Description of a new genus and three new species of Erebidae, from Central and South America (Lepidoptera, Arctiinae, Arctiini)

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Abstract. We describe a new genus, *Leocephaluncus* Espinoza & Laguerre **n. gen.**, with three new species of Arctiinae (Erebidae), *Leocephaluncus elianahenrichae* Espinoza **n. sp.**, *Leocephaluncus rafaelangelespinozai* Espinoza **n. sp.** and *Leocephaluncus boliviensis* Laguerre **n. sp**., from Central and South America, and clarify their identification with respect to *Pseudapistosia* Möschler, 1878 (Arctiinae). *Leocephaluncus leucocorypha* (Dognin, 1914) **new comb.** is transferred to the new genus from *Pseudapistosia*. *Pseudapistosia chimaera* Druce, 1893 **new comb.** is transferred from the genus *Elysius*, and *Pseudapistosia gigas* (Dognin, 1890) **rev. stat.** is restored to species status. A lectotype is designated for *Phalaena umber* Cramer, [1776]. For the new genus *Leocephaluncus*, we include images of the adult males and their genitalia, data from DNA barcodes and notes on the species' geographical distribution. In addition, we discuss the phylogenetic placement of the new genus.

Keywords. Taxonomy, Lepidoptera, Erebidae, Arctiinae, Arctiini, *Pseudapistosia*, Central America, South America.

INTRODUCTION

Leocephaluncus **n. gen.** is described to include three new species from Costa Rica, Venezuela, Ecuador and Bolivia, and to receive what was formerly known as *Pseudapistosia leucocorypha* (Dognin, 1914). *Leocephaluncus* is phenotypically very similar to *Pseudapistosia* Möschler 1878, which is a three-member genus currently restricted to South America; two *Pseudapistosia* species are very similar in morphology, and one new species described here was first believed to be a member of *Pseudapistosia* due to its similar wing pattern. All of these species are externally very similar, so we first review the status of *Pseudapistosia* before focusing on the new genus described here.

The type species of the genus *Pseudapistosia* is *Phalaena umber*, which was described by Cramer ([1776]) from Surinam. The original description is rather precise and a fairly good figure is provided on plate XV, figure F (Fig. 1B). Despite this good picture, following the description of *P. umber* by Cramer, only Hübner (Hübner, 1818: 164) and Möschler (Möschler, 1878: 665) correctly recognized this species, but in Biologia Centrali-Americana, Druce (1884: 100) incorrectly identified a series of specimens from Chiriquí, Panamá, in the NHMUK, as *P. umber.* These specimens are similar to *P. gigas* described by Dognin (1890) from Loja in Ecuador. Following this misidentification, Hampson (1901) treated the specimens from Panamá as *P. umber* and described a series collected in the lowlands of the Bolivian 'Yungas' under the name *P. similis*. These latter specimens are likely to represent true *P. umber* (see below). Finally, Watson & Goodger (1986) synonymized *P. gigas* with *P. umber*. The type of Cramer was presumed lost, but in the Rijksmuseum van Natuurlijke Histoire, Leiden, Netherlands (RNHL) there is a specimen, which is very likely a syntype, which bears the label "Surinam V[an] Lennep [collection]" (Fig. 1A) and which is identical to the Cramer ([1776]) artwork. To reduce confusion in the application of the name *umber*, we here designate this specimen as the **lectotype** of *Phalaena umber* Cramer, [1776]. The species appears to be extremely scarce in the Guianas and only a few specimens have been collected by day either at flowers or with interception traps. We were able to study and dissect one such specimen collected in French Guiana by Jean Cerda and which is, in turn, identical to the picture of Cramer ([1776]) (Figs 1C, D). The genitalia of this specimen are identical to those of a topotype of *P. similis* (Hampson, 1901) (dissected by Alan Watson (slide reference NHMUK 3113)), collected after the original description of *P. similis*. The holotype was not dissected, but even if it proves to be identical to the specimen we dissected (including the dark brown first segment of the abdomen, a feature that is shared by all the *Pseudapistosia* species here associated), some doubt remains as to the synonymy of *P. similis* with *P. umber*.

Figure 1. *Pseudapistosia umber* Cramer, [1776]. **A** Syntype (?) from Van Lennep collection in RNHL. **B** Picture from Cramer ([1776]) on plate XV, F. **C & D** Recto and verso of a recent specimen from French Guiana, Road to Kaw, PK37, Patawa Camp, 2005, J. Cerda *leg.*,(JCC).

