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# Two new lycaenid butterfly species from the high Andes of Ecuador and Peru (Lepidoptera, Lycaenidae: Eumaeini)

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Abstract – Two new Eumaeini species from the high Andes of Ecuador and Peru are described and diagnosed: *Penaincisalia amatamba* sp. n. (type locality: Chiguinda-Sigsig, Azuay/Morona-Santiago, Ecuador) and *Abloxurina dominiquae* sp. n. (type locality: Huancabamba, Pasco, Peru). Imagines and male genitalia of *Penaincisalia amatamba* are compared with *Abloxurina amatista* (DOGNIN, 1895) (the type species of *Abloxurina*) and *Penaincisalia balzapamba* (JOHNSON, 1992) (the most closely related species according to dorsal forewing androconia and genital structures). We present a brief discussion on selected characters of this species in relation with its close relatives. The holotype of *Abloxurina dominiquae* sp. n. is documented and the species is compared with *Abloxurina duviolsi* BÁLINT, BOYER et WOJTUSAIK, 2006, which is hypothesized to be the most closely related taxon based on the characters in dorsal forewing androconia and ventral wing pattern. With 30 figures.

Key words - Ecuador, Peru, Andes, cloud forest, Theclinae, androconia.

## INTRODUCTION

The generic name *Abloxurina* was erected by JOHNSON (1992) with *Thecla amatista* DOGNIN, 1895, as the type species. In JOHNSON's original diagnosis of the genus genital and wing characters were used. Although in the Checklist of Neotropical Butterflies, ROBBINS (2004) synonymized *Abloxurina* with *Penaincisalia* JOHNSON, 1990 (type species: *Thecla culminicola* STAUDINGER, 1894), most recently BÁLINT & WOJTUSIAK (2006) argued that *Thecloxurina* and *Abloxurina* were valid genera, recognizable by wing shape

characters (BÁLINT *et al.* 2006). The small hindwing tornal lobes in *Abloxurina* males are similarly formed in females.

Recently HALL et al. (2005) described several new species of Penaincisalia from Peru and Ecuador, among them they named P. ismaeli as an Ecuadorian sister and sympatric species of P. balzapamba (JOHNSON, 1992). According to HALL and his colleagues P. balzapamba and P. ismaeli share "a unique male genital valve shape within the genus ["Penaincisalia"] - short and broadly triangular with only a tiny posterior projection at the tip", moreover both species also have a very elongate aedeagus. Additionally, P. balzapamba and P. ismaeli possess similarly formed dorsal forewing scent pad unique in "Penaincisalia": a big, ovate patch of scales, which embraces the whole width in the final portion of the discal cell, and which is not accompanied by a small brand at M3 vein like in the other "Penaincisalia" species. In the present paper we are going to describe a new species and compare it with P. balzapamba and A. amatista because the newly discovered species seems to be an intermediate between these two. We place this new species in "Penaincisalia" in order to remain consistent with the concept of HALL and his colleagues introduced for the species Abloxurina balzapamba JOHNSON, 1992 and Penaincisalia ismaeli BUSBY et HALL, 2005 (see below). Although pairing up the sexes of many Eumaeini species is difficult, the newly described species have characteristic ventral wing pattern and supposedly restricted geographical range, factors that allow us to associate specimens representing both sexes with a high degree of confidence.

Also quite recently, a curious phenotype of high Andean eumaeine lycaenid has been discovered and named as *Abloxurina duviolsi* on the basis of dorsal forewing androconia (BÁLINT *et al.* 2006). A specimen of another curious "*Penaincisalia*" species has been collected in the high Andes of Peru, which seems to be closely related to *A. duviolsi* on the basis of dorsal forewing androconia and ventral wing pattern; we also describe this species below and place it in the genus *Abloxurina*.

The reason for tentatively placing the two new species in different genera is mainly the controversial situation around the taxa *P. balzapamba*, *P. ismaeli* and the first newly described species (HALL *et al.* 2005: 16–18, BÁLINT *et al.* 2006: 583–584). The generic placement of the second species seems to be convincing as long as no other hypothesis is available concerning the generic classification of this assemblage of species. Hence the term "*Penaincisalia*" used in the present paper indicates to the broad concept applied for this genus by HALL *et al.* (2005).

