

A NEW GENUS AND FIVE NEW SPECIES OF CENTRAL AND SOUTH AMERICAN HEMILEUCINAE (LEPIDOPTERA: SATURNIIDAE)

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ABSTRACT.— All the following new taxa have in common that they are inhabitants of the cordilleras in Central and South America, at elevations from 2000-4600m. *Arias* n. gen., *A. inbio* n. sp., is a day flier, while 4 other new species are nocturnal. Three of these belong to the genus *Meroleuca* and one to the genus *Periphoba*. Adults of the five species are illustrated in color; their genitalia are figured, their known range is indicated, and their phylogenetic relationships are discussed.

RESUME.— Les taxa décrits ci-dessous ont pour caractère commun d'habiter les cordillères centro et sud-américaines à des altitudes comprises entre 2000-4600m. *Arias* n. gen., *inbio* n. sp., est diurne, les quatre autres espèces sont nocturnes, trois de celles-ci appartiennent au genre *Meroleuca*, la quatrième est un *Periphoba*. Les adultes sont illustrés en couleur, les armures génitales figurées, la répartition géographique est indiquée et la position taxonomique précisée.

KEY WORDS: Andes, *Arias inbio* n. sp., *Catasticta*, *Catharisa*, Central America, Colombia, Costa Rica, distribution, *Eubergioides*, *Hemileuca*, *Meroleuca (Meroleuca) decaensi* n. sp., *Meroleuca (Meroleuca) mossi* n. sp., *Meroleuca (Meroleucoides) fassli* n. sp., Mesoamerica, Neotropical, *Periphoba ockendeni* n. sp., Peru, Pieridae, South America, taxonomy.

The following new taxa have been discovered recently and are described below to make the names available for upcoming works on the Neotropical fauna.

ARIAS Lemaire, new genus

Type species: *Arias inbio* Lemaire, n. sp.

Diagnosis.— The new genus differs from all the other Hemileucinae by the wing shape, the arrangement of the markings and the venation. Although the black and white coloration of the wings in *A. inbio* is somewhat suggestive of the *H. maia* group of *Hemileuca*, *Arias* is distinct from the latter and from all the previously known Hemileucinae that its phylogenetic relationship cannot be established, at least until the male is known.

Description.— Male unknown. The description applies to the female. Antennae strongly bidentate to the apex. Anterior tibiae subequal to tarsi in length, epiphysis and tibial spines absent, tibial spurs number 0-2-2, tarsal spines absent except for the usual apical pair on the penultimate anterior tarsal segment, arolium and pulvilli well-developed. Venation (Fig. 5) characterized by M2 strongly stalked with M1, and arising from the common stem at about one fifth and one third of the distance from the apex of the discal cell to the outer margin on the fore- and the hindwing respectively; Rs on the forewing and on the hindwing arises long before the apex of the discal cell.

Habitus: The most significant characters are the rounded shape of the forewing, the complete absence of the ante- and postmedial lines on the ventral and dorsal sides of the wings and the very unusual arrangement of the markings as shown on Fig. 1-2. **Genitalia** (Fig. 5): eighth sternum represented by a narrow sclerotic circumvaginal band; the sclerotization

of the eighth tergum is middorsally interrupted by a narrow membranous area. The ovidal corpus bursae is relatively small with the ductus seminalis arising dorsally near the base; the ductus bursae is very short and membranous; the lobes of the oviporus are very broad.

Immature stages.— Unknown.

Etymology.— This new genus is named in honor of the former President of Costa Rica, Dr. Oscar Arias Sanchez, in recognition of his outstanding work and untiring efforts for peace in Central America, a peace that is the strongest possible support for conservation of tropical biodiversity.

Remarks.— The position of M2 described above, stalked with M1 and arising from the latter far from the anterior angle of the outer margin of the discal cell, is extremely rare in Hemileucinae and the Saturniidae. It was observed in individuals of *Hemileuca chinatiensis* (Tinkham) and *H. hera* (Harris). In typical *Hemileuca*, the tarsi lack the arolium and pulvilli, the structure of the female genitalia is different, and the habitus conspicuously distinct, except for the black and white coloration of the wings. The absence of the lines on the dorsal and ventral sides of the wings is a relatively unusual feature in Saturniidae but it also occurs in the quite unrelated hemileucine genera *Eubergioides* and *Catharisa*.

