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Contributions to the knowledge of Neotropical Lycaenidae - reinstating names of three recently described species and description of a new one (Lepidoptera: Eumaeini)

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ABSTRACT. The species *Arcas alleluia* BÁLINT, 2002, *Margaritheclus dabrerus* BÁLINT, 2002 and *Rhamma tomaszpyrczi* BÁLINT et WOJTUSIAK, 2001 and the genus group name *Margaritheclus* BÁLINT, 2002 are reinstated from synonymy to their original stati in the context of the recently published "Checklist of Neotropical Lepidoptera". A description of a male of *Arcas alleluia* BÁLINT, 2002 is given. New data on their phenotypes and distribution are given and a new species, *Margaritheclus boliboyeri* is described from Bolivia.

Key words: entomology, taxonomy, checklist, Eumaeini, reinstated status, new species, Neotropics, unsupported action

In the checklist of Neotropical Lepidoptera (LAMAS 2004), names of three recently described species: *Arcas alleluia* BÁLINT, 2002, *Margaritheclus dabrerus* BÁLINT, 2002 and *Rhamma tomaszpyrczi* BÁLINT et WOJTUSIAK, 2001 were listed as synonyms of already known species. This change was not supported by any arguments that could justify it. Each of the above mentioned species was originally established on the basis of a single holotype that was described and illustrated in colour. Since in our opinion this change is unjustified, the present paper is aimed at restoring the original stati of each of the three species in question supported by appropriate arguments for such an action.

The material studied is deposited in the collections of the following institutions: Naturhistorisches Museum, Wien (NMW), Natural History Museum, London (BMNH), Zoological Museum of Jagiellonian University, Krakow, Poland (MZUJ); Pierre BOYER's collection, Le Puy Sainte Réparate, France (BC), Friedrich König collection II, Saalfelden, Austria (KC).

Acronyms used:

FW: forewing

HW: hindwing

D: dorsal surface

V: ventral surface

***Arcas alleluia* BÁLINT, 2002, bona species**

(Figs 1-2)

Arcas alleluia BÁLINT, 2002: 156, NMW holotype female, König coll. No. 427: "Rodriguez de Mendoza, N. Peru", figs 31-32.

Arcas jivaro NICOLAY, 1971; ROBBINS 2004: 119 (as senior synonym of *Arcas alleluia*).

TYPE MATERIAL EXAMINED: *Arcas alleluia* NMW holotype female, PERU: "Rodriguez de Mendoza".

NEW MATERIAL EXAMINED: Peru, Jorge Chavez, III.2003 (KC: male); Peru, Jorge Chavez, 1600m, X.2003 (KC: female).

This taxon was described on the basis of a single holotype female. In the new material that became available for study we examined specimens of both sexes. The female appeared to be almost identical to the holotype female, differing only in the lack of the faint ventral fore wing submarginal line that was present in the holotype. The male is described below for the first time.

DESCRIPTION OF THE MALE

The male (Figs 1-2) is unique amongst all the known *Arcas* species in possessing the following peculiar character: androconia (scent pad in the discal cell apex and subdiscal scent patches) on FWD are missing. The body from dorsal and ventral side covered with gleaming gold green scales, but the abdomen is pale orange ventrally. The colour of wings on dorsal surface greenish, somewhat intermediate between that of *A. splendor* (DRUCE, 1907) and *A. tuneta* (HEWITSON, 1865). The black outer margin relatively narrow on the FW but broadened in the apical area with a diffused inner border. The black outer margin on the HW is restricted to the margin, slightly broadened in the apex, as on the FW. Cells CuA1-2 and the cleft in the cell 1A+2A on HW are lighter in the antemarginal area and basally bordered by wide black crescents. Termini of the vein CuA1 and CuA2 possess long, black tail-like extensions and goldish green cleft which is widely separated as in other *Arcas* species. FW gleaming greenish blue in the discalis

and below the cubital vein. Remaining upper parts covered with a mixture of gleaming and black scales. The HWD colour similar to that of the FWD. The median black band basally with light bluish scaling. The submedian area suffused with black scales which are more intense in the area from M1 to CuA2. The termini of the veins are also black, and the marginal area, as well as the tails and the cleft, are black. FW length 17mm.

The pattern of colouration on ventral side of both sexes is very similar to that in other *Arcas* species, except for a scent patch which is present on the ventral side of the hind wing.

