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**Llorenteana, a New Butterfly Genus from the American Continent (Lepidoptera: Nymphalidae: Satyrinae)**

**Llorenteana, nuevo género de mariposas del Continente Americano (Lepidoptera: Nymphalidae: Satyrinae)**

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**ABSTRACT**

The genus Llorenteana, gen. nov., is diagnosed and described to allocate the enigmatic, relictual, satyrine butterfly, Euptychia pellonia Godman, 1901. The taxonomy of this species had been superficial, variable and unstable for more than a century. The new genus is monobasic and endemic to the montane pine-oak forests of the Northern Mexican Altiplano. Its morphology suggests it should be placed within the Ypthimina Miller, 1968, a subtribe notably diverse in other continents, mainly Africa and Asia, but so far unreported in the American continent.

**Keywords:** Argestina, Callerebia, Chillanella, Euptychia, Euptychiina, Hemadara, Incertae sedis, Loxerebia, Mashunoides, Megisto, Neosatyrus, Thymipa, Ypthimina, Ypthimomorpha.

**RESUMEN**

Se diagnostica y describe el género Llorenteana, gen. nov., al cual se asigna la mariposa satírida Euptychia pellonia Godman, 1901, una especie enigmática y relictual. La taxonomía de esta especie había sido superficial, variable e inestable durante más de un siglo. El nuevo género es monobásico y endémico de los bosques de pino-encino del norte del Altiplano Mexicano. Su morfología sugiere que debería ser ubicado dentro de Ypthimina Miller, 1968, un subtribe notablemente diversa en otros continentes, principalmente África y Asia, pero hasta este momento inadvertida en el continente Americano.

**Palabras clave:** Argestina, Callerebia, Chillanella, Euptychia, Euptychiina, Hemadara, Incertae sedis, Loxerebia, Mashunoides, Megisto, Neosatyrus, Thymipa, Ypthimina, Ypthimomorpha.

One of the rarest and least known satyrine butterflies from the American continent is the Mexican species Euptychia pellonia Godman, 1901. It was described from a representative series of individuals from montane localities of Durango and Jalisco, and after almost 120 years, few additional specimens have reached entomological collections. The strongly clubbed antennae and the presence of a dorsal, conspicuous, double piloped subapical ocellus, gives E. pellonia a singular, very unusual aspect, among the members of the American fauna of Satyrinae (especially Neotropical). Its taxonomic position, although only superficially considered in the past, had been so puzzling that it has historically been placed in five different genera: Euptychia Hübner, 1818 (Weymer, 1911; Gaede, 1931; D’Abrera, 1988), Pindis R. Felder, 1869 (Lewis, 1973; L. D. Miller, 1978; Shou et al., 2006), Cissia Doubleday, 1848 (L. D. Miller & J. Y. Miller, 1988; R. G. De La Maza, 2010), Megisto Hübner, [1819] (R. F. De La Maza & J. De La Maza, 1987; Llorente Bouquets et al., 1996; Vargas F. et al., 1996; Warren et al., 1996; Luis Martínez et al., 2000; Diaz-Batres et al., 2001; Michán et al., 2004) and Zischkaia Forster, 1964 (Glassberg, 2007). These genera, each notably distinctive, are all allegedly members of the Euptchiina Reuter (1896), a large and widespread, mostly tropical American, subtribe of the Satyrini. Lamas & Viloria (2004) considered E. pellonia as incertae sedis, but placed it as a member of the Euptchiina.

Close examination of peculiar morphological features of E. pellonia and comparative studies with other species of Satyrinae have shown that it is not closely related to any other representative of the satyrine fauna of America and strongly suggests that it should be placed in its own genus. It is proposed that this new genus belongs in a subtribe, Ypthimina Miller (1968) that has gone so far unnoticed in the American continent.

**MATERIALS AND METHODS**

**Abbreviations and acronyms:** BCA: Biología Central Americana; FWL: Forewing length; HT: Holotype; MZFC: Museo de Zoología “Alfonso Herrera”, Facultad de Ciencias, Universidad Nacional Autónoma de México, Ciudad de México; NHMUK: The Natural History Museum, London, UK.

**Methods:** This is a study of comparative morphology...
of adult butterflies of the subfamily Satyrinae. Type specimens were examined and compared with original descriptions and illustrations for taxonomic identification. We have identified structures, interpreted, compared and described the morphology of wing pattern, wing veins and male genitalia of dry adult butterflies specimens preserved in two major natural history museums. To diagnose and describe the genus herein erected we have also examined the morphology of representatives of almost all genera of Satyrinae recognized in America and a number of externally similar taxa from other continents (mentioned in discussion) and established homological comparisons. Some nomenclatural, taxonomic and biogeographic information has been gathered from published sources (cited in the synonymy, the discussion and the conclusions).