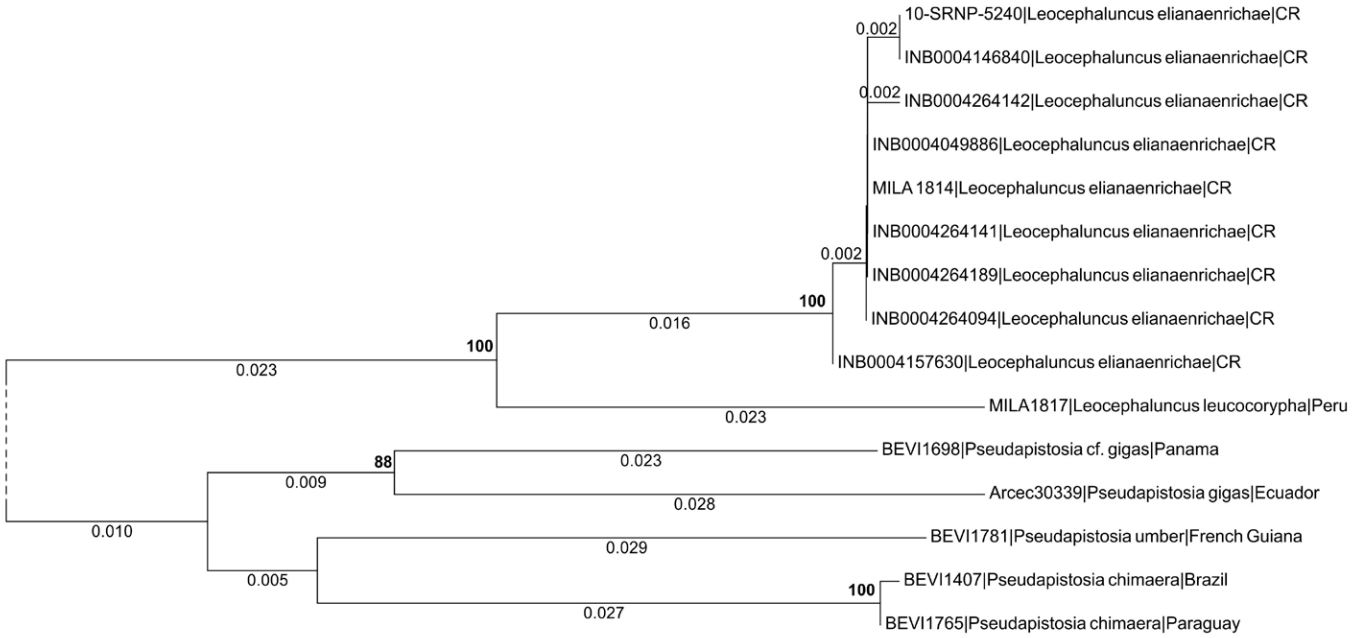


Figure 2. Neighbor-Joining Tree (Saitou & Neil, 1987) for the 15 specimens of the "*Pseudapistosia*" group from the Neotropics and the new genus *Leocephaluncus*. Distances are given below each branch and bootstrap supports are given above each branch in bold (obtained with MEGA4, see Tamura *et al*., 2007). The dashed line replaces approximately 15 pages of NJ tree.

It is interesting to note that the genitalia of *P. similis* exhibit coremata, which is an uncommon feature within the Arctiini (Lafontaine & Fibiger, 2006). On the other hand, a specimen of *Opharus gigas* dissected by Watson in the NHMUK (slide reference NHMUK 3116) from Peru, and examined by us, has genitalia very different from those of *P. similis* (= ? *umber*), in particular lacking coremata.

The specimen of *P. umber* from French Guiana was fresh enough to be successfully sequenced, and it is used as a reference for the genus *Pseudapistosia*. Besides this specimen, we were able to DNA barcode 9 specimens of the new species of *Leocephaluncus* n. gen. from Costa Rica, one specimen similar to *Opharus gigas* (= *umber*, sensu Druce) from Panamá and one specimen of *P. leucocorypha* (Dognin, 1914) coming from Perú (Cuzco, Valle de Quillabamba). We also included the DNA barcode of a specimen collected near Loja in Ecuador (provided by Gunnar Brehm, Jena Universität, Germany) which we consider to represent *Opharus gigas*, which shows a difference of 5.1 % with respect to *Opharus gigas* from Panamá (see Fig. 2). These sequences were aligned in our general NJ tree of near 11,000 sequences of Arctiinae, resulting in two nicely homogeneous clusters widely separated by 15 pages of DNA barcodes: on the one hand we have *P. leucocorypha* and the three new species described here, and on the other hand we have *P. umber*, *Opharus* cf. *gigas* and a third species which is currently identified as *Elysius chimaera* (Druce, 1893), originally described from Paraguay (type series in NHMUK, London), and which has been synonymized in the past (Vincent & Laguerre, 2010) with *Elysius hadesia* (Schaus, 1927), also described from Paraguay (Molinas, female holotype in USNM). Two specimens of this last species were sequenced, one from Paraguay (Kanindeyú) and the second from Brazil (Santa Catarina), and the two exhibit the same sequence (NJ tree, Fig. 2).

MATERIALS AND METHODS

Twenty-one specimens from Costa Rica, five from Bolivia, five specimens from Venezuela and Ecuador, one from French Guiana, one from Panamá and one from Perú were studied. Seventeen specimens are deposited in the Museo Nacional de Costa Rica collection and one in the ACG reared voucher collection, National Museum of Natural History, Washington D. C., USA (USNM) (Voucher: 10-SRNP-5240). Genitalia of seven specimens, six males and one female were prepared following the procedures for dissecting described by Lafontaine (2004) and photographed in natural position suspended in 95% alcohol. The preparations were placed in glycerin. Genitalia preparations were made in hot KOH solution (10%) and stained with Chlorazole Black E. Pictures were taken with a Nikon CoolPix 4500 using a super micro lens, as well as attached to a trinocular Nikon stereomicroscope SMZ-10A. Several samples were taken for sequencing of the COI barcode region and sent to the Canadian Center for DNA barcoding in Guelph, Ontario for corresponding analysis (Hebert *et al*., 2003). The following specimens were used as references for the application of species names: *Leocephaluncus leucocorypha*: 1 ♂, PERU. Province Cuzco. Valle de Quillabamba. 1800 m. OCT/NOV 2006, R. Marx leg., in Coll M. Laguerre. Dissected reference Gen. ML2202 and sequenced in BOLD reference MILA1817/ARCTD692-12 (BIN = ABW9391). (Figures 3a-d). *Pseudapistosia umber*: 1 ♂, FRENCH GUIANA, Road to Kaw, PK37, Patawa Camp, 2005, J. Cerda leg., in Coll J. Cerda. Dissected reference Gen. ML2212/JC490 and sequenced in BOLD reference BEVI1781/ARCTD856-13 (BIN = ACG5600). (Figures 4a-d). *Pseudapistosia gigas*: 1 ♂, ECUADOR, Zamora-Chinchipe, Parque Nacional Podocarpus, Mirador, 27-III-2012, 1470 m, 4°.11283 S - 78°.9735 W, F. Bodner leg., sequenced in BOLD reference Arcec 30339/ NARCA858-13

(BIN = ACJ9246). (Deposited in Friedrich Schiller University Jena, Jena, Germany (FSUJ)). *Pseudapistosia chimaera*: 1 ♂, BRAZIL, Santa Catarina, Saõ Bento do Sul, Sierra Río Natal, 1-V-1998, 850 m, 26°.34 S - 49°.31 W, sequenced in BOLD, reference BEVI1407/ARCTD102-11 (BIN = ABV4683); 1 ♂, PARAGUAY, Kanindeyú, Agr. Amiticio, 1-IV-2009, 24°.5667 S - 54°.5333 W, U. Drechsel leg., sequenced in BOLD, reference BEVI1765/ARCTD460-12 (BIN = ABV4683). All in the personal collection of Benoit Vincent, Paris, France (BVC).