When its colouration pattern is analysed, the species seems to be closely related with the other two species, *Arcas nicolayi* SALAZAR & CONSTANTINO, 1995 and *A. splendor* (DRUCE, 1907), from which it can be easily distinguished by the absence of dorsal androconia and the faint or missing submarginal line on FWV.

According to NICOLAY (1971), in the *A. jivaro* ... "scent spot large, but vaguely defined, filling distal half of the cell, extending out beyond transverse vein and surrounded by a greenish halo".... The author also points out the fact that the basic wing colouration on dorsal side of wings is brilliant blue with a slight greenish shade (NICOLAY 1971: 105). Contrary to *A. jivaro*, the dorsal ground colour of *A. alleluia* is basically green with a slight bluish shade as in *A. nicolayi* and *A. splendor*. Since the presence or absence of androconia and their shape are important characters in species discrimination (*c.f.* HALL & HARVEY 2002), the decision for lumping *A. alleluia* and *A. jivaro* is incorrect. Moreover, there is no evidence that in *Arcas* there are any species with two different male phenotypes, with androconia and without them.

Consequently, the synonymisation of the nominal taxa *Arcas jivaro* and *A. alleluia* is not justified, so we are reinstating here the original status of *Arcas alleluia*.

***Margaritheclus dabrerus* BÁLINT, 2002, bona species**

(Figs 3-4)

Thecla sp. ♂, D'ABRERA, 1995: 1131.

Margaritheclus dabrerus BÁLINT, 2002: 125; BMNH holotype female, "Ecuador".

Theritas margaritacea (DRAUDT, 1919); ROBBINS 2004: 120 (as senior synonym of *M. dabrerus*).

TYPE MATERIAL EXAMINED

Margaritheclus dabrerus BÁLINT, 2002: BMNH holotype female [ECUADOR].

NEW MATERIAL EXAMINED

ECUADOR: Prov. Bolivar, Santa Lucia, 2080m, Balzapamba-Guaranda old road, 3.IX.2003. (MZUJ), male.

This taxon was established on the basis of a single female (holotype) specimen without abdomen documented by d'ABRERA (1995) as an undescribed species. According to the wing shape and ventral colouration pattern one of us

(ZsB) presented evidence that this unique phenotype belongs to a close relative of *Margaritheclus danaus* (FELDER et FELDER, 1865) and represents the female phenotype of a distinct, unrecognised species (BÁLINT 2002), which probably originates from Ecuador, since the label attached to the holotype specimen bears a note “Brabant coll.” (Lamas, pers. comm.)

GOODSON (1946) treated the nominal taxon *Thecla margaritacea* DRAUDT, 1919 described on the basis of two male syntypes originating from Colombia (“Muzo”) as male phenotype of *Margaritheclus danaus*, the species that was also described from Colombia (BÁLINT & GOODGER 2004). After dissecting the specimen curated as “*Thecla danaus*” in the BMNH it was revealed that the *danaus* material contains a cryptic species pair (BÁLINT 2002). The genus *Margaritheclus* BÁLINT had been established with the type species *Thecla danaus* and a new cryptic species was described as *M. belus* BÁLINT, 2002.

