

# Some new Saturniidae species from Peru (Lepidoptera)

Stefan NAUMANN, Ulrich BROSCH, & Bernhard WENZEL  
[with contributions by Frank MEISTER and Ronald BRECHLIN]

**Abstract:** One species of the subfamily SATURNIINAE BOISDUVAL 1837 (“1834”) and 18 species of the subfamily HEMILEUCINAE GROTE & ROBINSON, 1866 from Peru are described as new and figured in colour. The taxa are members of the genera *Copaxa* WALKER, 1855, *Lonomia* WALKER, 1855, *Periga* WALKER, 1855, *Hylesia* HÜBNER, 1820 (“1816”), *Molippa* WALKER, 1855, *Gamelia* HÜBNER, 1819 (“1816”), *Automerina* Michener, 1949, *Automeris* HÜBNER, 1819 (“1816”), *Pseudautomeris* LEMAIRE, 1967, *Cerodirphia* Michener, 1949, and *Dirphia* HÜBNER, 1819 (“1816”). Males of all species and females if known so far plus micropreparation scans of all genitalia structures are figured, the differences of the new taxa to already known species are discussed. For some species the preimaginal instars are known, those are figured here as well. All holotypes and allotypes will be deposited in the collections of the Naturkunde-Museum der Humboldt-Universität in Berlin.

**Resumen:** Una especie de la subfamilia SATURNIINAE BOISDUVAL 1837 (“1834”) y 18 especies de la subfamilia HEMILEUCINAE GROTE & ROBINSON, 1866 de Perú se describen como nuevas, con ilustraciones en color. Los taxones provienen de los géneros *Copaxa* WALKER, 1855, *Lonomia* WALKER, 1855, *Periga* WALKER, 1855, *Hylesia* HÜBNER, 1820 (“1816”), *Molippa* WALKER, 1855, *Gamelia* HÜBNER, 1819 (“1816”), *Automerina* Michener, 1949, *Automeris* HÜBNER, 1819 (“1816”), *Pseudautomeris* LEMAIRE, 1967, *Cerodirphia* Michener, 1949, así como *Dirphia* HÜBNER, 1819 (“1816”). El artículo incluye ilustraciones de los machos y, siempre y cuando sean conocidas, de las hembras para todas las especies, así como los escaneos de las preparaciones de todas las estructuras genitales. Asimismo, se realiza un extenso diagnóstico diferencial para la delimitación de especies emparentadas. En el caso de algunas especies, se han podido observar estados preimaginales, cuyas ilustraciones se incluyen igualmente. Todos los holotipos y alotipos serán incorporados a la colección del Naturkunde-Museum der Humboldt-Universität de Berlín.

**Zusammenfassung:** Eine Art aus der Subfamilie SATURNIINAE BOISDUVAL 1837 ("1834") sowie 18 Arten der Subfamilie HEMILEUCINAE GROTE & ROBINSON, 1866 aus Peru werden als neu beschrieben und farbig abgebildet. Die Taxa stammen aus den Gattungen *Copaxa* WALKER, 1855, *Lonomia* WALKER, 1855, *Periga* WALKER, 1855, *Hylesia* HÜBNER, 1820 ("1816"), *Molippa* WALKER, 1855, *Gamelia* HÜBNER, 1819 ("1816"), *Automerina* Michener, 1949, *Automeris* HÜBNER, 1819 ("1816"), *Pseudautomeris* LEMAIRE, 1967, *Cerodirphia* Michener, 1949, sowie *Dirphia* HÜBNER, 1819 ("1816"). Männchen und, sofern bekannt, Weibchen aller Arten werden abgebildet, es werden Präparatescans sämtlicher Genitalstrukturen gezeigt, und es erfolgt eine ausführliche Differentialdiagnose zur Abgrenzung verwandter Arten. Von einigen Arten konnten Präimaginalstadien beobachtet werden, diese werden hier ebenfalls abgebildet. Sämtliche Holotypen und Allotypen werden in die Sammlung des Naturkunde-Museums der Humboldt-Universität zu Berlin gelangen.

**Key words:** Lepidoptera, Saturniidae, Saturniinae, Hemileucinae, Peru, *Copaxa*, *Lonomia*, *Periga*, *Hylesia*, *Molippa*, *Gamelia*, *Automerina*, *Automeris*, *Pseudautomeris*, *Cerodirphia*, *Dirphia*, new species.

## Introduction

During last few years a lot of interesting Saturniidae material was collected in Peru and came into the hands of the authors. While part of the material first was obtained from commercial collectors, the great majority was found during own expeditions by one of the authors (B. W.) and partly of Eric van Schayck, together with José Boettger from Oxapampa, Peru. Lifestock of many species was and still is obtained, and for some genera representatives were reared for even the first time under laboratory conditions. As in several cases some unclear taxa appeared, a group of European entomologists plans to work on the endless amount of those specimens to at least clarify their taxonomy and publish some information on the life cycles. Before 2002, part of the authors (S. N. and U. B.) had an agreement with the late Claude Lemaire that there will be no publications by themselves on the subfamily Hemileucinae before his long time announced revision was published. That was first to avoid that anything was described parallel and one would create a synonym, therefore to show our respect in not disturbing a current work, and second, to get a better overview about all taxa described so far. Although the famous three parts of his volume (LEMAIRE 2002) enabled us to gather lots of more information, mainly by using the

wonderful colour plates and the complete presentation of genera, there remains some criticism which made it not much easier after publication of his huge work to use all his conveyed knowledge.

In his work, LEMAIRE (1978: 164 and several other cases; 1996: 62; 2002 with many cases; same procedure in his other revisional works) designates several lectotypes and mentions for those specimens to be “lost”, “probably lost” or “probably destroyed” [During our work in several museum collections we so far located lots of those specimens which were indicated to be lost by Lemaire; type catalogues are in preparation]. This makes work for future taxonomist not only even harder because of absence of name-bearing type specimens, it is a contradiction to the sense of a lectotype in itself which after the regulations of the Code (ICZN 1999; 2000) should be designated in order to preserve stability of nomenclature, and therefore should be proved upon validity of those taxonomic acts (compare ICZN 1999: article 74). A not existing type specimen cannot bring stability into taxonomy, in worst cases future workers have again to use inaccurate figures from very old literature where such specimens were described by a sometimes coloured drawing. E.g. for the two superficially very similar taxa *Automerina cypria* (GMELIN, 1790) and *A. vala* (KIRBY, 1871) no types exist, but LEMAIRE (1974) designated lost lectotypes for which now exist only uncertain figures in the old literature; it remains unclear if Lemaire was right with his interpretation of those taxa. Same happened with the type specimens of *Pseudautomeris salmonea* (CRAMER, 1777) and its tentatively with it classified synonyms which makes it impossible to work taxonomically on this taxon and related species. Several other similar cases were found within the work of 2002. A further problem are genitalia descriptions and figures which refer not to a certain specimen; especially in problematic species it would have made sense to give a genitalia number and the origin data of the dissected specimen (see also discussion under *Pseudautomeris* in this volume).

Generally we found the revision by LEMAIRE (2002) to be a useful accumulation of information but that in all cases it will be necessary to study the original publications of taxa and to try to find missing or “lost” type specimens in not consulted museum collections to deliver a completed work.

Not much was published so far on the Saturniidae fauna of Peru; despite the work of Claude LEMAIRE, who generally worked on the nearctic and neotropical fauna with single descriptions or subfamilial revisions, there were few faunal papers printed. There are e.g. LAMAS (1997) for the

Cordillera del Cóndor, LAMAS & GRADOS (2001a; 2001b) for the Northern Cordillera de Vilcabamba, or, only recently, a publication by L. & T. RACHELI (2005) on the Saturniidae from Oliva, Muyo, Amazonas Department.