Arias inbio Lemaire, new sp.

Diagnosis.— See the description of the genus.

Description.— FEMALE: Wingspan: 47mm; forewing length: 25mm. Antennae straw-yellow of about 26 segments. Head, thorax and abdomen black with a tuft of grayish hairs on the back of the mesothorax and one pair of yellow lateral bands, dotted with pink scales, on the abdomen; anal tuft pink. Color and markings on the wings as shown on Fig. 1-2. Forewing venation thinly accented with yellow scales; fringes of the

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Fig. 1-4. Adults: 1) *Arias inbio* n. sp., holotype ♀ (47mm), dorsum (enlarged). 2) Same, venter. 3) *Meroleuca (Meroleuca) decaensi* n. sp., holotype ♂ (50mm). 4) *Meroleuca (Meroleuca) mossi* n. sp., holotype ♂ (50mm). [Fig. 1-2 show the same specimen, both views have the same wingspan, 47mm]

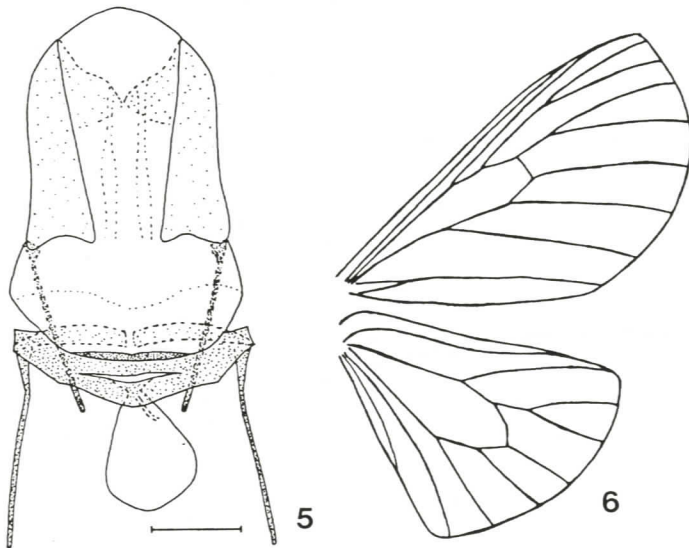


Fig. 5-6. *Arias inbio* n. sp.: 5) holotype ♀ genitalia (line = 1mm). 6) Wing venation of *Arias* new genus.

forewing black, fringes of the hindwing intermixed with yellow; costa and inner margin of the hindwing yellow. *Genitalia* (Fig. 5): see the description of the genus.

MALE: Unknown.

Immature stages.— Unknown.

Type.— Holotype ♀: COSTA RICA.— Cartago Prov., Cerro de la Muerte,

Pension la Georgina, 3000m, Lambert Coordinates Costa Rica Sur 389800, 493600, 25 May 85 (P. A. Opler, J. A. Powell). (Instituto Nacional de Biodiversidad (INBio), 3100 Santo Domingo, Heredia, Costa Rica), gift from the University of California, Berkeley, California, USA.

Etymology.— *A. inbio* is named in honor of the Instituto Nacional de Biodiversidad (INBio) of Costa Rica, in recognition of its efforts to conserve wildland tropical biodiversity through sustainable and non-damaging use.

Distribution.— Type locality only: there is a second female recorded from Costa Rica, San José Prov., Canton de Dota, Ojo de Agua, 2 km camino a Providencia, 3000m, 9 Aug 90 (Lambert Coordinates Costa Rica Sur 397300, 480000) (coll. I. A. Chacón).

Remarks.— This relatively small moth is known only from the female holotype and a second female caught a few kilometers away. When the holotype was collected by Professor J. A. Powell, it was flying in a bamboo thicket in the middle of the day, in full daylight. What appear to be the males (still uncaptured) have been seen flying very fast in the daytime in the tree crowns 20-30m above ground in June (J. Brown and J. A. Powell, pers. comm.; D. H. Janzen, pers. comm.). This species appears to be diurnal in flight activity, and no individuals have been captured in many nights of blacklighting in this area in all seasons (D. H. Janzen, pers. comm.). In size and general color, *A. inbio* resembles the black, white and yellow *Catasticta pierid* butterflies which are among the very few non-satyrid butterflies that breed at high elevations in Costa Rica.

