & Matthews, D. (1994) Neotropical Pterophoridae 9: *Chocophorus*, a new neotropical genus. *Entomologische Berichten, Amsterdam*, 54, 161–170.

Kovtunovich, V., Ustjuzhanin, P., Marquez, M. & Ustjuzhanina, A. (2016) Five new species of the genus *Singularia* Arenberger, 1988 (Lepidoptera, Pterophoridae). *European Journal of Taxonomy*, 247, 1–11.

Landry, B. & Gielis, C. (1992) A synopsis of the Pterophoridae of the Galapagos Islands, Ecuador. *Zoologische Verhandelingen, Leiden*, 276, 1–42, 39 figs.

Matthews, D. & Miller, J. (2010) Notes on the cacao plume moth in Honduras and description of the larvae and pupae (Lepidoptera: Pterophoridae). *Tropical Lepidoptera Research*, 20, (1), 28–34.

Meyrick, E. (1913) Exotic Microlepidoptera 1 (4), 97–128. London. Taylor and Francis.

Meyrick, E. (1921) Exotic Microlepidoptera 2 (14), 417–448. London. Taylor and Francis.