This present paper is the first article in a planned series on the Saturniidae fauna from Peru; a second one on the genus *Rothschildia* GROTE, 1897 is published in the same volume. Further papers with further descriptions of life histories and new species are almost finished and in preparation.

## Abbreviations

CBH – Collection Brosch, Hille, Germany.

CBWK – Collection of Bernhard Wenzel, Kloten, Switzerland.

CCLL – Collection of Dr. Claude Lemaire, Gordes, France, deposited in Muséum d'Histoire naturelle de Lyon, France.

CCMC – Collection of Carlos G.C. Mielke, Carambei, Paraná, Brasil.

CESB – Collection of Eric van Schayck, Bochum, Germany.

CFMP – Collection of Frank Meister, Prenzlau, Germany.

CKWE – Collection of Kirby Wolfe, Escondido, USA.

CRBP – Collection of Dr. Ronald Brechlin, Pasewalk, Germany.

CSNB – Collection of Dr. Stefan Naumann, Berlin, Germany.

CUWA – Collection of Ulrich Weritz, Adenbüttel, Germany

CWAN – Collection of Dr. Wolfgang A. Nässig, deposited in Senckenberg-Museum, Frankfurt am Main, Germany.

MHNL – Museum d'Histoire de naturelle de Lyon, France

SMFL – Senckenberg-Museum, Frankfurt am Main, Germany.

ZMHU – Museum für Naturkunde der Humboldt-Universität zu Berlin, Germany.

## Descriptions

***Copaxa wolfei* MEISTER, NAUMANN, BROSCH, & WENCZEL in NAUMANN, BROSCH, & WENCZEL, new species**

Holotype (Fig. 1 dorsal, fig. 2 ventral): ♂, Peru, Junin province, Calabaza, 2000 m, V 1999, ex CSNB. The holotype will be deposited in the collections of ZMHU Berlin.

Paratypes: 16 ♂♂ with following data: <http://www.biologiezentrum.at>

2 ♂♂, same data as holotype, genitalia no. 715/02 Naumann (CBWK); 3 ♂♂, same data as holotype, genitalia no. 35/01 Meister (CFMP); 2 ♂♂, same data as holotype, ex CBWK (CSNB; one of those will be given to Kirby Wolfe, Escondido); 2 ♂♂, same data as holotype, genitalia no. CBH-0234, ex CBWK (CBH); 1 ♂, same locality, but 14.VII.2001, leg. Bernhard Wenzel & J. Boettger (SMFL); 1 ♂, same data, genitalia no. CBH-0261 (CUWA); 1 ♂, Peru, Pasco province, Oxapampa env., La Suiza, 10°37'1S/075°30'0W GPS, 2180 m, 18.VII.2001, leg. B. Wenzel (CBWK); 1 ♂, same data, genitalia no. 774/01 Naumann, ex CBWK (CSNB); 1 ♂, same locality, but 15.VII.2001, leg. B. Wenzel & J. Boettger, genitalia no. CBH-0241 (CBH); 1 ♂, same data (SMFL); 1 ♂, Peru, Cusco province, San Pedro, Manu Nationalpark, ca. 1800 m, III.1997, received from W. Braun, genitalia no. 773/02 Naumann (CSNB).

Derivatio nominis: The new species is dedicated to our friend Kirby L. Wolfe from Escondido, California, USA, in recognition of his intensive studies on the genus *Copaxa*.

## Description

♂ (Fig. 1 dorsal, fig. 2 ventral): Antennae ochreous to orange brown, 9–13 mm long ( $\bar{O} = 11.4$  mm,  $n = 7$ ; holotype 11.5 mm), quadripectinate with around 27 segments, longest rami 2.0 mm long ( $\bar{O} = 1.9$  mm,  $n = 7$ ). The ground colour of the species is somewhat variable, from olive brown (holotype) to dark olive brown with reddish brown markings to orange brown, but always with the same pattern elements. Thorax with legs in ground colour, with a grey collum which is continued in the proximal half of the costa, and also the abdomen in ground colour. The length of the right forewing from basis to apex is 41 to 52 mm ( $\bar{O} = 49.6$  mm,  $n = 13$ ; holotype 52.0 mm). The wings suffused in the ground colour, only along the venation, the slight antemedian line and proximal to the postmedian line a little bit darker. Proximal to the halfmoon-like forewing ocellus which is rounded to its outer margin and slightly surrounded by yellow scales; there is a lighter, light olive to orange coloured area, bordered by the venation, apically bordered by a dark shadow. Postmedian line straight, in the apical third very near to the outer margin, the postmedian area greyish with some violet scales. The arc of basal to outer margin is nearly rectangular, the wing generally is quite narrow and ends in a backward bent apex with a small black and pink portion of scales. Hindwing in the same ground colour

as forewing, with prominent dark antemedian band which points directly to the forewing postmedian band. Ocellus very typical, almost round, small, the hyaline part 0.9 to 1.1 mm in maximum diameter ( $\varnothing = 1.0$  mm,  $n = 6$ ), bordered broadly with yellow scales. Posterior to the ocellus there is one row of small black dots, indicating a postmedian line when it crosses the veins. Underside of both fore- and hindwings typical in orange brown, with few grey scales in the area of the forewing antemedian line and quite a lot of such scales in the corresponding hindwing area and both fore- and hindwing postmedian area. On both wings also the typical small black dots at venation crosspoints, imaging a postmedian line. In the apical area of the hindwing a portion of white and black scales.

♂ genitalia (Fig. 91, genitalia no. 715/02 Naumann): Valves with a long, heavily sclerotized ventral processus and a second dorsal short one, reduced to a small tip. There are two internal lateral processi which LEMAIRE (1978: 155) classes with the transtilla. The ventral part of the juxta is strongly sclerotized, with narrow long base and two lateral symmetric processi, and thereby is different to all other near relatives such as *C. decrescens* WALKER, 1855 (Fig. 92, genitalia no. 772/02 Naumann), or *C. koenigi* LEMAIRE, 1974 (Fig. 93, genitalia no. 777/02 Naumann) which are strongly asymmetric in that part. Uncus also with long base and two lateral processi, saccus quite short. The aedeagus is 4.2 mm long, proximal with two lateral "wings", the distal half more sclerotized, the vesica emerging left ventrolateral and without any sclerites. Generally, the major part of the genitalia is most similar to *C. apollinairei* LEMAIRE, 1978 (compare LEMAIRE 1978: 163), but the aedeagus is totally different to the structures of that species.

Female and immature stages: Unknown.

Additional notes

Within the group of *Copaxa decrescens* (cf. LEMAIRE 1978) several details

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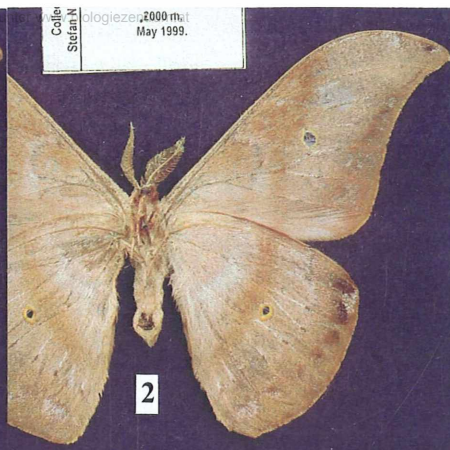
#### Colour figures:

Fig. 1: *Copaxa wolfei* ♂ holotype, dorsal view; fig. 2: same specimen, ventral view; fig. 3: *C. koenigi* ♂, Peru, Puno, coll. Naumann; fig. 4: *C. koenigi* ♀, Peru, Junin, coll. Wenczel; fig. 5: *Lonomia frankae* ♂ holotype, dorsal view; fig. 6: same specimen, ventral view.