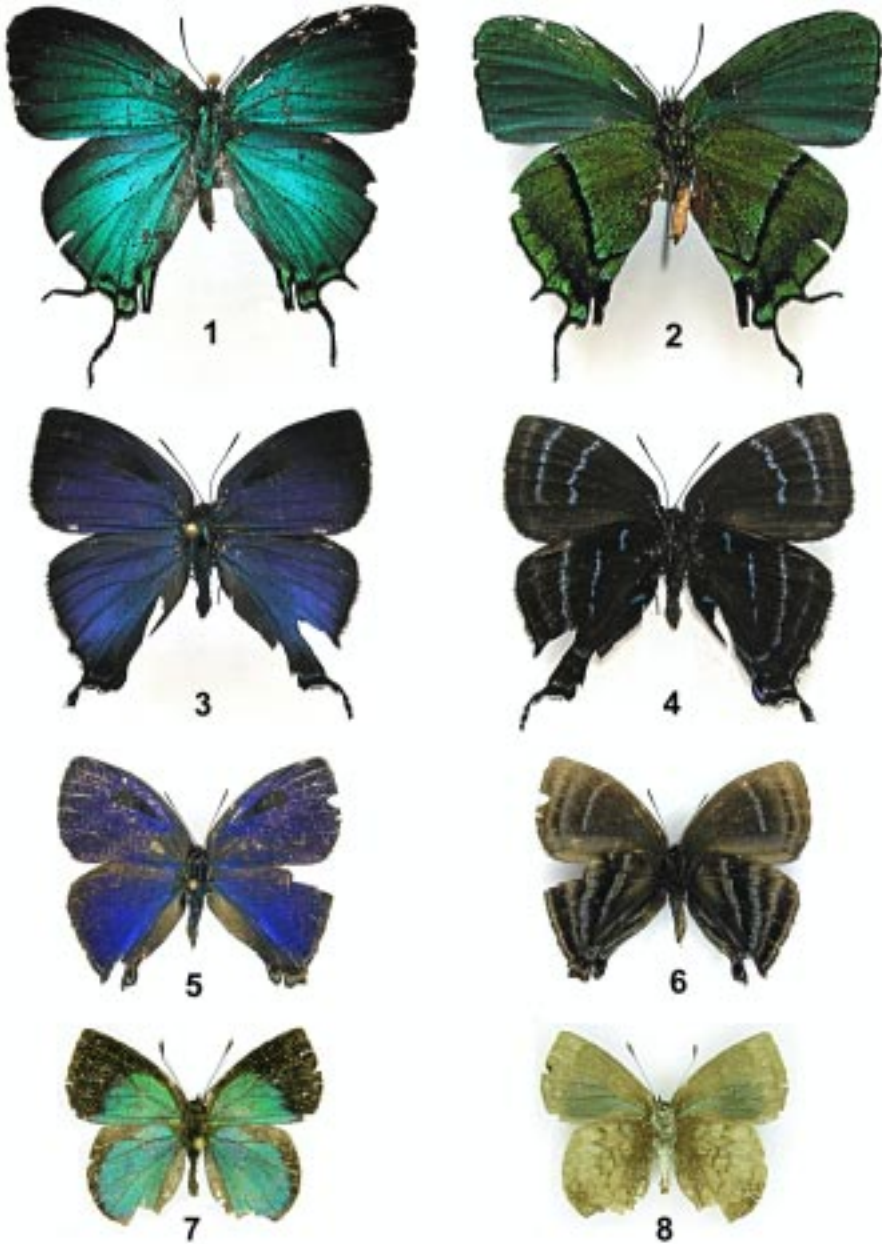
Regarding all these taxa, ROBBINS (2004) presented a totally different point of view without giving any convincing arguments to justify it. He placed *M. belus* as junior synonym of *M. danaus*, and regarded *M. dabrerus* as junior synonym of “*Theritas margaritacea*”.

One of us (JW) collected one male individual of *M. dabrerus* during an expedition to Ecuador in 2003. The voucher specimen is deposited in the MZUJ (Figs 5-6). Another male specimen was discovered in Boyer’s collection (BC). Examination of colouration pattern on ventral surface of wings in both specimens revealed that it matches closely colouration of the holotype female and bears a scent patch and pad on FWD.

The nominal taxon “*Thecla margaritacea*” was described on the basis of two male syntypic specimens having androconia on FWD. The dorsal structural colour of male *M. dabrerus* is tinted blue while that of *M. danaus* is gleaming azure with green hue. Their androconia also differ in quantitative terms: whilst the scent pad in both species is situated beyond the discal cell, *M. dabrerus* has a prominent furry scent patch in the apical half of this cell (Fig. 9). The nominal taxa *M. dabrerus* and *M. margaritacea* sensu Robbins can only be synonyms, if they are distinctive seasonal forms of the same biological species. According to the available data and our knowledge about large eumaeines this scenario can be excluded.

The genus *Margaritheclus* was lumped under *Theritas* HÜBNER, 1818 (Type species: *Theritas mavors* HÜBNER, 1818). The *Theritas* male scent pad is situated on FWD discal cell and the scent patches are intervenial beyond the discalis. The male also possesses HWV androconia along the cubital vein. All these characters are qualitatively distinct and can be easily used to separate the two genera in question.

Consequently, the synonymization is not justified and therefore, we are reinstating the genus name *Margaritheclus* BÁLINT, 2002 and the species *M. dabrerus* to their original status.