## MATERIALS AND METHODS

The comparative material examined is listed in the Appendix. The following collection acronyms are used throughout the text: AMNH = American Museum of Natural History, New York (USA), BMNH = The Natural History Museum, London (United Kingdom), HNHM = Hungarian Natural History Museum, Budapest (Hungary), JFLC = private collection of JEAN FRANÇOIS LECROM, Bogotá (Colombia), MUSM = Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima (Peru); MZUJ = Zoological Museum of the Jagiellonian University, Krakow (Poland), PB = private collection of PIERRE BOYER, Aix en Provencé (France) (will be donated to MZUJ), USNM = National Museum of Natural History, Smithsonian Institution, Washington DC (USA).

Terminology used for androconia, genitalia and wing pattern morphology is after ELIOT (1973), ROBBINS (1991) and JOHNSON (1992). We examined only male genital structures, because "*Penaincisalia*" females are rare in collections, consequently the genital structures were not studied in such a wide array of taxa as in the case of males. More dissections have to be made in order to gain a better understanding of the female structures. This is out of the scope of the present paper. In the dissections of the genitalia standard techniques for Lepidoptera were used (WINTER 2000). After macerating the abdomen in a hot 10% KOH solution the falces, aedeagus, valvae, vinculum, saccus, and dorsal capsule were separated and mounted in Euparal on slides, to examine them under optical microscope. The valvae were divided and positioned in lateral and ventral view, respectively.

The adult images were taken with a digital camera (Nikon Coolpix 4500) and manipulated with Adobe Photoshop 7.0. The images of the genitalia structures were taken with the same camera attached to a Leica MZ12 stereo-microscope and a Leica DMRB microscope.

#### DESCRIPTONS OF NEW SPECIES

## Penaincisalia amatamba PRIETO, BOYER, LECROM et BÁLINT, sp. n. (Figs 3-4, 11-12, 16, 19, 22)

*Type material* – Holotype male, set dorsally, in perfect condition, labelled as: "Ecuador, Azuay/Morona Santiago, Chiguinda-sigsig, 2900/3500m, 03/12/98, leg. P. Boyer"; now in PB, will be deposited in MZUJ. Paratype: Ecuador, Cordillera Lagunillas, 3300m, XI. 2000, leg. I. ALDAS (JFLC).

*Diagnosis* – The species is placed in the *balzapamba* group of species *sensu* HALL *et al.* (2005) within "*Penaincisalia*" *sensu* ROBBINS (2004) on the basis of a large forewing scent pad situated in the apical part of the discal cell, a slender aedeagus, which is longer than the genital capsule and is at least 1/4 of the total aedeagus length and the presence of a gray disc situated in the anal area of the hindwing ventral surface.

The male of *Penaicisalia amatamba* (Fig. 3) is distinguished externally from *P. balzapamba* (Fig. 5) by its larger scent pad in the dorsal surface of the forewing, rounder hindwing shape and the more greyish basal disc of the hindwing ventral surface. Internally the caudal extension of the *P. amatamba* male genital valva is a very long process instead of a minute triangular tip found in *P. balzapamba*.

The male of *P. amatamba* is distinguished from *P. ismaeli* (Fig. 7.) by the former being larger, having a more extended wingshape, and the dorsal wing surfaces bluish purple or lustrous blue with iridescence.

The female of *P. amatamba* (Fig. 4) has a silver blue dorsal colouration in the basal area instead of the brown female wing surface of *P. balzapamba* (Fig. 6) or the reddish brown female of *P. ismaeli* (Fig. 8).