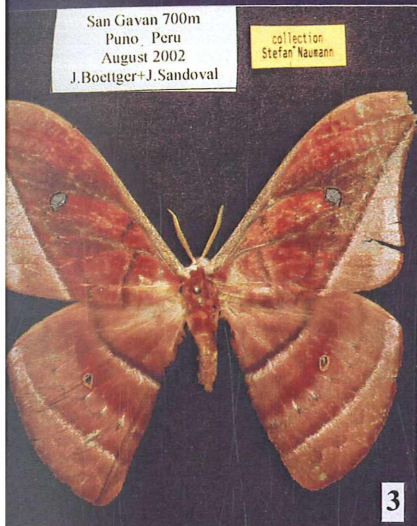
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1



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San Gavan 700m  
Puno, Peru  
August 2002  
J. Boettger+J. Sandoval

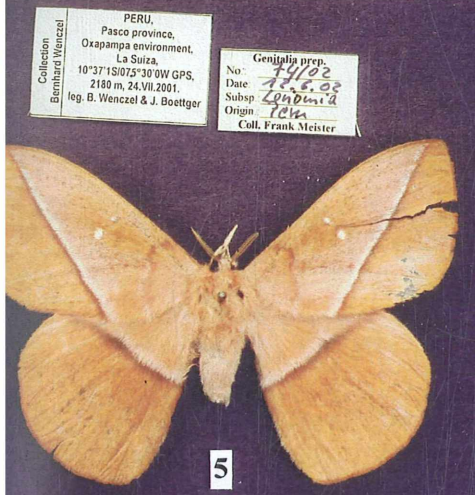
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3



PERU, May-99  
Junin prov.,  
Calabaza 2000m

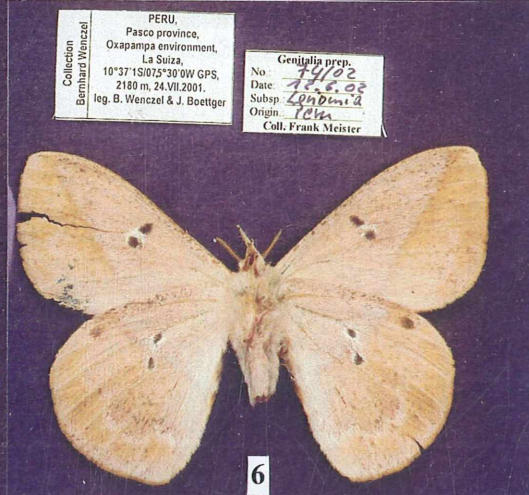
4



Collection  
Bernhard Wenzel  
PERU,  
Pasco province,  
Oxapampa environment,  
La Suiza,  
10°37'15.075" 30°00'W GPS,  
2180 m, 24.VII.2001,  
leg. B. Wenzel & J. Boettger

Genitalia prep.  
No. 74102  
Date 7.11.02  
Subsp. *Londonia*  
Origin. *ICM*  
Coll. Frank Meister

5



Collection  
Bernhard Wenzel  
PERU,  
Pasco province,  
Oxapampa environment,  
La Suiza,  
10°37'15.075" 30°00'W GPS,  
2180 m, 24.VII.2001,  
leg. B. Wenzel & J. Boettger

Genitalia prep.  
No. 74102  
Date 7.11.02  
Subsp. *Londonia*  
Origin. *ICM*  
Coll. Frank Meister

6

such as females and immature instars remain unknown, and several species probably have a small range as far as known so far from the small available type series of the *C. wolfei*. During studies of the new species we also compared a small series of typical specimens of *C. koenigi* in the collection of one of the authors (B. W.), including male genitalia morphology. All characters which were described by LEMAIRE were found in those specimens (genitalia no. 777/02 & 823/02 Naumann) which fly partly sympatric with *C. wolfei*, only new detail we found is that this species obviously is very variable in its ground colour, ranging from typical violet brown to brown olive. From the same locality there is one female in the Wenczel collection which shares all pattern elements of the males and which we interpret here as the unknown female of *C. koenigi*. It shares the same violet brown ground colour with pinkish scales with one male, but in difference to the male the hyaline ocelli are much larger and the forewing apex is nearly rectangular. Complete antennae are missing, the forewing length is 57 mm. Both the female and one of the variable coloured males are figured here as well in colour. To extend the knowledge on the range of *C. koenigi*, we hereby mention the data of the material examined (fig. 3 male, fig. 4 female, fig. 93 male genitalia, no. 777/02 Naumann):

1 ♂ 1 ♀, Peru, Junin province, Calabaza, 2000 m, V.1999, ♂ genitalia no. 777/02 Naumann (CBWK); 2 ♂♂, same locality, VI.1999 (CBWK); 1 ♂, Peru, Cuzco province, Rio Pilcap, 2800 m, 3.II.1994, genitalia no. 823/02 Naumann (CBWK); 1 ♂, Peru, Puno province, San Gavan, 700 m, VIII.2002, leg. J. Boettger & J. Sandoval (CSNB).

***Lonomia frankae* MEISTER, NAUMANN, BROSCH, & WENCZEL in NAUMANN, BROSCH, & WENCZEL, new species**

Holotype (Fig. 5 dorsal, fig. 6 ventral): ♂, Peru, Pasco province, Oxapampa environment, La Suiza, 10°37'1S/075°30'0W GPS, 2180 m, 24.VII.2001, leg. B. Wenczel & J. Boettger, genitalia no. 74/02 Meister, ex CBWK. The

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**Colour figures:**

Fig. 7: *Lonomia frankae* ♀ allotype, dorsal view; fig. 8: same specimen, ventral view; fig. 9: *Periga anitae* ♂ holotype, dorsal view; fig. 10: same specimen, ventral view; fig. 11: *P. anitae* ♀ allotype, dorsal view; fig. 12: same specimen, ventral view.





holotype will be deposited together with the allotype in the collections of ZMHU Berlin.

Allotype (Fig. 7 dorsal, fig. 8 ventral): ♀, same data as holotype, but collected mid VI.2002, ex CBWK (ZMHU).

Further paratypes: 15 ♂♂ 12 ♀♀ with following data:

3 ♀♀, same data as holotype, but 23., 25., & 26.VII.2001, leg. B. Wenczel (CBWK); 9 ♂♂ 1 ♀, same data as holotype, but 5.–13.VI.2002 (CBWK); 1 ♂, same data as allotype, genitalia no. 794/02 Naumann, ex CBH (CSNB); 1 ♀, same data as allotype (CSNB); 1 ♀, same data as allotype, but 5.–13.VI.2002 (CBH); 2 ♂♂, same data as holotype, but VI.2002, genitalia no. CBH-0238 & VI.2003 (CBH); 1 ♀, Peru, Pasco province, Oxapampa, 1800 m, IV.1999 (CBWK); 1 ♂ 1 ♀, Oxapampa, 1800 m, VII.1999, leg. Peña, male genitalia no. 75/02 Meister (CFMP); 2 ♂♂, Peru, Pasco province, Oxapampa, La Suiza, 2000–2300 m, 15.–20.VI.2004, leg. Hubert Meyer (CFMP); 1 ♀, Peru, Pasco province, Oxapampa, La Suiza, 2000–2300 m, 12.–18.VII.2004, leg. Hubert Meyer (CFMP); 1 ♀, Peru, Junin prov., Calabaza, 2000 m, V.1999 (CBWK); 1 ♀, Peru, Calabaza, Satipo, 2000 m, VI.1999 (CBWK); 1 ♀, Peru, without data, received from B. Wenczel (CFMP).