DNA was extracted, amplified and sequenced at the "Canadian Centre for DNA Barcoding" (CCDB) starting from dry legs removed from specimens coming from the authors' collection. Details of various protocols have been described in Vaglia *et al.* (2008) and Decaëns & Rougerie (2008) and can be found on the website of CCDB (http://www.dnabarcoding.ca/pa/ge/research/protocols). The specimen of *P. umber* from French Guiana was sequenced at the Criminal Research Institute of the National Gendarmerie in France. In some cases, we provide also the BIN reference number, which is a unique taxonomic unit that closely corresponds to a species. The BIN number can be used to retrieve all data linked to this taxonomic unit, for example by entering it in the web site http://www.boldsystems.org/index.php/Public_BarcodeIndexNumber_Home.

Sequences were aligned and downloaded from BOLD and a distance-tree analysis was performed using MEGA4 (Tamura *et al*., 2007) with the Neighbor-joining method. Bootstrap values (Felsenstein, 1985) were used to estimate branch support, calculated in MEGA4 with 1000 random replications. Distance calculations were performed using the Kimura 2-parameter (K2P) method (Kimura, 1980) in MEGA4 including all sites, with the pairwise deletion option and assuming both a homogeneous pattern of divergence among lineages and a uniform rate of substitutions among sites.

The following collections are referenced in the text by their corresponding acronyms:

MNCR-A	Museo Nacional de Costa Rica, San José, Costa Rica (formerly the INBio collection in Santo Domingo de Heredia, CR)
USNM	National Museum of Natural History, Washington D. C., USA
NHMUK	Natural History Museum, London, UK
RNHL	Rijksmuseum van Natuurlijke Histoire, Leiden, Netherlands
MNHN	Muséum National d'Histoire Naturelle, Paris, France
FSUJ	Friedrich Schiller University Jena, Jena, Germany
MLC	Personal collection of Michel Laguerre, France
BVC	Personal collection of Benoit Vincent, Paris, France
JCC	Personal collection of Jean-Aimé Cerda, French Guiana

SYSTEMATICS

Leocephaluncus Espinoza & Laguerre, **new genus**

Figures 3a-d, 5-12

Type species. *Leocephaluncus elianahenrichae* Espinoza, n. sp., by original designation.

Diagnosis. In general terms, the male genitalia in all the species of *Leocephaluncus* n. gen. are fairly homogeneous and this genus can be differentiated from *Pseudapistosia* by the presence of a very setose uncus in all members (Figs 9-12). The four *Leocephaluncus* species are very similar in size and maculation, sharing almost the same patterns on head, abdomen and wings, closely resembling *Pseudapistosia*. Except for *P. leucocorypha,* the other three new species described here share the feature of having the first tergite orange-yellow, and this condition is absent in *Pseudapistosia,* in which it is dark brown.

Description. Adult male (Figs 5-7). *HEAD*: Small, eyes large; antennae elongate, 2/3 of forewing length, bipectinate and brown. Vertex with an orange to pale yellow patch, frons dark brown, labial palpi dark brown, wide, very long, reaching base of antennae and with third segment very short and narrow; proboscis well developed. *THORAX*: densely setose, dark brown dorsally and yellow-orange ventrally, patagium dark brown and slightly iridescent blue; tegulae and thorax dark brown. *LEGS*: brown, coxae setose, tibial spurs on medial and posterior legs very long, tibias of posterior legs with basal spurs longer than distal spurs. *WINGS*: Forewing length 29.9 to 32.6 mm; brown ground color, slightly setose on its base and toward posterior margin; venation strongly marked, dark brown with some blue iridescence on anal, cubital, medial and radial veins. Hindwing brown ground color, slightly pale towards base; venation marking, less strong than in forewing, costal margin slightly lobed in median area. *ABDOMEN*: dark brown ground color, segments 1 to 3 hairy dorsally, segment 1 orange-yellow dorsolaterally, segments 2 to 8 with large subdorsal orange-yellow patches, ventrally dark brown. *GENITALIA*: (Figs 9a-d). Strongly sclerotized; uncus very wide basally, pointed distally and acute at tip, densely covered with short and straight hairs dorsally. Valvae elongate, very wide basally, costal margin slightly lobed in middle, acute and slanting slightly upward at tip in lateral view and curves inward in dorsal view. Juxta sclerotized, longer than wider, convex, constricted in middle and bifurcated at base. Transtilla sclerotized, narrow at base and expanding dorsally above aedeagus. Aedeagus widened on its anterior portion and slightly curved upward in distal portion in lateral view. Vesica simple, membranous, elongate and arising on right side, with a patch of short and thick spines, and three small lobes distally.

Etymology. The genus name is masculine in gender and it is a combination of three terms: the Latin word "leo" meaning "lion", the greek word "cephale" meaning "head" and the scientific term "uncus", which is the structure of the genitalia that shows the distinctive hairy character found in all its species, reminiscent of the mane of a lion.