Description – Male. Wings. Forewing length 12 mm (measured from forewing apex to the erection of the cubital vein at thorax). Shape: Forewing costal margin approximately straight, distal margin medially concave creating a bulbous apex. Hindwing anal margin convex, apex rounded, distal margin rounded, tornus elongated forming a minute and pointed anal lobe. Fringes on both wings formed comprised by long reddish brown scales. Dorsal surface: Both wings with pale lavender blue ground colour with broad black border ill defined distally, costal margin black. Forewing scent pad large (approximately 1/2 length of discal cell length) and embracing the whole width of discal cell end; fringes brown. Ventral surface: Forewing ground colour light brown, postmedial band slightly irregular with reddish proximal and white distal edge; submarginal elements appear as four independent well defined spots. Hindwing anal fold gray at the basal area with a medial reddish brown line; discal spot reddish brown and faint; discal margin appears as a straigth medial line extending caudally from costa to vein CuA2 and then turning sharply towards anal margin forming a pattern with 90 degrees angle; basal disc grayish except a ligth brown illuminated medial area above vein 3M; submarginal spots faint and reddish brown; marginal band with dark brown intercellular spots; fringes brown.

Body: Head and thorax dark brown, abdomen dark brown dorsally and orange ventrally.

Genitalia: Eighth abdominal tergite simple and rectangular; caudal extension of valvae in lateral view approximately 1/2 length of valvae and with a smoothly rounded dorsal margin at basal portion; uncus with dorsal square shaped medial indentation in approximately 1/2 length of dorsal capsule; saccus triangular with a narrow square shaped distal tip; aedeagus conspicuously long and narrow, with a shallow concave posterior half, and a blunt tip; distal portion of aedeagus having two cornuti: (1) medial cornutus flattened, concave and serrate-tipped rod positioned dorsally in posterior third of aedeagus, and (2) posterior cornutus short, anteriorly tapered, convex and serrate, similar in shape to an artichoke (Fig. 22).

Female. Wings. Similar to male but it differs as follows: Forewing rounder; hindwing anal lobe rounder. Dorsal surface: Both wings iridescent silver-blue with ill-defined distal part and accompanied by a relatively wide black border (approximately 3–4 mm) in submarginal areas.

Ventral surface: Ground colour in both wings light brown; medial and submarginal bands on both wings as in male; basal disc grayish and spreader reaching the anal lobe.



**Figs 1–8.** Dorsal (on left) and ventral (on right) wing surfaces of "*Penaincisalia*": 1 = *Abloxurina amatista* (DOGNIN, 1895), male (Peru), 2 = ditto, female, 3 = *Penaincisalia amatamba* sp. n, holotype male, 4 = ditto, paratype female, 5 = *Penaincisalia balzapamba* (JOHNSON, 1992), male (Ecuador), 6 = ditto, female, 7 = *Penaincisalia ismaeli* BUSBY et HALL, 2005, male (Ecuador), 8 = ditto, female

Folia ent. hung. 68, 2007

*Biology* – At the moment of capture, the male collected did not show the hilltopping behavior typical of other members of this genus. The larval host plants and the nectar sources of the adults are unknown.

*Distribution* – Spatial: The species is known actually from southern Ecuadorian provinces Azuay/Morona-Santiago and Loja at 3300 m (Fig. 30). Temporal: Known only from December.

*Etymology* – The species name is composed from the names of the closely related congeners "amatista" and "balzapamba" indicating the intermediate position of the taxon.

Discussion – Penaincisalia amatamba has similar wingshape to that of Abloxurina amatista. Additionally, the P. amatamba female has dorsally blue basal hue like the female of A. amatista (Figs 1–4). Because of these characters plus the shape of the male genital valva resembling also that of A. amatista (Figs 18–20) the newly described P. amatamba can be regarded as an intermediate taxon between the lineages of the amatista species group (Abloxurina s. str.) and the P. balzapamba–P. ismaeli species pair. Despite these resemblances, P. amatamba appears to be more closely related to P. balzapamba and P. ismaeli than A. amatista because these three species share the following characters we think also important for detecting their relationships:

Character 1: male dorsal forewing androconia comprise a large oval scent pad, there is no additional element (Figs, 3, 5, 16, 18). The dorsal forewing androconia comprise only a large scent pad in the apical area of the discal cell, and the additional scent patch at the erection of vein M3 typical for the *Penaincisalia* lineage is missing. This character is in contrast with the "traditional" bipartite "*Penaincisalia*" androconia (see JOHNSON 1990: 99). The bipartite *Penaincisalia* androconia can be a result of specialisation from an ancestral large scent pad, but similarly the large oval scent pad can also be explained as a specialization, which results the extension of the androconia surface on the wings fusing the small scent patch and the scent pad into a larger but single organ. This latter explanation is in harmony with the findings of HALL & HARVEY (2002), who pointed out that riodinid specialized scales are rarely lost it they appeared in a given lineage.