Derivatio nominis: The species is named in honour of Franka Meister, the wife of F. M., one of the authors.

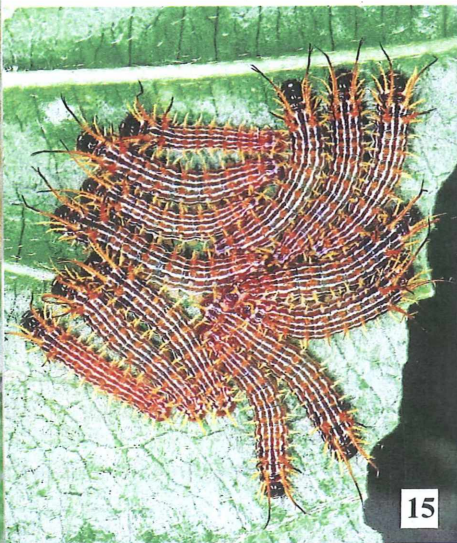
### Description

♂ (Fig. 5 dorsal, fig. 6 ventral): Ground colour ochreous, suffused with white scales in the antemedian and median area, more vivid in the postmedian area. Head, thorax and abdomen hairy, coloured in the light ground colour both on dorsal and ventral side. Antennae ochreous, bipectinate, around 29 segments, the last two or three with much or totally reduced rami, 7.0–8.5 mm long ( $\bar{\varnothing}$  = 7.4 mm, n = 12; holotype 8.5 mm). Rami bent ventrally, in maximum 0.7–0.9 mm long ( $\bar{\varnothing}$  = 0.8 mm, n = 12;

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### Colour figures:

Fig. 13 *Lonomia frankae*, larva, fifth instar; fig. 14 *Periga anitae*, larvae, first instar; fig. 15 *P. anitae*, larvae, second instar; fig. 16 *P. boettgerorum* ♂ holotype, dorsal view; fig. 17: same specimen, ventral view; fig. 18: *P. boettgerorum* ♀ allotype, dorsal view; fig. 19: same specimen, ventral view.



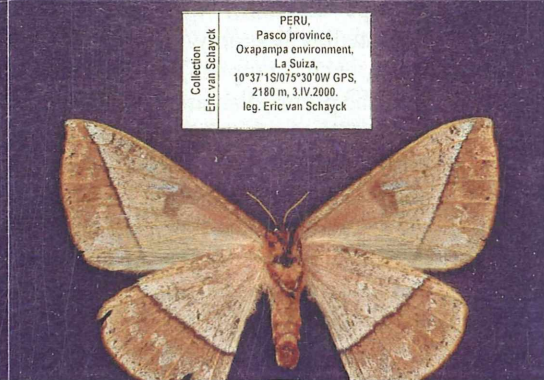
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Pasco province,  
12 km S Oxapampa,  
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early 2000

PERU,  
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12 km S Oxapampa,  
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leg. Eric van Schayck  
received from v. Schayck  
early 2000



PERU,  
Pasco province,  
Oxapampa environment,  
La Suiza,  
10°37'15S/075°30'0W GPS,  
2180 m, 3.IV.2000,  
leg. Eric van Schayck

PERU,  
Pasco province,  
Oxapampa environment,  
La Suiza,  
10°37'15S/075°30'0W GPS,  
2180 m, 3.IV.2000,  
leg. Eric van Schayck



holotype 0.8 mm). Forewing from basis to apex 38–43 mm long ( $\bar{\varnothing} = 41.5$  mm,  $n = 12$ , holotype 43 mm), with almost rounded apex. Antemedian line hinted, proximal dark, posterior white, in the centre of the median area two white dots, postmedian band distinct, consisting of broad white and slender white portion. The hindwing rounded, in same colours, but antemedian band missing, postmedian band quite near to the basis. The postmedian area suffused with some dark scales in the outer part. On the underside wings are somewhat paler, antemedian band missing, both on fore- and hindwing two black dots, surrounded by white area in the median field. Postmedian area not separated by any band but coloured more intensively. Hindwing with a subapical dot consisting of dark brown scales. Tibia and epiphysis of the legs purple.

♂ genitalia (Fig. 95; genitalia no. 74/02 Meister): Uncus helmet-like, heavily sclerotized, and like a hook covering the bilobed gnathos. Saccus large, almost squarelike and rounded, Valves rectangular with rounded tip, without any processes but heavily covered with long bristles on their outer margin, especially on ventral side. Juxta pairst, heavily sclerotized, with a small ventral tip. Aedeagus simple, proximal with small dorsal indentation, vesica round, without any processes or spines. The eighth sternite shows typical structures with sclerotized margin and one spine right and left lateral turned inwards. Tergite without any typical structures, narrow.

♀ (Fig. 7 dorsal, fig. 8 ventral): Ground colour greyish brown, suffused with white scales in the antemedian and median area, dark brown in the postmedian area. Head, thorax and abdomen hairy, coloured in the light ground colour both on dorsal and ventral side, legs brown. Antennae ochreous, fasciculate (cf. Scoble 1995: 34), around 40 segments, 7.0–8.5 mm long ( $\bar{\varnothing} = 7.7$  mm,  $n = 11$ ; allotype 8.5 mm). Rami bent ventrally, in maximum 0.7–0.8 mm long ( $\bar{\varnothing} = 0.8$  mm,  $n = 3$ ; allotype 0.8 mm). Forewing from basis to apex 51–56 mm long ( $\bar{\varnothing} = 54.2$  mm,  $n = 10$ , allotype 55 mm), with apex ending with an almost rectangular tip. Antemedian line only hinted in the costal area, postmedian band proximal white, central purplish, and posterior ending dark brown, becoming blurred with the postmedian area. There are two more or less indicated white dots in the median area. Hindwing similar coloured, antemedian band missing, postmedian band quite near to the basis. The postmedian area suffused with some dark scales. On the underside colouration almost inverse to dorsal view, area proximal to postmedian band dark brown, postmedian area brownish white and only in the outer marginal area brown. On both fore- and hindwing two black dots, surrounded by white area in the median field.

The new species easily can be separated from all other so far described species of the genus *Lonomia* WALKER, 1855 by its always very typical and stabile colour both in male and females specimens, the unique combination of genitalia structures and the typical elements on eighth sternite. It is obviously a high altitude species known only from a small area in Pasco and Puno provinces in altitudes from 1800 to 2180 m. All specimens were collected between May and July, with a peak in June; obviously there is only one generation per year.

Other species in the genus *Lonomia* are often variable in the colour but also show stabile structures in male genitalia and on eighth sternite (LEMAIRE 1972, 2002). *L. frankae* easily can be separated from *L. obliqua* WALKER, 1855 and *L. electra* DRUCE, 1886 by the missing spines on the valves and vesica of those species, and from *L. achelous* CRAMER, 1777 with which it shares the same aedeagus, by the different uncus and eighth sternite. Genitalia of *L. descimoni* LEMAIRE, 1972 are nearest, but the gnathos of that species shows more rectangular structures, the eighth sternite four spines instead of two in *L. frankae*, and *L. descimoni* is a much smaller, variable species occurring in lower elevations only. Another species described in this same supplementum by L. RACHELI also shows different details in genitalia structures.

The species was reared to last instar larvae in Switzerland by B. W (Larval instar L5, fig. 13) on *Fagus sylvatica* L. (Fagaceae) but failed to pupate successfully. The larvae live gregariously up to last instar, are of brown colour with white transversal lines with turquoise and black hardly urticating bristles.