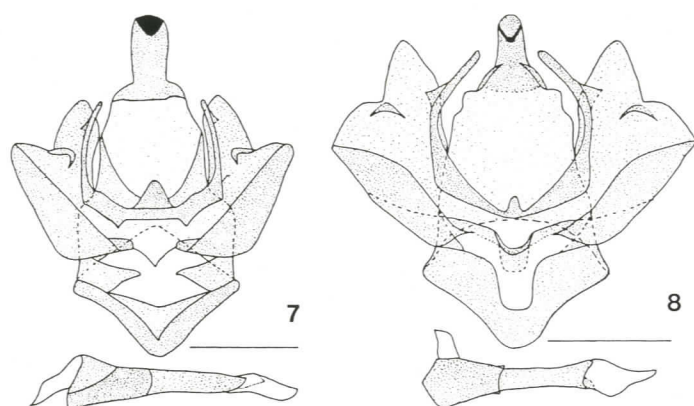


Fig. 7-8. Male genitalia: 7) *Meroleuca (Meroleuca) decaensi* n. sp., holotype ♂. 8) *Meroleuca (Meroleuca) mossi* n. sp., holotype ♂.

Meroleuca (Meroleuca) decaensi Lemaire, new sp.

Diagnosis.— This new species differs from the three previously known members of the nominotypical subgenus *Meroleuca* by the yellow instead of black antennae, the brown instead of white or black and white ground color of the wings, and the presence of pink hairs on the dorsal surface of the first abdominal segments and the inner margin of the hindwing. *M. (M.) decaensi* is an Andean species, known only from a single male specimen from Peru.

Description.— Wingspan: ♂ 50mm.

MALE (Fig. 3): Antennae straw-yellow, quadripectinate to apex. Labial palpi ventrally beige, dorsally pink; frons yellow, scarcely interspersed with pinkish scales; thorax dorsally black, becoming yellow on the tegulae and pink on the posterior margin, ventrally beige, intermixed with pink and yellow hair-like scales; first abdominal segments pink, other segments black, dorsally ringed with yellow; anal tuft pink. **Forewing:** length 25mm; elongated, apex rounded, outer margin convex; ground color dark brown, costa yellow; postmedial line convex, parallel to the outer margin, black, distally doubled by a series of large yellowish-white dots; discal spot dull white. Underside dull pink becoming yellow on the costal area, shaded with black on the terminal area; postmedial line as above, discal spots un conspicuous. **Hindwing:** Above dull blackish-brown with pinkish shades; anal margin pink; postmedial line very vague. Underside colored and marked as in the forewing. Fringes pinkish-white on all four wings above and below. **Male genitalia** (Fig. 7): Uncus simple, longer than usually in the subgenus, ventral plate of the transtilla triangular instead of a narrow rectangular structure; costa of valves broader and differently shaped, giving rise to a small inner spine-like process at the junction with the valvula; aedeagus noticeably longer than in the previously known species.

FEMALE: Unknown.

Immature stages.— Unknown.

Type.— *Holotype* ♂: PERU.— Junín Prov., Tarma to La Merced road, elevation 2700m, 3 Nov 89 (T. Decaëns) (T. Decaëns coll., Mont-Saint-Aignan, France).

Etymology.— The species is named for his collector, Thibaud Decaëns.

Distribution.— This new species is known only from the type locality at 2700m in cloud forest. It probably has a very restricted range, as seemingly have most of the *Meroleuca*.

Remarks.— Although superficially very distinct from other members of the nominotypical subgenus *Meroleuca*, the new species belongs there because of the combination of the following characters: antennae of male quadripectinate, terminal bristles of basal rami subequal to setae; labial palpi extremely long; epiphysis absent, hind tibiae without subapical spurs (tibial spurs number 0-2-2); veins M2 and M1 of forewing connate. The male genitalia are typical of those of *Meroleuca*, with the most characteristic feature being the long and slender lateral arms of the transtilla.