Nomenclatural acts of this work follow the provisions of the International Code of Zoological Nomenclature (International Commission on Zoological Nomenclature, 1999)

Technical procedures: Due to the limited number of specimens examined for this study we have selected the minimum necessary quantity of individuals for dissecting their morphological structures. Wing diaphanization and genitalia dissections were performed by standard basic procedures. These were accomplished by simple chemical treatments like bleaching and, watering of wings and digesting soft abdominal tissues with strong alcaline solutions to remove sclerotized male genitalia structures. Cleaning was performed manually with microdissecting tools under stereoscopic magnification. Illustrations have been produced while examining the insects and their structures with several types and brands of microscopes and stereomicroscopes (Leica, Nikon, Olympus, Wild) coupled with artificial light systems and camera lucida (for drawings) or 35 mm photographic camera (for macro and microphotographs). Figures were generated with the aid of imaging software Zerene Stacker™ and Adobe Photoshop™ (several versions).

RESULTS
Llorenteana Viloria and Luis-Martínez, gen. nov.
http://zoobank.org/E6815CA0-F0C0-4E03-B8F6-40A735DCAE12

Type species: Euptychia pellonia Godman, 1901: 655, pl. 107, figs. 5, 6; herein designated.

Diagnosis: Members of the new genus Llorenteana, gen. nov., can be diagnosed by their forewing venation, in which the five radials (R1 to R5) conspicuously branch out from a single root or sector; R1 emerging after the first basal sixth of the length of Rs, well beyond the costal corner of the discal cell. This character has only been detected in two other genera of Satyrinae in the American continent: Neosatyrus Wallengren, 1858 and Chillanella Herrera, 1966 (herein considered valid), both restricted to southern latitudes (Chile and Argentina). In all other known American genera forewing R1 always departs independently from the root of R2-R5, at the distal extremity of the discal cell.

Description: Butterflies of small size (males FWL: 17.9-18.7, \(\bar{x}=18.5\), n=6; females FWL: 18.5-20.3, \(\bar{x}=20.3\), n=5), antennae conspicuously clubbed; forewing subtriangular, with rounded angles; hindwing suboval, outer margins not scalloped. Hindwing lacking ocelli.

Veneration (Fig. 2, female): Forewing: Sc independent, inflated at basal third, with small constriction at base, running from base through three fifths of costa; all radials (R1-R5) emerging from same single root, which forms the costal margin of discal cell; R1 branches out towards costa at first sixth of radial sector, beyond distal extremity of discal cell; R2 shorter than other radials, emerging slightly beyond second sixth of radial sector; R3 emerging about half length of radial sector; R4 and R5 diverging at its second third, their distal extremities limiting both sides of wing apex (R4 costal, R5 marginal); M1 independently emerging from anterior extremity of discal cell, running smoothly parallel to radial sector; M2 independent, emerging from distal end of discal cell, more or less half way between emergence of radial sector and that of M3; M3 independent, emerging from the vertex of a right angle formed by the junction of m1-m2 and m2-cu1; Cu1 independent, running free from posterior corner of distal end of discal cell to outer margin, parallel to anal margin; Vogel’s chordotonal organ present at base of cubital sector, which is only slightly swollen along its basal third; conspicuous constriction distally limiting Vogel’s structure; A2 independently running from wing base to tornus, slightly sinuous and parallel to anal margin; r3-m1 straight, one seventh length of m1-m2; m1-m2 curved towards cell, approximately two thirds length of m2-m3; m3-m4 straight. Hindwing: Humeral present, thick at base, thin basal branch towards wing base, thick branch, twice as long as previous one emerging towards costa in opposite direction; Sc + R1 ending over middle point of coastal margin; R5 independent, emerging from middle length of anterior border of discal cell, M1, M2 and M3 independent, the latter emerging from distal vertex of discal cell, ending in middle point of outer margin; Cu1 and Cu2 independent and more or less straight; A2 and A3 both independent but emerging from wing base very close to each other, quickly diverging as they run separately; A2 ends at tornus; A3 ends at first, basal third of anal margin; rs-m1 straight; m1-m2 double length of rs-m1, slightly angled towards cell; m2-m3 straight, twice length of m3-m4.

Wing pattern (Fig. 1, male): prominent black postdiscal ocellus on forewing (recto and verso), in middle of cell M1, central pupil white; smaller element from neighboring cell M2 expressed as fused sallute of main M2, with a second, excentric, white pupil.

Male genitalia (Fig. 3): genital capsule compact and stout, thickly sclerotized (3A, B, C). Tegumen subglobular, not much higher than the origin of uncus; the latter more or less distinct from tegumen, beak-like, 1.3 times as long as tegumen, slightly curved, pointing downwards; subunci stylized and well defined, thin but stout, half length of uncus,
emerging laterally outwards, just below base of uncus; vinculum thin, stout, strongly sigmoidal in lateral view, forming a ring laterally compressed; saccus as wide as tegumen and very short, dorsally depressed; valvae moderately setose at distal quarter, large, deep in lateral view, broader at base, as much as lateral extension of tegumen, slightly less towards tip, ampullar process conspicuous with many short, denticular spines pointing to inner side, distal spiny process; a diastema or space without spines between ampulla and distal tip; aedeagus (Fig. 3D) very strong and rather sclerotized, moderately thick, sinuous in lateral view, a broad, bifid distal extremity, reminiscent of a human foot in lateral view.