Leocephaluncus elianahenrichae Espinoza, **new sp.**

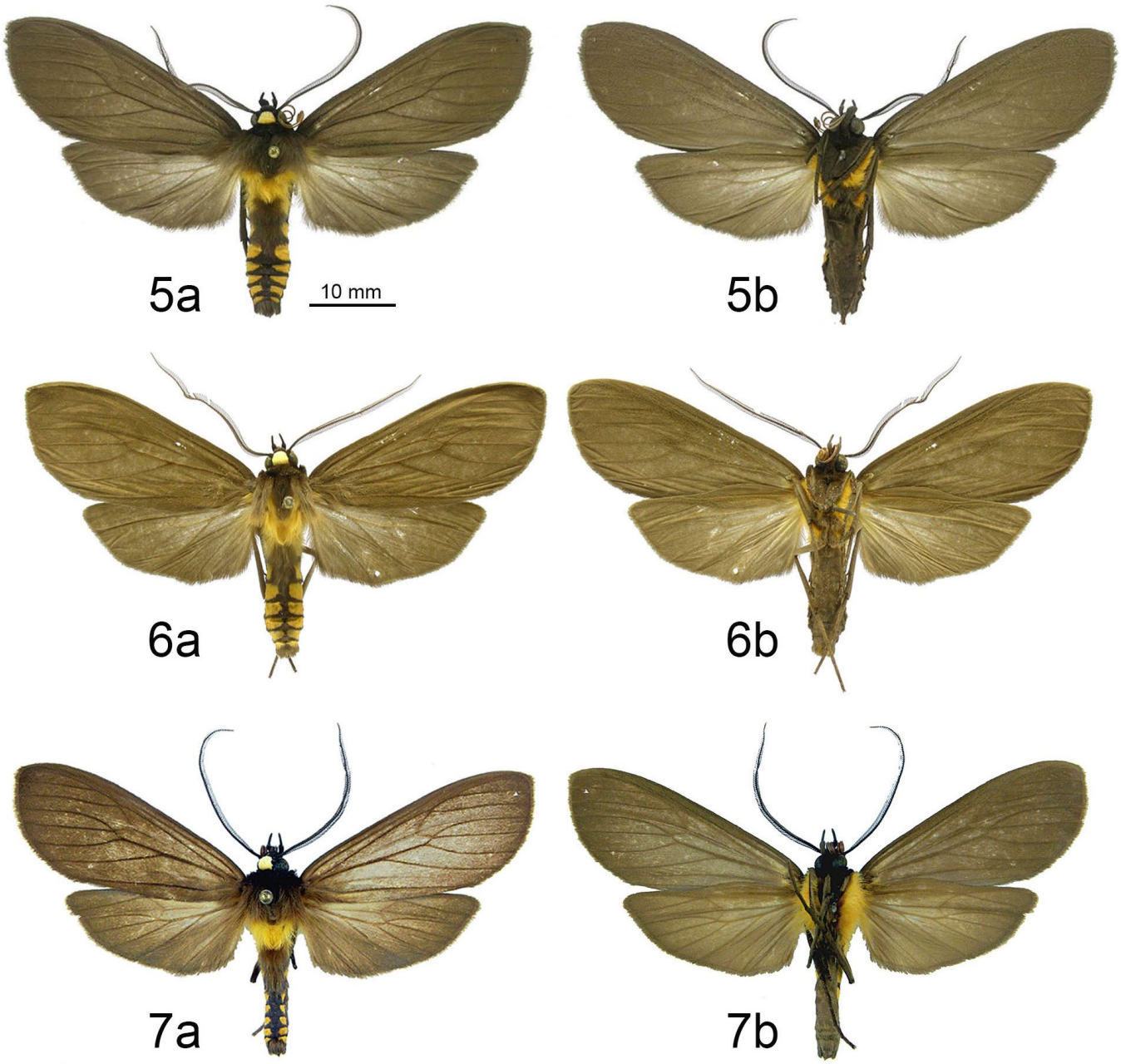
Figures 5a-b, 9a-b, 10

Holotype ♂: COSTA RICA. Prov. Cartago, Paraíso, P.N. Tapantí-Macizo de La Muerte, Camino principal, del porton del ICE 3.5 km siguiendo hacia Río Humo, 1650 m, 9.720517°N, 83.777771°W, 8-10.Sep.2010, *leg.* B. Espinoza; Tp. Luz; #99952; Voucher INB0004264094, GenBank accession number: JX681688. Deposited MNCR-A.

Paratypes: 13♂ and 7♀. COSTA RICA. Cartago: 3♂, Same information as the holotype. Voucher # INB0004264189, GenBank accesion: JX681692; Voucher INB0004264141, GenBank accesion: JX681684, (dissected); Voucher INB0004264142, GenBank accesion: JX681673, (dissected); 1♂, Prov. Cartago, Tapantí, Río Grande de Orosi, 1300-1400 m, 9.775254°N, 83.795598°W, Apr.1984, *leg.* D. H. Janzen & W. Hallwachs; Voucher INB0003447445; 1♀, Prov. Cartago, Moravia de Chirripo, 1000 m, 9.828709°N, 83.442726°W, 10.May.1983, *leg.* D. H. Janzen & W. Hallwachs; Voucher INB0003446415; 1♂, Prov. Alajuela, Fca. La Campana, El Ensayo, 7 Km NW Dos Ríos, 700 m, 10.94834°N, 85.420173°W, 15-17 Mar.1986, *leg.* D. H. Janzen & W. Hallwachs; Voucher INB0003448135; 1♂, Prov. Alajuela, Río San Lorencito, Res. For. de San Ramón, 5 km N. Col. Palmarena, 800 m, 10.219533°N, 84.600758°W, Feb.1986, *leg.* I. Chacón; Voucher INB0003510378; 1♂, Prov. Alajuela, Guatuso, P. N. V. Tenorio, Punto 2: Falda N. Cerro Montezuma, 1160 m, 10.698113°N, 85.018467°W, 27.Jun.2008, *leg.* J. A. Azofeifa; Tp. Luz; Voucher INB0004153868, (dissected); 1♂, Prov. Alajuela, P.N. Volcán Tenorio, Punto 2: Falda N. Cerro Montezuma, 1000-1100 m, 10.698113°N, 85.018467°W, 31.May.2008, *leg.* J. A. Azofeifa; Tp. Luz; #93818; Voucher INB0004146840; GenBank accesion: JX681679; 1♂, Prov. Alajuela, P. N. Volcán Tenorio, Falda Norte V. Tenorio 1, Los Quemados, 1200-1300 m, 10.682763°N, 85.008836°W, 23.Nov.2006, *leg.* J. A. Azofeifa; Tp. Luz; #90240; Voucher INB0004049886, GenBank accesion: JX681680; 1♀, Prov. Alajuela, P. N. Volcán Tenorio, Punto 4: Cerro Montezuma, 1400-1500 m. 10.695154°N, 85.027602°W, 27.May.2008, *leg.* J. A. Azofeifa; Tp. de Luz; #93820; Voucher INB0004147406, (dissected);

Figures 3-4. 3a-d Male genitalia of *Leocephaluncus leucocorypha*, (Druce, 1893) **n. comb.,** Peru, Cuzco, Valle de Quillabamba, 1800 m, Oct/Nov 2006, R. Marx *leg*. **4a-d** Male genitalia of *Pseudapistosia umber* (Cramer, [1776]), French Guiana, Road to Kaw, PK37, Patawa Camp, 2005, J. Cerda *leg*. **a** dorsal view of genital capsule. **b** ventral view of genital capsule. **c** lateral view of genital capsule. **d**, dorsal view of aedeagus.