Meroleuca (Meroleuca) mossi Lemaire, new sp.

Diagnosis.— This small species superficially resembles *M. (M.) decaensi* by the wingshape and the configuration of the postmedial line of the forewing. It is distinctive by the structure of the male antennae, the much paler ground color of all four wings, and by the absence of pinkish shades on the hindwing; there are significant characters in the structure of male genitalia. The elevation (14500 ft) [4460m] of the unfortunately imprecise type locality is very likely the highest ever recorded for an Hemileucinae.

Description.— Wingspan: ♂ 50mm.

MALE (Fig. 4): Antennae straw-yellow; apical rami on inner side of flagellum about one-half as long as the corresponding basal rami, on outer side absent or reduced to mere stubs. Labial palpi light brown, frons and prothoracic collar light beige, remainder of thorax light brown, intermixed with pale grayish and yellow hair-like scales; legs light beige, clothed with pink hairs on the inner side of tibiae and femora. First abdominal segments densely covered with orange hairs, following segments dorsally black, ringed with yellow. **Forewing:** Length 24mm; ground color light brown, costa whitish, veins brown, slightly accented with whitish giving the pattern a distinct strigate appearance; postmedial line slightly preapical, convex, distally doubled with broad whitish dots; discal spot whitish, very small. Underside brown, becoming lighter with a whitish tinge on the postmedian area; there is a vague indication of a postmedial line. **Hindwing:** Dull brown becoming white on basal area, without markings. Underside colored as on forewing. **Male genitalia** (Fig. 8): Lateral arms of the transtilla more broadly fused with the inner margin of the valves than in *M. (M.) decaensi*; uncus shorter and narrower; juxta slightly sclerotized instead of membranous.

FEMALE: Unknown.

Immature stages.— Unknown.

Type.— *Holotype* ♂: PERU.— "found dead on ground, on limestone (2nd cordillera) of Andes E. at 14500 ft, probably spec. nov." (A. M. Moss) (The Natural History Museum (BMNH), London).

Etymology.— Species named in memory of its collector, Reverend Arthur Miles Moss (1873-1948).

Distribution.— Type locality. All that is known about the range of *M. (M.) mossi* is on the handwritten label that was placed by A. M. Moss on the pin of the holotype. Reverend A. M. Moss resided in Perú from May 1907 to late June 1910, mostly collecting in the neighborhood of Lima and in the Chanchamayo valley (Lamas, 1981b).

Remarks.— *M. (M.) mossi* is known only from the holotype. It is phenotypically and morphologically more closely related to *M. (M.) decaensi* than to any other member of the nominotypical subgenus. An exceptional feature is the absence or virtual absence of the apical rami on the outer side of the flagellum (due to the high elevation of the range?).