**Material examined:** MEXICO, Jalisco: 1 male (Type HT), Bolaños, Jalisco, Mex. [ico], Richardson, Godman-Salvin Coll.1904-L., B. C. A. Lep. Rhop. Euptychia pellonia, Godm., Agrees with Figure of Type. N.[orman] D.[iley], B. M. TYPE No. Rh. 3295, Euptychia pellonia, [male] Godm., SYNTYPE Euptychia pellonia Godman & Salvin, det. P. Ackery 1974 [NHMUK]; Durango: 1 male (MZFC 56097), 1 female (MZFC 56096), 25 mi W Durango, 24°01’18”,-105°03’11”, 20.vii.1964, J. A. Powell; 1 female (MZFC 56126), Genit. prep. ALV-528-14, 11.xii.2014), 29 mi W Durango, 28°08’25”,-104°58’23”, 20.vii.1964, J. A. Powell; 1 male (MZFC 56125), 30 mi W Durango, 24°01’18”,-105°05’17”, 31.vii.1964, J. A. Powell; 1 male (MZFC 56098), 1 female (MZFC 56099), 29 mi W Durango, 24°08’25”,-104°58’23”, 18.vii.1969, J. A. Powell; 1 male (MZFC 56107), 1 female (MZFC 56108), Wing prep. ALV009-14, Genit. prep. ALV527-14, 11.xii.2014), same data, 7.viii.1972; 2 males (MZFC 66723, 66965 [Fig. 1 A (dorsal), B (ventral)], 1 female (MZFC 66964), La Michilía, Mesa del Burro, Municipio Súchil, [Durango], 23°35’17”, -104°04’33”, 3.viii.1984, M. E. Díaz B. [MZFC]

**Etymology:** *Llorenteana* means “belonging or relative to Llorente”. It is a feminine Spanish derivation of the first surname of our long-time friend and colleague, Jorge Enrique Llorente Bousquets, prominent Mexican scientist, philosopher, evolutionary biologist, biogeographer.
and especially, lepidopterist. He is an Emeritus Professor of the Universidad Nacional Autónoma de México (UNAM). Professor Llorente Bousquets owns a rich academic record among Latin American lepidopterists. He was one of the founders of the Museo de Zoología “Alfonso L. Herrera” in the Faculty of Sciences at UNAM, where he pioneered and continues developing modern studies of systematics, faunistics and biogeography of Mexican and other Neotropical butterflies. Our knowledge of the butterfly fauna of Mexico has been greatly improved by the initiative and persisting efforts of Jorge Llorente and the members of his research team, as to become one of the most complete of any country in Latin America. We feel honored to name this new, peculiar genus of satyrine butterfly endemic to Mexico after Jorge Llorente, tutor, companion and mentor.

Llorenteana, gen. nov., is herein recognized as a monobasic genus of satyrine butterflies, endemic to the mountains of the northern Mexican Altiplano. Llorenteana pellonia (Godman, 1901), comb. nov.

Figs. 1 male, A (dorsal), B (ventral);
2 female (wing venation); 3 male (A-D genitalia)
Euptychia pellonia Godman, 1901: ii, xxxii, 655, pl. 107, figs. 5, 6.
Euptychia pellonia Godman; Weymer, 1911: 202; Gaede, 1931: 459; D’Abrera, 1988: 876 [index].
Pinidis pellonia (Godman); Lewis, 1973: 235, pl. 63, fig. 16; L. D. Miller, 1978: 1; Shou et al., 2006: 86.
Cissia pellonia (Godman & Salvin) [sic]; L. D. Miller & J. Y. Miller, 1988: 276; R. G. De La Maza, 2010: 184.
“Megisto” pellonia (Godman); Michán et al., 2004: 40; 2005: 130.
Zischkaia pellonia (Godman); Glassberg, 2007: 139 figs.

DISCUSSION

Diagnostic or prominent characters of Llorenteana, gen. nov., could only be compared with those of a limited number of satyrine taxa. In the American continent, forewing radial veins all emerging from a single root is a character so far detected in two austral genera of the Andean region: Neosatyrus Wallengren (1858) and Chilanebula Herrera (1966) (Wallengren, 1858: 79; Hayward, 1958: 258-259; Herrera, 1966: 71; Herrera & Howarth, 1966: 121, fig. 77, 122, fig. 83). It is found in some African genera such as Thymipa Moore (1893), Ypthimomorpha Van Son (1955: 152, fig. 175c) and Mashunoides Mendes & Bivar de Sousa (2009: 8, fig. 1), along with some Asian species currently classified in the genus Ypthima Hübner, 1818, which are certainly not close to the type species of the genus, Y.
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LITERATURE CITED


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