1-8. Neotropical eumaeine hairstreaks: 1-2. *Arcas alleluia*-male, Peru (CK): 1 - dorsum; 2 -ventrum; 3-4. *Margaritheclus dabrerus*, Ecuador (MZJU): 3 -dorsum, 4 - ventrum; 5-6. *M. boliboyerus*, holotype: 8 - dorsum, 9 - ventrum; 7-8. *Rhamma tomaszpyrczi*, southern Ecuador (CB). (Digital photos 1-4 by A. KUN, 5-8 by P. BOYER)

***Margaritheclus boliboyerus* BÁLINT et WOJTUSIAK n. sp.**

(Figs 5-6)

TYPE MATERIAL

Holotype male, in coll. P. Boyer (will be deposited in the MZUJ), in moderate condition (dorsum somewhat worn, both HW and right FW margins broken, HW tails missing), labelled as: “Cochabamba, vers. Villa Tunari, km 90 Rio Ronquito, 2250 m (Cochabamba), Bolivie, 11/03/02”.

DIAGNOSIS AND DESCRIPTION

Similar to *M. dabrerus* in colouration of dorsal side (vivid structural tint blue) and in size (FW length between 16-22 mm), but can be separated by the following characters (1) dorsal discoidal scent patch is brown and its shape rounded (black and basally pointed in *M. dabrerus*); (2) ventral postbasal, medial and postmedial elements faint ash blue in colour (gleaming blue in *M. dabrerus*); (3) FW medial vertical stripe is straight (zigzagged in *M. dabrerus*); (4) HW vertical postbasal line with continuous pattern elements from cell Sc+ R1 to cell CuA2 (pattern element in cell Sc+R1 displaced basally in *M. dabrerus*); (5) ante marginal row marked stronger (faint in *M. dabrerus*); HW basal and anal area with ash blue hue and pattern (lacking in *M. dabrerus*).

DISTRIBUTION

Geographical: known only from type data (Cochabamba, Bolivia); spatial: recorded from 2250 m; temporal: collected in the middle of March.

ETYMOLOGY

We dedicate this species to Pierre BOYER, collector of the holotype, as a Latinized masculine noun made in rhyme to congeneric species *M. belus* and *dabrerus*, but with the prefix “boli” used to emphasise the origin (Bolivia) of the holotype specimen.

REMARKS

The androconia are crucial in the discrimination of eumaeine species because those structures show a relative constancy in their appearance on dorsal side of the FW. However, whilst the scent pad is relatively constant in shape and pattern, scent patches are extremely variable in shape and size. In spite of this, differences in their pigmentation can be used for species discrimination, as for example, in the genus *Atlides* HÜBNER, 1818, (cf. BÁLINT *et al.* 2003, figs 7-11) and in *Margaritheclus*, where the male of *M. danaus* (“*Thecla margaritacea*”) shows somewhat similar HW pattern to *M. boliboyerus*, but is lacking the furry discoidal scent patch. Accordingly, three known male phenotypes of *Margaritheclus* can be distinguished on the basis of this sole character (the male of *M. belus* is hitherto unknown).

ROBBINS (2004: 120) has mentioned the existence of an undescribed species from Peru numbered as “112” in the checklist edited by Lamas (2004) and placed it between “*Theritas margaritacea*” and “*Theritas adamsi* (H.H. DRUCE, 1909)” (an unsupported, erroneous new combination). We may only speculate that this mysterious species may belong to *M. boliboyerus*, since the Cochabamba region of Bolivia, collection site of the holotype, is in proximity to southeastern Peru where it was collected.

***Rhamma tomaszpyrczi* BÁLINT ET WOJTUSIAK, 2002, bona species**

(Figs 7-8)

Rhamma tomaszpyrczi BÁLINT & WOJTUSIAK, 2002: 190.

Rhamma hybla (H.H. DRUCE, 1907) JOHNSON, 1992; ROBBINS 2004: 121, no. 191 (as senior synonym of *R. tomaszpyrczi*).

TYPE MATERIAL EXAMINED

Thecla hybla DRUCE, 1907: BMNH 266631 holotype male, ECUDOR [no concrete locality]. *Rhamma tomaszpyrczi* BÁLINT & WOJTUSIAK, 2002: Museo de Historia Natural, Universidad Nacional Mayor de San Marcos (Lima, Perú) holotype male, PERU: “Department Amazonas, Molinopampa”.