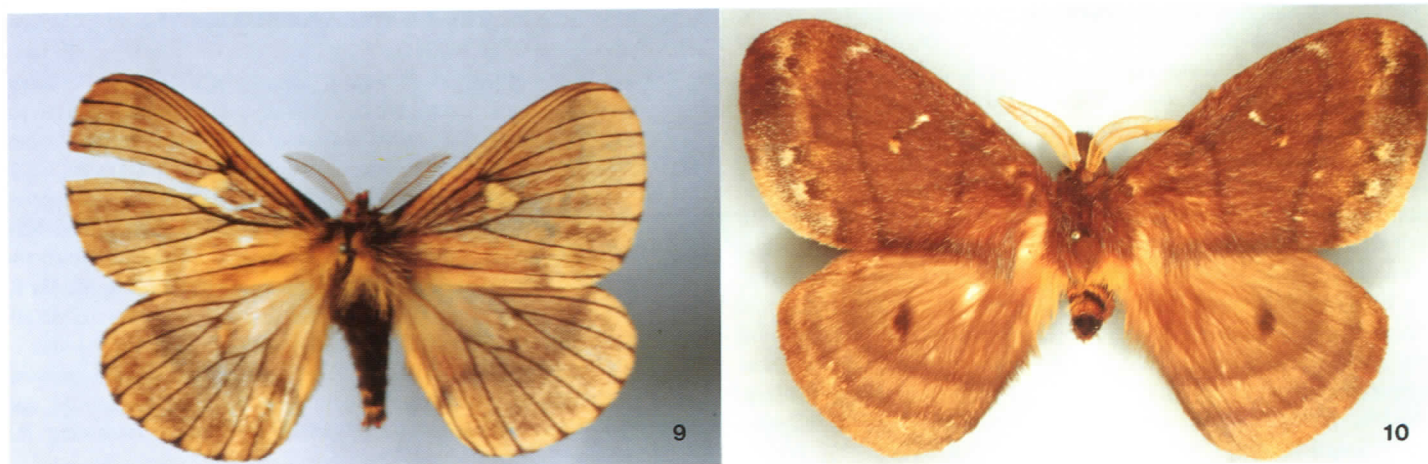


Fig. 9-10. Adults: 9) *Meroleuca (Meroleucoides) fassli* n. sp., holotype ♂ (54mm). 10) *Periphoba ockendeni* n. sp., holotype ♂ (80mm).

***Meroleuca (Meroleucoides) fassli* Lemaire, new sp.**

Diagnosis.— This new species is closely allied to *M. (M.) flavodiscata* (Dognin). It differs by the almost complete absence of yellow hairs on the upper surface of the abdomen, and by the much broader and rounded discal spot on the forewing; the medial band is lacking on the latter. There are also significant characters in the structure of the male genitalia. *M. (M.) fassli* is known only from the male holotype from the Central Cordillera of Colombia.

Description.— Wingspan: ♂ 54mm.

MALE (Fig. 9): Antennae yellow, quadripectinate to apex. Labial palpi red, frons black; prothoracic collar yellow, remainder of thorax black, densely covered with yellow scales on the tegulae; legs black, clothed with pink hairs; abdomen dorsally black, laterally banded with yellow, anal tuft pink. **Forewing:** Length 27mm; ground color dull yellow, suffused with black especially on the discal cell and the postmedian area; postmedial line black, slightly wavy; discal spot yellow, broad, rounded and more prominent than in related species. Underside colored as on upperside, postmedial line S-shaped. **Hindwing:** more abundantly suffused with black than the forewing; postmedial line black, inwardly bent between M3 and the inner margin. Underside colored as on upper side; postmedial line convex, slightly sinuate. Venation black, very prominent; fringes yellow, dotted with black at end of veins, on all four wings above and below. **Male genitalia** (Fig. 11): typical structure of *Meroleuca*: ventral plate of the transtilla narrow, lateral arms slender (asymmetrical, probably abnormally, in the holotype); the most characteristic feature is the absence of the inner spine-like process of the valves, this process by contrast very large in *M. (M.) flavodiscata*.

FEMALE: Unknown.

Immature stages.— Unknown.

Type.— *Holotype* ♂: COLOMBIA.— Cañon de Tolima, 2700m, Dec 1909 (A. H. Fassl) (Tring Museum, The Natural History Museum (BMNH), London).

Etymology.— This species is named in memory of its collector, the famous German entomologist Anton Heinrich Hermann Fassl (1876-1922) (Lamas, 1981).

Distribution.— The type locality "Cañon de Tolima," probably on the slopes of the so-called volcano, could not be located precisely on maps. The elevation (2700m) is typical of the range of *Meroleuca*.

Remarks.— *M. (M.) fassli* is placed in the subgenus *Meroleucoides*, based on the following characters: presence in

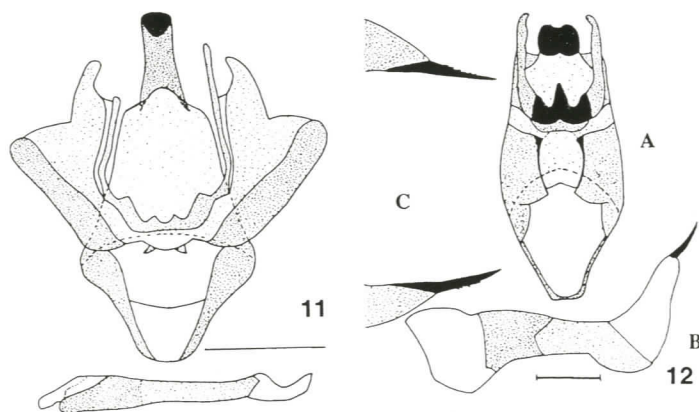


Fig. 11-12. Male genitalia: 11) *Meroleuca (Meroleucoides) fassli* n. sp., holotype ♂. 12) *Periphoba ockendeni* n. sp., holotype ♂ (A. Ventral view, aedeagus removed; B. Aedeagus, lateral view; C. Sternum 8 and sclerotized projections).