### ***Periga anitae* NAUMANN, BROSCH, & WENCZEL, new species**

Holotype (Fig. 9 dorsal, fig. 10 ventral): ♂, Peru, Pasco province, Oxapampa environment, La Suiza, 10°37'1S 075°30'0W GPS, 2180 m, VI.2002, leg. B. Wenczel & J. Boettger, genitalia no. CBH-0245, ex CBH. The holotype will be deposited together with the allotype in the collections of ZMHU Berlin.

Allotype (Fig. 11 dorsal, fig. 12 ventral): ♀, Peru, Pasco province, Oxapampa environment, high altitude humid forest, high altitude humid

forest, 2511 m, 10°38'15.1''S 75°17'14.2''W, VI. 2002, leg. B. Wenczel & J. Boettger, ex CBH (ZMHU).

Further paratypes: 35 ♂♂ 15 ♀♀ with following data:

1 ♂, same data as holotype (CBH); 9 ♂♂ 4 ♀♀, same data as holotype, 5.–13.VI.2002 (CBWK); 2 ♂♂ 1 ♀, same data (CWAN > SMFL); 1 ♂, same locality, 10.VI.1999, leg. I. Calleghari (CBWK); 1 ♂ 1 ♀, same locality, ♂ 23.VII.2001, ♀ 27.VII.2001, leg. B. Wenczel (CBWK); 1 ♂, Peru, Pasco province, Oxapampa env., high altitude humid forest, 10°37'12.1''S 75°17'22.2''W, 2412 m, 5.–18.IV.2002, leg. B. Wenczel & J. Boettger (CBWK); 1 ♂, same data, genitalia no. 718/02 Naumann, ex CBWK (CSNB); 1 ♂, same data, genitalia no. CBH-0214 (CBH); 3 ♀♀, same data as allotype (CSNB); 1 ♂ 3 ♀♀, same data as allotype (CBH); 3 ♂♂ 1 ♀, same locality as allotype, 5.–18.IV.2002 (CBWK); 1 ♂ 1 ♀, same locality as allotype, 5.–13.VI.2002 (CBWK); 3 ♂♂, same locality as allotype, VI.2002 (CESB); 1 ♀, same data as holotype, 5.–13.VI.2002, leg. B. Wenczel (CFMP); 1 ♂, same data as allotype, 5.–13.VI.2002 (CBWK); 1 ♂, Peru, Junin province, Calabaza, 2000 m, 9.IV.1998, leg. I. Calleghari (CBWK); 1 ♂, same locality, V.1999, genitalia no. 719/02 Naumann, ex CBWK (CSNB); 1 ♂, same locality, 2300 m, 9.IV.1998, genitalia no. CBH-0218, ex CBWK (CBH); 1 ♂, same locality as allotype, 21.IV.–1.V.2003, leg. B. Wenczel (CSNB); 2 ♂♂, same locality as allotype, IV.2003 (CBH); 1 ♂, same locality as holotype, 25.&26.IV.2003, leg. B. Wenczel & J. Boettger, genitalia no. CBH-0367 (CBH); 1 ♂, same locality as holotype, X.2003, leg. B. Wenczel (CSNB); 1 ♂, same locality as allotype, IV.2003, received from B. Wenczel (CSNB).

Derivatio nominis: *Periga anitae* is dedicated to Anita Brosch, the wife of U. B., in recognition of her neverending sustaining work for the Saturniidae study at Hille-West.

## Description

♂ (Fig. 9 dorsal, fig. 10 ventral): Ground colour a little variable, a light ochreous to greyish brown; head, thorax and legs generally more greyish. Antennae bipectinate, around 34 segments, the last 5 to 8 with much or totally reduced rami, 7.0–8.0 mm long ( $\bar{\varnothing}$  = 7.1 mm, n = 24; holotype 7.8 mm). Rami bent ventrally, in maximum 0.85–1.35 mm long ( $\bar{\varnothing}$  = 1.1 mm, n = 7; holotype 1.3 mm), greyish brown. Forewings from basis to apex 27–31 mm long ( $\bar{\varnothing}$  = 28.8 mm, n = 24; holotype 28.5 mm), antemedian and

median area fused, ochreous with darker scales, and only in the costa and in front of the straight postmedian line more greyish. There are two greyish white dots, surrounded by dark brown scales which are of the same colour as the postmedian line. Postmedian area ochreous in the proximal half, marginal part much darker and separated by several ochreous patches. Outer margin rounded. The hindwing is of same colours, antemedian line totally reduced, postmedian line more basally and broader than on forewing, outer part of postmedian area clear unicoloured brown, separated by yellow patches from darker rest, and the internal angle bent outward like a small tip, which is also found in some other species of the genus, e.g. in *P. galbinimaculata* (LEMAIRE, 1972). The undersides nearly similar, somewhat lighter, and the forewing dots reduced to a single brown dot which is also found on the hindwing.

♂ genitalia (Fig. 96, genitalia no. CBH-0245; fig. 99, genitalia no. 719/02 Naumann): Uncus triangular with a rounded hook dorsally. Gnathos indented centrally, with lateral tips in dorsal direction with small tufts. Saccus rounded, nearly triangular, valves almost rectangular with rounded tip, bordered ventrally and distally with long hair. Juxta square with two small lateral tips. Aedeagus ending with a heavy sclerotized cone left ventrolaterally, vesica without any cornuti emerging on right dorsolateral side.

♀ (Fig. 11 dorsal, fig. 12 ventral): There is much sexual dimorphism in the species: All females are of grey instead ochreous groundcolour and much bigger than males, but otherwise pattern is quite similar. Antennae without any rami, fasciculate but with white and brown scales situated on the dorsal half, 6.0–7.2 mm long ( $\bar{\varnothing}$  = 6.9mm, n = 12; allotype without complete antenna) and of around 40 segments. Forewings from basis to apex 34.0–40.0 mm ( $\bar{\varnothing}$  = 37.5 mm, n = 13; allotype 40.0 mm), apically with a small tip bent outward. All pattern elements of the males in dark grey, the ochreous elements of the males are of very light grey in the females. This is also found on the ventral side of the wings.

#### Additional notes

The species probably is nearest related to *P. galbinimaculata* in the genus, as there are similar pattern elements and hindwing form with this species; these are the light patches in the postmedian areas and the small tip of the hindwing which is bent to the inner margin similar to the African genus *Carnegia* HOLLAND, 1896, plus some overall similarities in the aedeagus of the male genitalia with missing cornuti on the vesica. Nevertheless, both

species have totally different form of wings, with being much more rounded in *P. anitae* compared to the slender ones in *P. galbinimaculata*. *P. anitae* shares also pattern characters with the recently described *P. kindli* LEMAIRE, 2002 from French Guyana, *P. herbini* LEMAIRE, 2002 and *P. extensiva* LEMAIRE, 2002 from Ecuador, and *P. intensiva* LEMAIRE, 2002 from Colombia but from all those it easily can be separated by the different male genitalia structures.

Observed flight times for *P. anitae* were early evening for the males and between 8.00 and 10.00h p.m. for the females.

Attempts to rear that species in all instars failed so far. Larvae hatching from imported ova in Switzerland were offered a wide range of foodplants, they finally accepted *Cornus mas* L. and *C. sanguinea* L. (Cornaceae). They were sitting in large groups on the underside of leaves. In first instar larvae (Fig. 14) are purplish brown with white lateral stripes and brown head, thoracal scoli of thoracal segments Th2 & 3 are much elongated and prolonged anteriorly, on abdominal segment A8 there is a fused central scoli. Pattern is similar in second instar (Fig. 15), but head is black. Larvae could not be reared to further instars and died.