NEW MATERIAL EXAMINED

ECUADOR: Azuay, Mayles, Gualaceo vers. Limon 24 km, 3200 m, XII.2003 (BC: male). PERU: Huanuco, Carpish, 2850 m-3050 m, 27.VII.2002 (MZUJ: male).

The taxon was described on the basis of the holotype male. The holotype was documented in colour and was discussed in minute details. In spite of the fact that the holotype of *Thecla hybla* is perfectly documented by JOHNSON (1992: 142) and D’ABRERA (1995: 1141), *R. tomaszpyrczi* was considered by ROBBINS (LAMAS, 2004) the youngest subjective synonym of *Rhamma hybla* (DRUCE, 1907) JOHNSON, 1992.

Subsequently, further specimens have been collected confirming distinct taxonomic status of *R. tomaszpyrczi* (Figs 7-8). The species occurs together with *R. hybla* (Figs 12-13) in the Chachapoyas highland in northeastern Peru. Markings and colouration displayed on specimens closely agree with the original description of *R. tomaszpyrczi*. In view of the above, the synonymisation and other nomenclatorial actions made by ROBBINS and published in the Checklist are unjustified.

The species *R. tomaszpyrczi* can be distinguished from *R. hybla* by (1) its different size (FW costa length from base to apex 12-13 mm in *R. tomaszpyrczi* and 16-18 mm in *R. hybla*); (2) different male dorsal green structural colour (luminescent green in *R. tomaszpyrczi* and dark and somewhat matt green in *R. hybla*) and (3) relatively monotonous light HWV ground colour with simple

reduced cryptic markings in *R. tomaszpyrczi* and relatively colourful dark HWV ground colour with complex cryptic markings in *R. hybla*.

We consider therefore that the synonymisation made by ROBBINS (2004) was erroneous, and are reinstating the species *Rhamma tomaszpyrczi* to its original status.

CLOSING REMARKS

In the checklist (LAMAS 2004) it was emphasized that differences in sculpture of genital structures, generally regarded as fundamental in taxonomic discriminations in Lepidoptera, are not very helpful in eumaeine hairstreaks. "...The richest source of traits for distinguishing eumaeine species is wing pattern, followed by androconia and only then by genitalia, including brush organs"... . Therefore it is better to use male specimens for taxonomic analysis because they offer more characters, and females are sometimes hard to distinguish (ROBBINS 2004).

We agree with this statement because it confirms the widely known phenomenon that daily active insects can manipulate light in communication between opposite sexes and in defence. Genitalia of many lycaenids can be distinguished only by quantitative methods, but colours and patterns are qualitatively distinct in many cases. Distinct colours can be characterized by their different spectral reflectivity and intensity as it has been shown in recently conducted experiments (KERTÉSZ *et al.* 2005).

We want to point out that when a knowledge of a given group of lycaenids, or a genus, is relatively good, as it is for example in the case of *Arcas* SWAINSON, 1832 and *Margaritheclus* BÁLINT, 2002, even a curious singleton female individual can be used for taxonomic evaluations, assuming that border lines between already discriminated taxa are well defined.

In the case of *Rhamma* JOHNSON, 1992 the "criteria" of ROBBINS were fully applied with other supporting data as genital characters plus congeners' analysis.

The taxa we are discussing in this paper were all documented in colour and therefore they can be treated as really existing, distinct biological entities.

The introduction of many unsupported genus- and species- group synonymies in the Checklist by ROBBINS is raising the question about scientific value of such actions. Moreover, "n. sp." indications pose further problems as there is no real guide how to understand them in the context of other, neighbouring taxa. According to ROBBINS, species "112" occurs in Peru, however, it cannot be excluded that for example, behind this number, *M. boliboyerus* may be hidden.

The eumaeine part of the Checklist is a good and important framework for further research, and constitutes another milestone following voluminous descriptions of HEWITSON (1863-1878), the synthesizing compilation of GODMAN & SALVIN (1887) for Mesoamerica and that of DRAUDT (1919-1920) for the entire Neotropical region, and finally the curatorial work of Frederick W. GOODSON from the Natural

History Museum, London (BÁLINT 2005a). However, the examples we are presenting in the present paper suggest that voluminous work still has to be done on the taxonomy of Neotropical eumaeine lycaenids to achieve a better and more real picture of species diversity and the number of genera.

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