1♀, Prov. Alajuela, A.C.G., Sector Rincón Rain Forest, Sendero Albergue Crater, 980 m, 10.84886°N, 85.32810°W, 16.Sep.2010, *leg.* Gloria Sihezar; Voucher 10-SRNP-5240; 1♀, Prov. Alajuela, Guatuso, P. N. Volcán Tenorio, Punto 2: Falda N. Cerro Montezuma, 1160 m, 10.698113°N, 85.018467°W, 7.Aug.2008, *leg.* J. A. Azofeifa; Tp. Luz; #94403; Voucher INB0004157630; GenBank accesion: JX681666; 1♀, Prov. Heredia, El Angel Waterfall, 8.2 Km downhill from Vara Blanca, 1350 m, 10.260295°N, 84.178152°W, 3.Jan.1981, *leg.* D. H. Janzen & W. Hallwachs; Voucher INB0003448776; 1♂, Prov. Guanacaste, Macizo Miravalles, Estación Cabro Muco, 1100 m, 10.718333°N, 85.144722°W, 27.Jun-2.Jul.2003, B. Hernández; Tp. de Luz; #74526; Voucher INB0003743250; 1♀, Prov. Guanacaste, Estac. Pitilla, 9 km S. Santa Cecilia, 700 m, 10.992609°N, 85.429477°W, 27.Jan-4.Feb.1989, GNP Biod. Survey; Voucher INBIOCRI000024551; 1♀, Prov. Guanacaste, Derrumbe, Estac. Mengo, W. side Volcán Cacao, 1400 m, 10.933732°N, 85.461289°W, 11.Jul.1988, *leg.* D.H. Janzen & W. Hallwachs; Voucher INB0003448550; 2♂, Prov. Cartago, P.N. Tapantí, 1515m, 09°42.118 N, 83°46.553 W, 9.May.2010,



Figures 5-7. Adults of *Leocephaluncus* **n. gen**. **5a, b** *Leocephaluncus elianahenrichae* Espinoza, **n. sp**., male holotype, voucher INB0004264094, Costa Rica. **6a, b** *Leocephaluncus rafaelangelespinozai* Espinoza, **n. sp.**, male holotype, Venezuela, Aragua, Rancho Grande, 1100 m, 1-5 Jul 1981, J. Heppner *leg.*, cloud forest. **7a, b** *Leocephaluncus boliviensis* Laguerre, **n. sp.**, male holotype, Bolivia, Cochabamba, Road Cochabamba - Villa Tunari, PK 87, 2000 m, 15 Feb 1997, M. Laguerre *leg*. **a**, dorsal view; **b**, ventral view.

leg. M. Laguerre; one sequenced, ref. MILA1814/ARCTD689-12; BIN = AAN8905; one dissected, ref. Gen. ML2059; 1♂, Prov. Cartago, P. N. Tapantí, 1632m, 09°41.348 N, 83°46.584 W, 8.May.2010, *leg.* M. Laguerre; In MLC. Paratypes deposited in the MNCR-A collection except the last three males deposited in MLC.

Supplementary material examined: 1♂, PANAMA, Prov. Chiriquí, Ojo de Agua, 1600 m, 25-31.Apr.1981, *leg.* C. Moinier; Dissected; Reference Gen. ML2218 in MNHN.

Diagnosis. This species is readily recognized by having the basal sternite orange-yellow, in combination with the two lateral, short horns with rounded tips present on the uncus, which is also triangular on its distal portion in lateral view.

Description. Adult male (Figs 5a, b). A description of the male is provided above in the generic description. Distinctive characteristics of *L. elianahenrichae* n. sp. are as follow: *WINGS*: Forewing length averaging 31.2 mm, (n=11); ground color brown, wing slightly setose on its base and toward the posterior margin; venation strongly marked, dark brown with some blue iridescence on anal, cubital, medial and radial veins. Hindwing ground color brown, slightly pale towards the base; venation marked, less strong than in forewing, costal margin slightly lobed in median area. *ABDOMEN*: tergite 1 orange-yellow. *GENITALIA* (Figs 9a-d): uncus wide dorsally and square basally, pointed distally and acute at tip, densely covered with short and straight hair and with two short, robust and lobed horn-shaped processed that arise laterally; distal half of uncus short and triangular in lateral view.

Adult female. Markings as in male, antennae with shorter pectinations, female noticeably larger than male; abdomen more robust and terga 2 to 7 with large subdorsal orange-yellow patches, ventrally dark brown. Forewing length averaging 35.4 mm (n = 7). *GENITALIA* (Fig. 10): Papillae anales flattened in ventral view and rectangular in lateral view; anterior apophysis ¾ length of

posterior apophysis; ostium simple and membranous, ductus bursae slightly sclerotized, broad and compressed dorsoventrally; corpus bursae membranous, elongated and completely covered with tiny spines pointing internally; accessory bursae simple, elongate and membranous.

Etymology. *Leocephaluncus elianahenrichae* n. sp. is named in honor of Ms. Eliana Henrich of California in recognition of her and her mother's critical support for understanding the taxonomy and biodiversity development of Área de Conservación Guanacaste(ACG) in northwestern Costa Rica, where this species has been found by the ACG caterpillar inventory (Janzen *et al.*, 2009).