males of an epiphysis, M2 of forewing arising from a point between the middle and anterior angle of apex of discal cell (epiphysis absent, M2 and M1 connate in the nominotypical subgenus). *M. (M.) fassli* and *M. (M.) flavodiscata*, which were collected by Fassl in the same area of central Colombia, may be sympatric. However, from the type locality (Monte Tolima, 3200m), the latter apparently occurs at higher elevations, a hypothesis supported by two recent records: Tolima, Municipio Cajamarca, Anaime Reserve, 3200m; and Quindío, E. of Armenia, 3400m (K. Wolfe *et al.*, leg.) (K. Wolfe, pers. comm.).

***Periphoba ockendeni* Lemaire, new sp.**

Diagnosis.— *P. ockendeni* n. sp. is described from the Cordillera de Carabaya in southeastern Peru. It is characterized by the more rounded shape of the forewing and the darker coloration (except for the melanic male of *P. nigra*) than in the other known *Periphoba*; other significant features are the configuration of the discal spot and the contrasting outer margin of the submarginal band on the forewing.

Description.— Wingspan: ♂ 80mm.

MALE (Fig. 10): Antennae quadripectinate (see remarks), straw-yellow. Labial palpi, frons and upper surface of thorax brown, underside of thorax dark brown; abdomen dorsally black, ringed with orange, ventrally dark brown, anal tuft orange. *Forewing*: Length 41mm; above blackish-brown; lines black, the antemedial obtusely angled on the cubitus, the postmedial inwardly bent under the costa (there distally bordered with light gray) and then subparallel to the outer margin; submarginal band yellowish, intermixed with black, distally speckled with light gray; discal spot a small dark brown dot with a narrow white streak on the upper side and a tiny yellow dot on the lower side, giving it a tripartite appearance. Underside yellowish-brown; postmedial line and submarginal band wavy, discal spot very weak. *Hindwing*: above less dark blackish-brown than on forewing; postmedial line and submarginal band black, quite convex and parallel; discal spot black, rounded, very prominent. Underside same ground color as forewing below; usual markings very weak. *Male genitalia* (Fig. 12): Typical structure of the genus; eighth sternum armed with a pair of large heavily sclerotized spines; vesica with a large spine-like cornutus.

FEMALE: Unknown.

Immature stages.— Unknown.

Type.— Holotype ♂: PERU.— [Puno], Carabaya, Santo Domingo, 6000 ft, Jan 1902 (wet season) (Tring Museum, The Natural History Museum (BMNH), London).

Etymology.— This species is named for the memory of Georg Richard Ockenden (1866-1906), who very actively collected Lepidoptera in the Department of Puno, Peru, from 1900 to 1906, and died of typhoid in the city of Puno (Lamas, 1981a).

Distribution.— *P. ockendeni* is known only from the type locality. It is very likely endemic to the eastern slopes of the Andes at moderate elevations.

Remarks.— *Periphoba* Hübner is a genus of about 15 species (Lemaire, 1994) with distinctive characters: antennae of male quadripectinate with apical rami on inner side of flagellum very short, on outer side reduced to mere stubs or absent; eighth sternum of male with large spines on each side (Michener, 1952). Other significant features are the very broad aedeagus (compared to the other genitalic structures) and the presence of a long spine-like cornutus at the apex of the vesica. The new species is closely allied to *P. hircia* (Cramer) but much darker; the latter is a Guiano-Amazonian species with an extension of its range to the east slopes of the Andes at low elevations; *P. ockendeni* is an inhabitant of the cloud forest.

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