Character 2: ventral hindwing ground colour brown with a gray basal disc (Figs 3–8). This character is also unique in "*Penaincisalia*". However certain *Abloxurina* taxa tends to have lost the pinkish ventral wing colour and the basal and medial elements of the patterns are united in a similar basal disc with the notable difference that the medial wavy pattern remains and reaches the hindwing costa (BÁLINT, *in prep.*).



**Figs 9–14.** "*Penaincisalia*" male genital structures: 9 = Abloxurina amatista (DOGNIN, 1895) in lateral view (with arrow indicating the height of the upper tegumenal part of the genital capsule), <math>10 = ditto, in ventral view, aedeagus removed, 11 = Penaincisalia amatamba sp. n. in lateral view, 12 = ditto, in ventral view, aedeagus removed, 13 = Penaincisalia balzapamba

(JOHNSON, 1992) in lateral view, 14 = ditto, in ventral view, aedeagus removed

Character 3: aedeagus long and slender (Figs 9, 11, 13). This character is also unique in "*Penaincisalia*". The aedeagus of *Abloxurina* is also long and exceeding the height of the upper tegumenal part of the genital capsule in lateral view (see Fig. 9) with 1/3 or 1/4 of the whole aedeagus length, and the adeagus itself is not so thin compared to other genital structures, for example the thickness of the gnathos (cf. BÁLINT *et al.* 2006, figs 17–18). In the *balzapamba* species group the aedeagus is longer, exceeding the height of the genital capsule in lateral view with 1/5 or 1/6 of the whole aedeagus length, it is generally thinner than the arms of the gnathos.

Character 4: aedeagus with blunt, curved and heavly dentated apical cornutus (Figs 21–23). The "*Penaincisalia*" male genitalia possess two cornuti, a large and flat medial one, and a dentated apical one. Their taxonomic importance was pointed out in the case of *Thecloxurina* JOHNSON, 1992 (type species: *Thecla loxurina* FELDER et FELDER, 1865) (BÁLINT & WOJTUSIAK 2003, 2006). It seems that it is also an important character for reconstructing relationships, as *P. amatamba* and *P. balzapamba* share a bulbous and short, but heavily dentated and sclerotized apical cornutus (Figs 22–23), while this cornutus is longish, membranous and less dentate in *Abloxurina* (Fig. 21). The apical cornutus is also longish but heavily dentate and sclerotized in *Thecloxurina* (cf. BÁLINT & WOJTUSIAK 2003, 2006), as well as in the *browni* group of "*Penaincisalia*" (= *Pons* JOHNSON, 1992).

On the basis of these shared character states we think that the members of the *amatamba-balzapamba-ismaeli* cluster are closely related. At this moment we cannot decide whether this species triad is derived or not and whether it deserves a name or not. The phylogenetic analysis will add more information on whether the broad concept of "*Penaincisalia*" (ROBBINS 2004, HALL *et al.* 2005) or the arguments of BÁLINT & WOJTUSIAK (2006) for splitting into different genera seem to be more coherent with the clade history.

## Abloxurina dominiquae BÁLINT, BOYER et PRIETO, sp. n. (Figs 24–25, 28–29)

*Type material* – Holotype male, set dorsally, labelled as: "Chulla?, au dessus de Milpo et Cueva Blanca, (Huancabamba) (Pasco), Perou, 3200/3400m, 30/10/2006, Pierre Boyer Leg."; at present in PB, but will be deposited in MUSM.