Distribution and biology. *Leocephaluncus elianahenrichae* n. sp. is frequent in Costa Rica at higher elevations; the specimens collected come from the northwest and the central part of Costa Rica, namely Cordillera de Guanacaste and Cordillera de Talamanca, at 700 to 1750 m elevation. A total of 19 caterpillars have been found by the inventory of the caterpillars of Área de Conservación Guanacaste (Janzen *et al.,* 2009), all feeding on *Elaeagia auriculata* (Rubiaceae), and one survived to adult (female, voucher: 10-SRNP-5240, Sector Rincón Rain Forest, Sendero Albergue Crater, 980 m, eclosed 16 September 2010). The caterpillar (Fig. 13) is black, with dense short hairs, and with a red head (voucher: 05-SRNP-30617) (more images and details on the information of this species at http://janzen.sas.upenn.edu/caterpillars/database.lasso).

Leocephaluncus rafaelangelespinozai Espinoza, **new sp.**
Figures 6a-b, 8a-b, 11a-d

Holotype. ♂: VENEZUELA: Edo. Aragua, Rancho Grande, 1100 m., 1-5. Jul.1981, 10°20'58" N 67°41'04" W, *leg.* J. Heppner, cloud forest. Deposited USNM.

Paratypes. VENEZUELA: 1♂, Same locality as the holotype, 26-30. Jun.1981, *leg.* J. Heppner, cloud forest; 1♂, same locality as the holotype, 30-31.May.1988, UV light, *leg.* M. Epstein. (USNM). ECUADOR: 1♂, Zamora, 6, 93, Dognin Collection. (USNM). 1♂, VENEZUELA, Edo. Aragua, surroundings of Choroní, 1250 m, Dec.1980-Mar.1981, *leg.* G. Bonnefoy. Dissected reference Gen. ML2219. (MNHN). 1♂, PERU, San Martín, Road Olmos - Tarapoto, PK 386, 1700 m, 10-12.Jan.1980, *leg.* T. Porion. Dissected reference Gen. ML2217. (MNHN).

Diagnosis. This species is recognized by having its basal sternite orange-yellow, in combination with an elongate uncus, which is also slightly wider dorsally, acute distally and densely covered with short hairs.

Description. Adult male (Figs 6a, b). *HEAD*: small head and large eyes, antenna bipectinate, almost 3/4 of wing length; vertex of head creamy-white, frons dark brown, labial palpi dark brown, wide, very long, barely reaching base of antenna and with third segment very short and narrow, proboscis well developed. *THORAX*: densely setose, dark brown anteriorly and brown posteriorly, yellow-orange ventrally, patagium dark brown, tegulae dark brown basally and brown distally. *LEGS*: brown, coxae very setose, middle and posterior legs with long spurs on tibias. *WINGS*: Forewing length averaging 31.05 mm, (n = 04); brown color, slightly setose on its base and to posterior margin, venation strongly marked with dark brown. Hindwing brown ground color, very slightly paler towards base on area of discal cell, venation very slightly marked, costal margin slightly lobed in medial area. *ABDOMEN*: (Figs 8a, b) dark brown ground color, segments 1 to 3 hairy dorsally, segment 1 orange-yellow dorsolaterally, segments 2 to 8 with large subdorsal orange-yellow patches, ventrally dark brown. *GENITALIA* (Figs 11a-d): Strongly sclerotized; uncus elongated, slightly wider dorsally on its base, acute distally and densely covered with short and straight hair. Valve elongated, very wide basally, acute and slanting upward dorsally which curves inward medially and costal margin lobed in middle. Juxta sclerotized, elongated, convexe and bifurcated at base. Transtilla sclerotized, narrow at base and extending dorsally above aedeagus. Aedeagus elongate; vesica simple and membranous, elongate and arising on right side in dorsal view, with one very well defined lobe distally and a small irregular patch of short and thick spines.

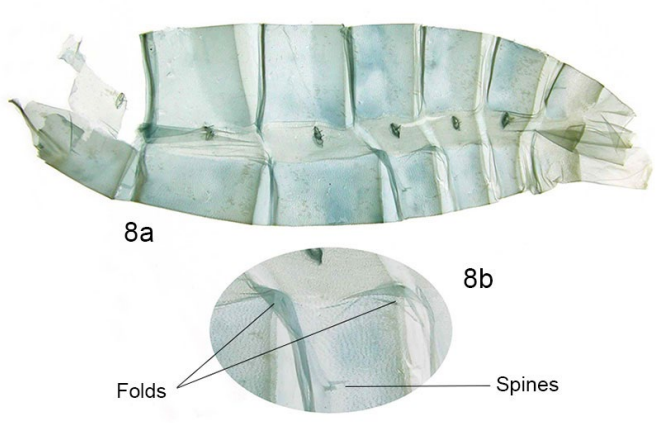


Figure 8. Abdomen of *Leocephaluncus rafaelangelespinozai* Espinoza, **n. sp.**, male paratype, Venezuela, Aragua, Rancho Grande, 1100 m, 26-30 Jun 1981, J. Heppner *leg.*, cloud forest. **8a**, abdomen in lateral view. **8b**, detail of 3rd and 4th sterna showing folds at the junction of 3-4 and 4-5 sterna and tiny ventro-lateral spines on the 4th sternum.

Female. Unknown.

Etymology. The species name is in honor of Rafael Angel Espinoza Espinoza, father of the first author, who was always an inspirational example in life to his whole family, in times when he had to face many hard moments in his health, which was something that he did with courage and bravery even when he felt he had no more energy.

Distribution and biology. This species has been collected only in Venezuela, Aragua, Rancho Grande at 1100 m elevation in cloud forest, in Ecuador, Zamora, and in northern Perú. No natural history information has been recorded.