### ***Periga boettgerorum* NAUMANN, BROSCH, & WENCZEL, new species**

Holotype (Fig. 16 dorsal, fig. 17 ventral): ♂, Peru, Pasco province, 12 km S Oxapampa, 2000 m, 2.IV.2000 at light, leg. E. van Schayck, GP CBH-0213, ex CBH. The holotype will be deposited together with the allotype in the collections of ZMHU Berlin.

Allotype (Fig. 18 dorsal, fig. 19 ventral): ♀, Peru, Pasco province, Oxapampa environment, La Suiza, 10°37'1S 075°30'0W GPS, 2180 m, 3.IV.2000, leg. E. van Schayck, ex CESB (ZMHU).

Paratypes: 1 ♂, same data as allotype, leg. B. Wenczel (CBWK); 1 ♀, Peru, Pasco province, Oxapampa env., 2000 m, 6.IV.2000, leg. B. Wenczel & J. Boettger (CBWK); 2 ♂♂, Peru, Pasco province, 30 km NW Oxapampa, 2000 m, 5.IV.2000 at light, leg. E. van Schayck, genitalia no. 793/02 Naumann (CESB).

Derivatio nominis: The new species is dedicated, similar to the new *Pseudautomeris* described below, to José Boettger and in addition to his wife Pilar Boettger Chavez-Silva, in recognition of their valuable help during the expeditions of B. W. to Peru and also their independent work on



the local Saturniidae during his absence. In addition to those it is a pleasure to mention an older member of the Boettger family in Peru, Emil Boettger, who collected material at the end of two centuries ago; material came via the Staudinger collection to ZMHU Berlin and MNH Lyon and is still found there (compare also paratype list of *Periga brechlini* n. sp., fig. 22).

## Description

♂ (Fig. 16 dorsal, fig. 17 ventral): The species is of a dark orange ground colour, with pattern elements in dark violet and redish brown. Head, thorax, and abdomen on dorsal side in orange, ventrally little lighter. Antennae bipectinate, around 41 segments, the last 8 with much reduced and broader rami, 7.9–8.0 mm long ( $\emptyset = 8.0$  mm,  $n = 3$ ; holotype 8.0 mm). Rami bent ventrally, in maximum 0.9 mm long, ochreous. Forewing from basis to apex 30 mm long ( $\emptyset = 30$  mm,  $n = 2$ , holotype with damaged apex), the outer margin only rounded very little, with a very small outer tip most apically. Antemedian and median area in ground colour, suffused with some dark violet scales, and only separated by a bent dark violet antemedian band. There appear two light greyish dots surrounded by dark ring in the median area, the postmedian band proximally bordered by yellow scales, posterior by a dentate violet area, the outer portion of the postmedian area again in ground colour. Outer margin with dark fringes. Hindwing of similar colour, with two less developed greyish spots. The ventral side of ochreous colour, antemedian band missing, dark postmedian band, the markings (fore- and hindwing spots and proximal part of the postmedian area) of brownish violet colour.

♂ genitalia (Fig. 97, genitalia no. CBH-0213; fig. 100, genitalia no. 793/02 Naumann): Uncus bilobed with small, heavy sclerotized dorsolateral rounded processes. Gnathos a rounded plate. Saccus long, rounded, juxta square-like, with dorsolateral tips. Valves elongated, sacculus heavily bent inward with a row of bristles in distal two thirds. Valves ending with a small apical tip on dorsal margin, which has an inner field of short bristles. Aedeagus straight, vesica in both available preparations damaged, obviously a tube-like projection with a small sclerite at its tip. Eighth abdominal segment without much significance, tergite rounded, on the posterior rand of the spiracles of eighth segment there are few short bristles.

♀ (Fig. 18 dorsal, fig. 19 ventral): As typical for the genus and also as already described for the other new species of *Periga*, there again is much sexual dimorphism in *P. boettgerorum*. The female is of larger size and has

a different, vivid purplish brown ground colour but certain pattern elements and form of wings are quite similar to the males. Antennae fasciculate, 7.1–7.7 mm long and composed of 43–44 segments. Forewings from basis to apex 37–38 mm, with a very falcate outer tip, antemedian band of both fore- and hindwing dark brown, the antemedian band bordered posteriorly with greyish scales, the straight postmedian band proximally broadly with yellow scales. In the forewing two light greyish dots surrounded by a black area. The uniform dentate proximal portion of the postmedian area is separated by a dentate yellowish line of scales which in some parts is widened to yellow dots. Colour and pattern on ventral side almost identical, but proximal to the postmedian line much lighter, greyish, and the antemedian band of fore- and hindwing completely missing. The dentate inner part of the postmedian area also purplish grey.

#### Additional notes

Generally, males easily can be determined within the genus by their orange brown colour which is known as well from some specimens of *P. rasplusi* LEMAIRE, 1985 (compare LEMAIRE 2002, pl. 6, fig. 5) from the Gran Sabana in Venezuela. This and *P. kishidai* NAUMANN et al., described later in that volume are also nearest to *P. boettgerorum* in their male genitalia structures; nevertheless, there are stable differences between structures of those species: *P. rasplusi* has strong inner spines in its valves, which are missing in *P. boettgerorum*, and a much longer vesica with heavily sclerotized apical thorn. *P. kishidai* differs by its different, furcate juxta, missing sclerotization on the aedeagus, and a small inner dorsal process of the valves.

#### ***Periga brechlini* NAUMANN, BROSCH, & WENZEL, new species**

Holotype (Fig. 20 dorsal, fig. 21 ventral): ♂, Peru, Pasco province, Oxapampa env., La Suiza, 10°37'1S/075°30'0W GPS, 2180 m, 16.VII.2001, leg. B. Wenzel & J. Boettger, genitalia no. 717/02 Naumann, ex CSNB. The holotype will be deposited in the collections of ZMHU Berlin.

Paratypes: 1 ♂, Peru, Junin province, Calabaza, Satipo, 2000 m, 14.VII.2001, traders material, received from B. Wenzel, genitalia no. CBH-0211 (CBH); 1 ♂, Peru, Junin province, Calabaza, 2000 m, V 1999,

traders material, genitalia no. 792/02 Naumann (CBWK); 1 ♂, Peru or., Chuchuras, 1885–7, leg. Böttger, coll. Staudinger (ZMHU) (Fig. 22).

Derivatio nominis: This species is dedicated to our friend Dr. Ronald Brechlin from Pasewalk, Germany.

### Description

♂ (Fig. 20, 22 dorsal, fig. 21 ventral): Ground colour a light ochreous yellow to orange, pattern elements in dark greyish brown. Head, thorax, and abdomen on dorsal side in ground colour, ventrally little lighter, ochreous. Antennae bipectinate, around 38 segments, the last 7 much reduced and nearly without rami, nearly fasciculate, 7.2 (holotype) and 6.8 mm long. Rami bent ventrally, in maximum 1.0 mm long, ochreous. Forewing from basis to apex 33.0 (holotype) – 33.1 mm long, the outer margin only rounded very little, with a very small outer tip most apically. Antemedian and median area in ground colour, suffused with dark grey scales, and only separated by a rounded antemedian band. There appear two or three small light greyish dots surrounded by a dark ring in the median area, the straight postmedian band bordered posteriorly by a dentate grey area with yellow outer margin, the outer portion of the postmedian area again in ground colour with dark scales. Outer margin with brown fringes. Hindwing of similar colour, without any central spots. The grey area posterior to the postmedian line quite prominent, dentate, bordered with yellow, outer margin with a slight angle half way. The ventral side of light ochreous colour, antemedian band missing, postmedian band almost invisible but in apical area of the forewing ending with a greyish brown field, forewing spots, proximal part of the postmedian area, and some single scales of dark brown colour.