*Diagnosis* – The species is placed in the genus *Abloxurina* on the basis of the dorsal forewing androconia comprised by an oval scent pad in the apical



Figs 15–23. Various characters in "Penaincisalia". forewing dorsal surface androconia in same magnification: 15 = Abloxurina amatista (DOGNIN, 1895), 16 = Penaincisalia amatamba sp. n., 17 = Penaincisalia balzapamba (JOHNSON, 1992)18–20: male genital valvae in lateral view under same magnification; 18 = Abloxurina amatista, 19 = Penaincisalia amatamba, 20 = Penaincisalia balzapamba; 21–23: apical cornuti in aedeagus under same magnification: 21 = Abloxurina amatista, 22 = Penaincisalia amatamba, 23 = Penaincisalia balzapamba

part of the discal cell supplemented by a small scent patch at the erection of vein M3 and on shape of the hindwing tornal lobe. The male of *A. dominiquae* cannot be confused with any *Abloxurina* species, but on the basis of wing coloration and pattern it seems to be related to *A. duviolsi* (Figs 26–27). However the wing shape of *A. duviolsi* has remarkably toothed wing margins with conspicuous tornal lobe instead of the slightly irregular margins and falcate *Abloxurina* tornal lobe, what typify *A. dominiquae*.

Description - Male. Wing, Forewing length 13 mm (measured from forewing apex to the erection of the cubital vein at thorax). Shape: Forewing costal margin approximately straight, distal margin medially concave creating a slightly bulbous and rounded apex. Hindwing anal margin convex, apex rounded, distal margin rounded and tornus elongated forming a small anal lobe. Fringes on hindwing formed by long reddish brown scales under vein 3M, fringes on forewing formed by white or light brown scales; margins in both wings slightly undulated. Dorsal surface: Both wings with bluish purple ground colour very well defined distally; forewing androconial cluster comprised by an oval shaped scent pad (approximately 1/3 length of the discal cell), positioned in upper distal corner of discal cell and a minute scent patch in the lower distal corner at the erection of vein M3; hindwing with broad black marginal border (approximately 3 mm) running parallel with margin, vein termini with reddish brown scaling, tornal lobe reddish brown, anal fold bright silvery. Ventral surface: Ground colour in both of the wings appearing in a combination of variously hued brown, red and yellow. Forewing light brown, postmedial line waved with black proximal edge and yellowish white distal edge, submarginal elements comprised by five distinct and well defined little lines, marginal area over the CuA2 vein red and apex with white suffusion. Hindwing basal area comprised by a combination of variously hued brown, gray, red and yellow; discal margin with rounded pattern with yellowish white distal edge, submarginal spots distinct with yellowish proximal edges, marginal area between veins M1 and CuA2 red; fringes in both wings dark brown.

Body: Head and thorax dark, abdomen dark brown dorsally and pale orange ventrally. Genitalia: Eighth abdominal tergite simple and rectangle shaped; valval caudal extension in lateral view approximately 1/2 length of valvae and with a smoothly rounded dorsal margin at basal portion; uncus with square shaped medial indentation in dorsal side and approximately 1/2 length of dorsal capsule; saccus sligthly square shaped; aedeagus typical for the group: long and slender, terminal cornutus anteriorly tapered, slightly convex and delicately compressed laterally, heavily serrate dorsally.

*Biology* – This species is known only from the cloud forest type locality at 3200 m, the only known male was collected from a tree top about 5 meters above the ground.

*Distribution* – Spatial: The species is known only from the type locality in Peru (Fig. 30). Temporal: Known only from October.

*Etymology* – This species is named for DOMINIQUE VICENTE, wife of the second author PIERRE BOYER.



**Figs 24–29.** *Abloxurina* imagines and structures: 24 = *Abloxurina dominiquae* sp. n., holotype male (dorsal wing surfaces in left, ventral wing surfaces in right), 25 = ditto, dorsal forewing androconia, 26 = *Abloxurina duviolsi* BÁLINT, BOYER et WOJTUSAIK, 2006, holotype male (dorsal wing surfaces in left, ventral wing surfaces in right), 27 = ditto, dorsal forewing androconia; 28 = *A. dominiquae* holotype genitalia in lateral view; 29 = ditto, in ventral view with aedeagus removed

## APPENDIX: MATERIAL EXAMINED FOR COMPARATIVE PURPOSES

Abloxurina amatista (DOGNIN, 1895)

Thecla amatista DOGNIN, 1895: 106; lectotype male (BMNH 266570) (designated by JOHNSON 1992: 27), Ecuador: "Loja" (illustrated by D'ABRERA 1995: 1139); paralectotype male (BMNH 266571), Ecuador : "Environs de Loja" (paratpye of *Candora fallacandor* JOHNSON, 1992: 34) (both specimens examined).