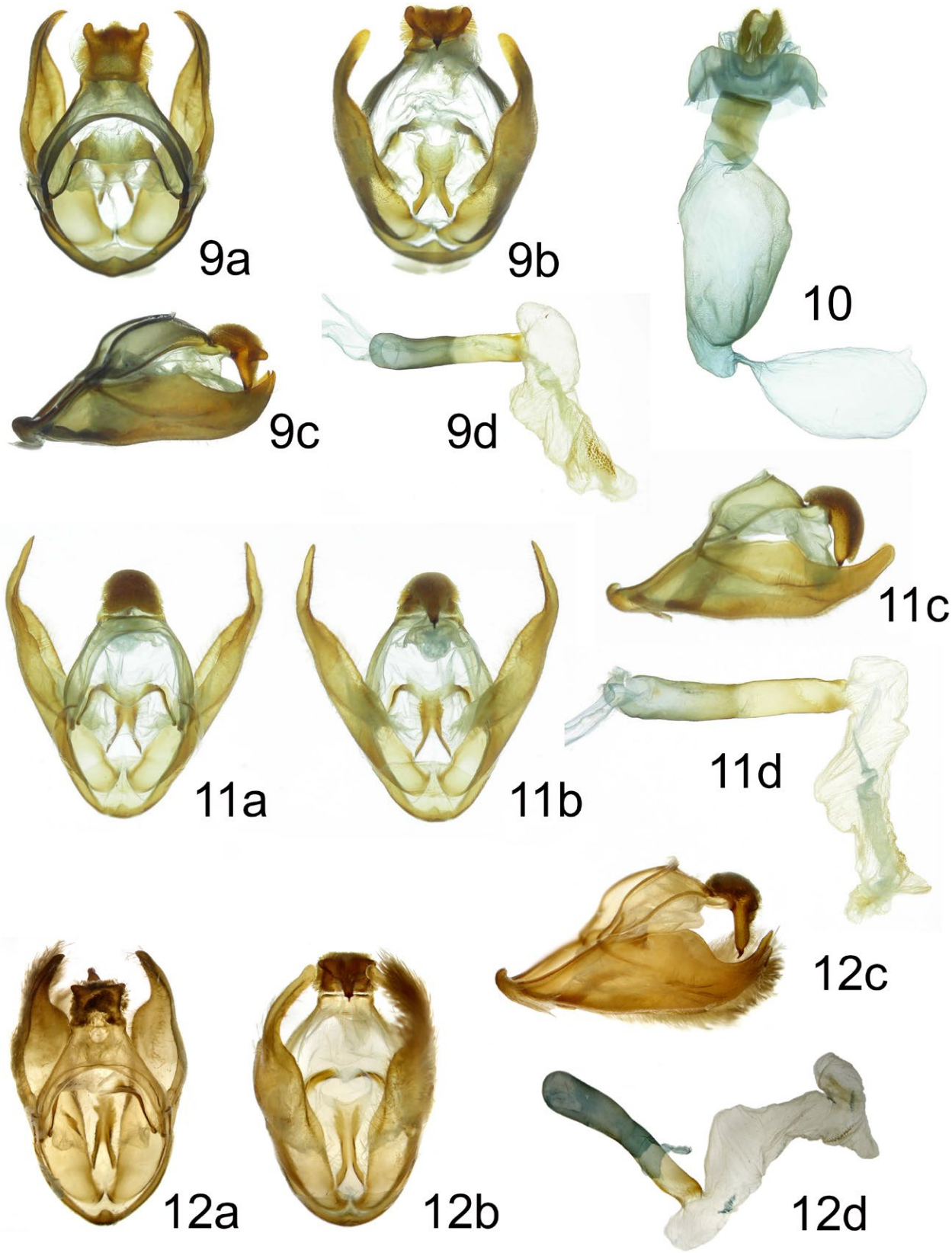
Leocephaluncus boliviensis Laguerre, **new sp.**
Figures 7a-b, 12a-d

Holotype. 1♂, BOLIVIA: Road Cochabamba - Villa Tunari (Cochabamba), PK 87, 2000 m, 15.Feb.1997, 17°12'10" S 65°49'13" W, *leg.* M. Laguerre, Dissected reference Gen. ML2246. Deposited MNHN.

Paratypes. BOLIVIA: 4♂, Road Cochabamba - Villa Tunari (Cochabamba), PK 111, 1500 m, 29.Jan.1997, *leg.* M. Laguerre. One has been dissected, reference Gen. ML449. (MLC)

Diagnosis. This species is recognized by having its basal sternite orange-yellow, in combination with an elongate uncus, which is also slightly wide dorsally, acute distally, with two short triangular projections arising laterally and densely covered with short straight hair; distal half of uncus very long and pointed.

Description. Adult male (Figs 7a, b). *HEAD*: small head and large eyes, antenna bipectinate, almost 3/4 wing length; vertex of head creamy-white, frons dark brown, labial palpi dark brown, wide, very long, barely reaching base of antenna and with third segment very short and narrow, proboscis well developed. *THORAX*: densely setose, dark brown anteriorly and brown posteriorly, yellow-orange ventrally, patagium dark brown, tegulae dark brown basally and brown distally. *LEGS*: brown, coxae setose, middle and posterior legs with long spurs on tibias. *WINGS*: Forewing length averaging 26-29 mm (n = 05). Drab-brown, slightly setose on base and to posterior margin, venation not contrasting; hindwings brown, slightly paler with a greyish tinge in median and anal part, venation brown not contrasting, apex slightly protruded. *ABDOMEN*: dark brown, segments 1 to 3 hairy dorsally, segment 1 orange-yellow dorsolaterally, segments 2 to 8 with large subdorsal orange-yellow patches, ventrally dark brown. *GENITALIA* (Figs 12a-d): Strongly sclerotized; uncus elongate, slightly wide basally, with two short triangular projections arising



Figures 9-12. Genitalia of *Leocephaluncus.* **9a-d** *L. elianahenrichae* Espinoza, **n. sp**., male paratype, INB0004264141, Costa Rica. **10** *L. elianahenrichae* Espinoza **n. sp.**, female genitalia in ventral view, paratype, INB0004147406, Costa Rica. **11a-d** *L. rafaelangelespinozai* Espinoza, **n. sp.**, male paratype, Venezuela, Aragua, Rancho Grande, 1100 m, 26-30 Jun 1981, J. Heppner *leg.*, cloud forest. **12a-d** *L. boliviensis* Laguerre, **n. sp.**, male holotype, Bolivia, Cochabamba, Road Cochabamba - Villa Tunari, PK 87, 2000 m, 15 Feb 1997, M. Laguerre *leg.* **a** dorsal view of genital capsule. **b** ventral view of genital capsule. **c** lateral view of genital capsule. **d**, dorsal view of aedeagus.

laterally and densely covered with short and straight hair dorsally, acute distally and with a pointed tip; distal half of uncus elongate-shaped in lateral view. Valve elongate, very wide basally, acute distally and slanting upward dorsally which curves inward medially and costal margin lobulate in middle. Juxta sclerotized, elongated, convexe and bifurcated at base. Transtilla sclerotized, narrow at base and extending dorsally above aedeagus. Aedeagus elongate; vesica simple and membranous, elongate and arising on right side in dorsal view, with a small irregular patch of short and thick spines distally.