♂ genitalia (Fig. 113; genitalia no. 717/02 Naumann): Uncus strongly sclerotized, valves without harpes, with a shorter ventral portion and a dorsal separated smaller process, ventral margin with a lot of bristles. There are two small lateral internal protuberances covered with short setae which may be interpreted as a part of a transtilla or reduced internal processi. Saccus very long, rounded, juxta laterally longest, round and without any lateral processi. Aedeagus with a tapering right lateral process covered outside with rough spiculae. Vesica long, with an apical spine. Ductus ejaculatorius is three times as long as the aedeagus.

♀ and immature stages: Unknown.

Due to the form of uncus with two apical protuberances *P. brechlini* clearly belongs to the species group of *P. occidentalis* (LEMAIRE, 1972) (LEMAIRE 1973: 812; 2002: 46). Superficially the species somewhat resembles *P. armata* (LEMAIRE, 1973), *P. occidentalis*, and *P. gueneei* (LEMAIRE, 1973), the latter which is not assigned to the *occidentalis*-group anyway due to its different shape of the uncus. *P. armata* also has quite distinct male genitalia, with a second, lateral cornutus on the very bulbous vesica, and quite short valves. Nearest to *P. brechlini* is *P. occidentalis* itself, but this differs in the form of the uncus, valves, and the posterior part of the aedeagus and its smaller size plus the different number of segments in male antennae (43 in *P. occidentalis*); we hereby refer to the genitalia description in the original description (LEMAIRE 1972: 201) which is based on the type material from Colombia, Valle Cauca, and not at all to the figures published later by LEMAIER (1973: 835; 2002: 978) for which unfortunately no origin was mentioned. Compared to the original description, in his later works the figures always changed in details, and we hardly suppose that different genitalia of probably different species were figured as then also populations from Nicaragua, Ecuador and Peru were mentioned. In the original description he clearly mentioned for *P. occidentalis* valves without apical process, and a dorsal projection of the aedeagus with small spiculae which was figured twice as being rounded; in *P. brechlini* we have very distinct apical parts of the valvae, and the long tapering process of the aedeagus is situated right lateral. In our genitalia figure the vesica with the apical cornutus is not evolved but the structure is clearly visible still within the aedeagus. Those specimens figured by LEMAIER in 2002 (pl. 4, figs. 10 & 11) from Ecuador most probably are not conspecific with the holotype from Colombia, figured on the same plate.

The historical specimen from Berlin museum collection was collected only 60 km away from the type locality by the great-grandfather of José Boettger, Emil Boettger. As far as we know, *P. brechlini* and *P. occidentalis* do not occur syntopic.

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### Colour figures:

Fig. 20: *Periga brechlini* ♂ holotype, dorsal view; fig. 21: same specimen, ventral view; fig. 22: *P. brechlini* ♂ paratype, dorsal view (ZMHU Berlin); fig. 23: *P. kishidai* ♂ holotype, dorsal view; fig. 24: same specimen, ventral view; fig. 25: *P. kishidai* ♀ allotype, dorsal view; fig. 26: same specimen, ventral view.

PERU,  
Pasco province,  
Ozapampa s. Suiza,  
10°31' S/75°30'00" W GPS,  
2160 m, 16.VI.2001,  
leg. B. Wenzel & J. Beedtger

genitalia prep.  
no. 10000  
date 10.11.2002  
SP. :  
CR191M  
Stefan Hasemann



20

PERU,  
Pasco province,  
Ozapampa environment,  
humid forest, 2412 m,  
10.31.21, 13.8.11.V.2002,  
leg. J. Beedtger



23

PERU,  
Pasco province,  
Ozapampa environment,  
humid forest, 2412 m,  
10.31.21, 13.8.11.V.2002,  
leg. J. Beedtger



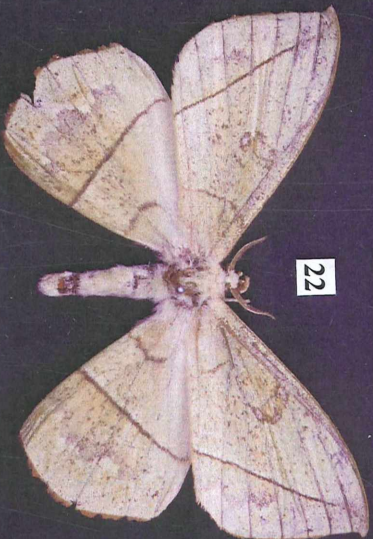
24



21

Chuchuras  
Peru, or.  
1885 - 7. Bötzger

Geol.  
Staudinger



22

PERU,  
Pasco province,  
Ozapampa environment,  
humid forest, 2412 m,  
10.31.21, 13.8.11.V.2002,  
leg. B. Wenzel & J. Beedtger



25



26

***Periga kishidai* NAUMANN, BROSCH, & WENZEL, new species**

Holotype (Fig. 23 dorsal, fig. 24 ventral): ♂, Peru, Pasco province, Oxapampa env., high altitude humid forest, 2412 m, 10°37'12.1''S 75°17'22.2''W, 5.–18.IV.2002, leg. B. Wenzel & J. Boettger, ex CSNB. The holotype will be deposited together with the allotype in the collections of ZMHU Berlin.

Allotype (Fig. 25 dorsal, fig. 26 ventral): ♀, Peru, Pasco province, Oxapampa env., high altitude humid forest, 2511 m, 10°38'15.1''S 75°17'14.2''W, 5.–18.IV.2002, leg. B. Wenzel & J. Boettger, ex CBWK (ZMHU).

Further paratypes: 13 ♂♂ in the following collections:

5 ♂♂, same data as the allotype (CBWK); 1 ♂, same data as allotype, genitalia no. 716/02 Naumann (CSNB); 1 ♂, same data as allotype, genitalia no. CBH-0212 (CBH); 1 ♂, same locality, 5.–13.VI.2002 (CBWK); 1 ♂, same data (CBH); 1 ♂, same data (CWAN > SMFL); 1 ♂, Peru, Pasco province, Oxapampa env., La Suiza, 10°37'1S 075°30'0W GPS, 2180 m, 6.IV.2000, leg. B. Wenzel (CBWK); 1 ♂, same locality, 23.VII.2001, leg. B. Wenzel (CBWK); 1 ♂, same locality, 5.–18.IV.2002, leg. B. Wenzel & J. Boettger (CBWK).

Derivatio nominis: This showy species is dedicated to our friend Yasunori Kishida from Tokyo, Japan.

### Description

♂ (Fig. 23 dorsal, fig. 24 ventral): Ground colour always similar, a light orange, suffused with violet scales and dark brown markings. Head, thorax, and abdomen with long orange hairs, antennae bipectinate, around 38 segments, the last three with much or totally reduced rami, 7.0–9.1 mm long ( $\bar{\varnothing}$  = 8.1 mm, n = 13; holotype 9.0 mm). Rami bent ventrally, in maximum 0.8–0.95 mm long ( $\bar{\varnothing}$  = 0.9 mm, n = 4; holotype 0.9 mm), ochreous. Forewing from basis to apex 28–33.5 mm long ( $\bar{\varnothing}$  = 31.5 mm, n = 13, holotype 33 mm), with a much rounded outer margin which turns back to a small outer tip of the apex. Antemedian and median area in groundcolour, separated by a convex dark purple band. Median area suffused with some dark scales, with three more or less developed central dots of white colour, surrounded by purple scales. Postmedian band nearly

straight, dark brown with a purple shadow in the marginal area, marginal area again in the ground colour. Hindwing also quite rounded, without any lobe of the anal margin, and of same colour as forewing. Only with a single small central dot, the postmedian band is much stronger, and the posterior purple shadow broader. Ventral side much lighter, ochreous, without antemedian band, in the forewing with three, in the hindwing with two brown dots. Postmedian band greyish brown with reddish brown shadow, the forewing apical area and the hindwing postmedian area with single black scales.