Abloxurina amatista (DOGNIN, 1895) JOHNSON 1992: 26.



Fig. 30. Topographic map illustrating the geographic ranges of *Penaincisalia amatamba* sp. n. and *Abloxurina dominiquae* sp. n.

Material examined - 11 males, 7 females: ECUADOR: Azuay, Gualaceo-Limón Road, west slopes, 3050 m, 7.II.2002, leg. WOJTUSIAK, PYRCZ & GARLACZ (HNHM: 2 males; gen. prep. BALINT nos 1101, 1102); Loja (BMNH lectotype male, BMNH paralectotype male); Loja, Saraguro, 3000 m, 2.VI.2004, leg. T. PYRCZ (MZUJ: female); Morona-Santiago, Gualaceo-Limón road, east slopes, 3100 m, 8.II.2002, leg. WOJTUSIAK, PYRCZ & GARLACZ (HNHM: male); Napo, Papallacta, 3400 m, 13.IX.2003, leg. J. WOJTUSIAK (HNHM: female); Pichincha, Calacali, Pela Gallo, 3100 m, 29.I.2002, leg. WOJTUSIAK, PYRCZ & GARLACZ (HNHM: male); Pichincha, Chillogallo, San Juan, via La Victoria, 3300-3400 m, 30.I.2002, leg. WOJTUSIAK, PYRCZ & GARLACZ (HNHM: male; gen. prep. BALINT no. 1100); Tungurahua, Baños, 3200 m, I.2000, leg. I. ALDAS (MZUJ: female); Tungurahua, Tungurahua volcano, Baños-Pondoa road, 3400 m, 17-20.I.2002, leg. WOJTUSIAK & GARLACZ (HNHM: male; gen. prep. BÁLINT no. 1027); Tungurahua, Tungurahua volcano, Baños-Pondoa road, 3350 m, 17-20.1.2002, leg. WOJTUSIAK & GARLACZ (HNHM: female; gen. prep. BALINT no. 1147); Tungurahua, Tungurahua volcano, Baños-Pondoa road, 3700 m, 17-20.I.2002, leg. WOJTUSIAK & GARLACZ (HNHM: female). PERU: Amazonas, Chachapoyas, Via Granada, 3000 m, III.2003, leg. WOJTUSIAK (HNHM: 4 males, female; one male is dissected: gen. prep. BALINT no. 1148); Amazonas, Chachapoyas, Molinopampa, 2300 m, 2002, leg. B. CALDERON (HNHM: female); Road Leimebamba-Balsas, Abra de Barro Negro, 6'46"S, 7'57"W, 3350-3650 m, 1-15.XII.2001, leg. BOLLINO (HNHM: female).

## Penaincisalia balzapamba (JOHNSON, 1990)

Abloxurina balzapamba JOHNSON, 1992: 29; AMNH holotype male, Ecuador: "Balzapamba" (not examined).

Penaincisalia balzapamba (JOHNSON, 1992) ROBBINS 2004: 122 (unsupported new combination); BUSBY & HALL in HALL et al. 2005: 17.