Female. Unknown.

Etymology. This species is named for the country where it is known to occur.

Distribution and biology. This species has been collected only in Bolivia, Chaparé between 1500 and 2000 m. No natural history information has been recorded.

DISCUSSION

As with many other genera in the Arctiinae, the taxonomy of *Pseudapistosia* is confused and has not been carefully reviewed and characterized in the past. Apart from the original descriptions, limited data and illustrations of *P. leucocorypha* female and *P. gigas* male were given by Watson (1973) and Watson & Goodger (1986). Prior to that, and as indicated above in the introduction, the species generally identified as *Pseudapistosia* were not carefully studied. All specimens collected in recent times in different countries were wrongly identified as one of the *Pseudapistosia* species already described, based on the adult morphology and following mainly the works of Hampson (1901), Druce (1884) and Watson & Goodger (1986).

The new evidence from DNA barcodes confirms that this group of superficially similar species actually constitutes two generic-level clades (Fig. 2); that containing *P. umber* is *Pseudapistosia* and that in which the three new species described here are contained is *Leocephaluncus* n. gen.

Both genera differ strongly in their genitalia and can be easily distinguished by dissection. The male genitalia of all species of *Leocephaluncus* n. gen. are very homogeneous and not very complex in shape, and have strongly sclerotized structures, the uncus is densely pilose and the valvae are elongate and sharply pointed at the tip. In contrast, in *Pseudapistosia* the male genitalia have very sclerotized structures that are strongly ornamented, particularly in the shape of the valvae (Figs 4a-d). Besides the above characters, and no less important, *Pseudapistosia* males have coremata and long and membranous lobes that arise basally on the outer surface of valvae, which are elongate and can be rounded or pointed at the tip.

Leocephaluncus n. gen. also has tiny ventro-lateral spines on the basal half of sternum 4, as well as small lateral folds at the juncture of sternites 3-4 and 4-5 (Fig 8), which are present in both *L. elianahenrichae* n. sp. and on *L. rafaelangelespinozai* n. sp., although it seems that these structures are not present in *L. boliviensis* n. sp.

Based on the characters discussed above, *P. gigas* and the similar species from Panama are correctly classified within *Pseudapistosia*, but it is also necessary to transfer *Elysius chimaera* (Druce, 1893) to *Pseudapistosia*. The following taxonomic changes are therefore made:

Pseudapistosia gigas (Dognin, 1890), **rev. stat.**
Opharus gigas Dognin (1890: 176)

Pseudapistosia chimaera (Druce, 1893), **new comb.**
Phaegoptera chimaera Druce (1893: 288)

We transfer *P. leucocorypha* (Dognin, 1914) from *Pseudapistosia* and place it in the new genus described here with the three new species from Costa Rica, Venezuela, Peru and Bolivia, as follows:

Leocephaluncus leucocorypha (Dognin, 1914) **new comb.**
Calidota leucocorypha Dognin (1914: 18).

Finally, our results also suggest that *P. similis* described from Bolivia by Hampson (1901) could be a synonym of *P. umber* described from Surinam by Cramer ([1776]). Unfortunately, we have not examined the holotype of *P. similis*, making it difficult to test this hypothesis. More information on *Pseudapistosia* will be necessary to have a better understanding of that genus.

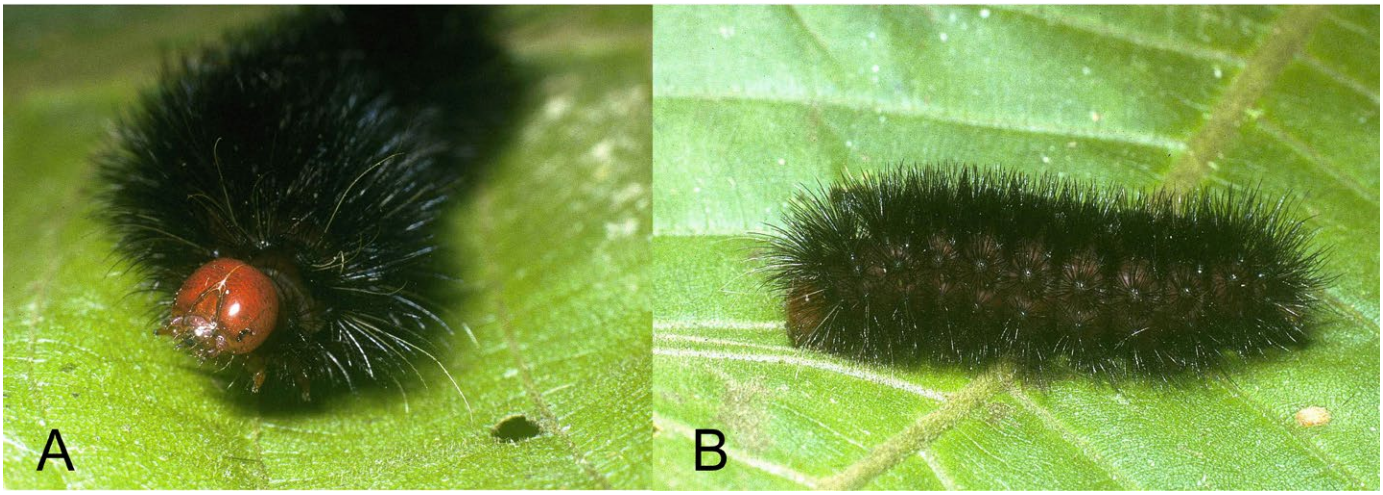


Figure 13. Caterpillar of *Leocephaluncus elianahenrichae* Espinoza, **n. sp.**, last instar, voucher 05-SRNP-30617. **A** Magnified view of the head. **B** Lateral view of larval body.

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