*Material examined* – 20 males, 3 females: ECUADOR: Ancienne Route, Loja-Catamayo, 2700 m, 28.II.2005, leg. S. & M. ATTAL (HNHM: male); Azuay, Gualaceo-Limón Road, west slopes, 3050 m, 7.II.2002, leg. WOJTUSIAK, PYRCZ & GARLACZ (HNHM: male); Azuay, Gualaceo-Limón Road, west slopes, 3050 m, 9.II.2002, leg. WOJTUSIAK, PYRCZ & GARLACZ (HNHM: male); Bolivar, Santa Lucia, Balzapamba-Guaranda old road, 2600 m, 5.II.2002, leg. WOJTUSIAK, PYRCZ & GARLACZ (MZUJ: female); Cotopaxi, via La Maná, Pilaló, 2.IX.2002, leg. WOJTUSIAK & PYRCZ (MZUJ: female); Culebrollas, Juncal (Cañar), 3200–3400 m, 12.III.2001, leg. P. BOYER (PB: 6 males); Loja, 2900 m, IX.2000, leg. I. ALDAS (JFLC: 4 males); Loja, Saraguro via Las Anteans, 3200 m, 15.IX.2004, leg. WOJTUSIAK & PYRCZ (MZUJ: 2 males); Morona-Santiago, Gualaceo-Limón road, east slopes, 3100 m, 8.II.2002, leg. WOJTUSIAK, PYRCZ & GARLACZ (HNHM: female); Pichincha, Chillogallo, San Juan, via La Victoria, 3300–3400 m, 30.I.2002, leg. WOJTUSIAK, PYRCZ & GARLACZ (HNHM: 4 males; one male is dissected: gen. prep. BÁLINT no. 1028); Pichincha, Pito, 3200 m, 4.V.2005, leg. T. PYRCZ (HNHM: male).

#### Penaincisalia ismaeli BUSBY et HALL, 2005

Penaincisalia ismaeli BUSBY & HALL in HALL et al. 2005: 16; USNM holotype male, Ecuador: "Loja, km 10 Loja Zamora rd" (not examined).

*Material examined* – 2 males, 2 females: ECUADOR: Cotopaxi, via La Maná, Pilaló, 2.IX.2004, 3200 m, leg. WOJTUSIAK & PYRCZ (MZUJ: female); Loja, Saraguro via Las Anteans, 3200 m, 15.IX.2004, leg. WOJTUSIAK & PYRCZ (MZUJ: 2 males); Zamora Chinchipe, Cordillera Lagunillas, Jimbura-Zumba, 3250 m, 27.VIII.2003, leg. J. WOJTUSIAK (HNHM: female).

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# Checklist of the Fauna of Hungary

# Volume 3. Macrolepidoptera

Varga, Z., Ronkay, L., Bálint, Zs., László, Gy. M. & Peregovits, L.

This is the third volume of the series Checklist of the fauna of Hungary launched in 2001 published by the Hungarian Natural History Museum. The present volume follows the Microlepidoptera (Vol. 2) making complete the checklist of the Lepidoptera fauna of Hungary. The volume divided into three chapters: introduction, checklist and index of scientific names and their authors.

The annotated checklist contains, besides the taxonomic list of the Macrolepidoptera taxa recorded from Hungary, a double biogeographical categorisation of each species. The major part of the extensive Introduction list, shortly explain and illustrate by examples the biogeographic and ecological categories used. The faunal type defined as an assemblage or aggregation of groups of species-group level taxa (or in certain cases subspecies) which can be attributed to given core areas, while the faunal element defined as a species-group level taxon belonging to the given faunal type, indicating their type of distribution in a finer scale. Ten faunal types (number of faunal elements in parentheses) are represented in the Hungarian Macrolepidoptera fauna: Extra-Palaearctic (10), Transpalaearctic (4), Boreo-continental Siberian (4), Southern continental (6), Western Palaearctic (11), Pannonian endemic (1), Carpathian (4), Alpine (5), Xeromontane (2), Eremic (2). Altogether 106 faunal component categories describing the ecological demands of the species based mostly on the bionomy and habitat requirement of the given species.

In the Checklist chapter the following information given for all the 1259 species (552 genera) listed: the generic name with the author and the year of publication; the valid name of the species-group name with the author and the year of publication in the current generic combination; the faunal type and faunal element categorization of the given species, completed with the faunal component category; and when necessary, a concluding remark is given providing brief details of taxonomic and/or nomenclatural information concerning with the taxon under discussion.

Lepidopterans play an important role in ecosystems and are equally favoured by professionals and non-professionals. Based on the information provided in this volume readers can characterise not only a given species but will be able to evaluate a given area through the qualification of the composition of its lepidopteran fauna. We presume that beside basic sciences it will have a wide and successful application in the practice of agriculture, forestry and nature conservation as well.

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