♂ genitalia (Fig. 98; genitalia no. 716/02 Naumann): Uncus with a heavily sclerotized ventral and a less sclerotized dorsal portion, indented in between and quite long. Transtilla without any visible structure. Saccus quite long, straight, formed at its distal end to a rounded juxta without any processes. Valves long, straight, on the ventral margin a row of long hairs, the inner part of the dorsal apex with a field of shorter bristles. Aedeagus as long as saccus, with a dorsal distal arrow-like hook with small heavily sclerotized spines. Vesica nearly as long as aedeagus, with a small spine at its end. Tergite of eighth segment broad and straight, with a small central process.

♀ (Fig. 25 dorsal, fig. 26 ventral): As typical for the genus, there again is much sexual dimorphism in *P. kishidai*. The female is of larger size and has a different, dark purplish brown ground colour but pattern and form of wings are quite similar to the males. Antennae fasciculate, 8 mm long and composed of 40 segments. Forewings from basis to apex 39 mm, antemedian band of both fore- and hindwing less intensive, the straight postmedian band proximally bordered with yellow scales. In the forewing there is a single large dark greyish dot. Colour and pattern on ventral side almost identical, a little lighter, and only the antemedian band of fore- and hindwing completely missing.

#### Additional notes

Nearest to *P. kishidai* due to their superficial pattern, size and form of wings are *P. lichyi* (LEMAIRE, 1972), *P. bispinosa* (LEMAIRE, 1972), and *P. rasplusi* (LEMAIRE, 1985). While the latter two have completely different male genitalia structures (compare LEMAIER 1973: fig. 47; 1985: fig. 11; 2002: fig. 5, no. 3 & fig. 6, no. 4) with spines on the vesica, even inner spines of the valves in *P. rasplusi* and much shorter antennae in *P. bispinosa*, *P. lichyi* obviously is the nearest relative. According to LEMAIER (1972: 203; 1973a: 846; 2002: 60) *P. lichyi* males are of beige, yellow or rusty-orange colour with sprinkling of single black scales, the holotype

which was figured in colour in 2002 (pl. 5, fig. 9) is of more greyish brown colour; measurements show a larger size of that species. For comparison a male genitalia preparation of a topotypical male from Venezuela, Merida, 1600–2500 m altitude in coll. Wenczel was consulted (genitalia no. 778/02 Naumann) which shows that the genitalia figures of that species by Lemaire are very accurate for that species and makes differences between *P. lichyi* and the here described *P. kishidai* clear: The genitalia structures of the smaller *P. kishidai* are one third larger, the saccus is more rounded and much longer, the juxta much more sclerotized, and the valves which are ending as single rounded margin with bristles in *P. lichyi* are earlike in *P. kishidai* with small apical furcation, causing a small inner dorsal process, and a patch of nearby bristles. While the apical spine of the aedeagus in *P. lichyi* has thorns only on the right lateral margin, it is completely sclerotized and thorny on the whole surface in *P. kishidai*. The central small process on eighth tergite as shown for *P. kishidai* is missing in *P. lichyi*, the margin is completely rounded.

#### ***Hylesia extremex* NAUMANN, BROSCH, & WENCZEL, new species**

Holotype (Fig. 27 dorsal, fig. 28 ventral): ♂, Peru, Pasco province, Oxapampa env., high altitude humid forest, 2511 m, 5.–18.IV.2002, leg. B. Wenczel & J. Boettger, genitalia no. 706/02 Naumann, ex CBWK. The holotype will be deposited together with the allotype in the collections of ZMHU Berlin.

Allotype (Fig. 29 dorsal, fig. 30 ventral): ♀, same data as holotype, in ZMHU Berlin.

Further paratypes: 3 ♂♂ 1 ♀ with following data:

2 ♂♂ 1 ♀, same data as holotype (CBWK); 1 ♂ same locality as holotype, 21.IV.–1.V.2003 (CBH).

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#### **Colour figures:**

Fig. 27: *Hylesia extremex* ♂ holotype, dorsal view; fig. 28: same specimen, ventral view; fig. 29: *H. extremex* ♀ allotype, dorsal view; fig. 30: same specimen, ventral view; fig. 31: *Gamelia longispina* ♂ holotype, dorsal view; fig. 32: same specimen, ventral view.





29

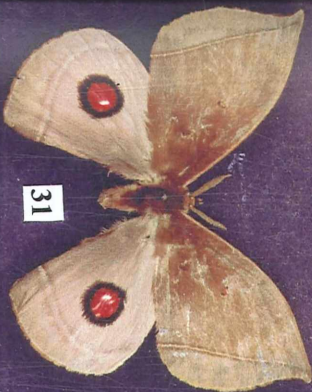


30

genitalia prep.  
no. 1000  
date 1999  
sp. 1999  
origin  
Stegan Naumann

Collection  
Bernhard Wenzel

PERU,  
Junin province,  
Salpo,  
650 m,  
June 1999  
Leg. Local collector

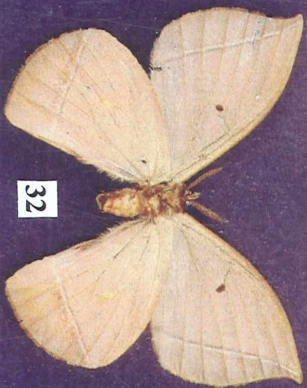


31

genitalia prep.  
no. 1001  
date 1999  
sp. 1999  
origin  
Stegan Naumann

Collection  
Bernhard Wenzel

PERU,  
Junin province,  
Salpo,  
650 m,  
June 1999  
Leg. Local collector



32

PERU,  
Pasco province,  
Oxapampa environment,  
humid forest, 2511 m,  
10°38'15.1" S 75°17'14.2" W,  
5.-18.IV.2002,  
leg. B. Wenzel & J. Boettger

genitalia prep.  
no. 27  
date 2002  
sp. 27  
origin  
Section Neumann



27

Collection  
Bernhard Wenzel

PERU,  
Pasco province,  
Oxapampa environment,  
humid forest, 2511 m,  
10°38'15.1" S 75°17'14.2" W,  
5.-18.IV.2002,  
leg. B. Wenzel & J. Boettger

Collection  
Bernhard Wenzel

PERU,  
Pasco province,  
Oxapampa environment,  
humid forest, 2511 m,  
10°38'15.1" S 75°17'14.2" W,  
5.-18.IV.2002,  
leg. B. Wenzel & J. Boettger

genitalia prep.  
no. 28  
date 2002  
sp. 28  
origin  
Section Neumann



28

Collection  
Bernhard Wenzel

PERU,  
Pasco province,  
Oxapampa environment,  
humid forest, 2511 m,  
10°38'15.1" S 75°17'14.2" W,  
5.-18.IV.2002,  
leg. B. Wenzel & J. Boettger

Derivatio nominis: Self-explanatory, the species is named after, first, its southernmost record of this group and, second, the high elevation of the locality; the final syllable was chosen in concordance with names of many other species of the genus.

### Description

♂ (Fig. 27 dorsal, fig. 28 ventral): Antennae quadripectinate up to the last four segments, then reduced, with 22 segments in total, 6.5 mm long, longest dorsal rami 0.9 mm, ventral rami around 0.5 mm, ochreous. Head and thorax chocolate brown, abdomen with brown and reddish hairs. Forewing length 25.5 mm (holotype). Colour of forewing chocolate brown, suffused with grey and yellow scales. Antemedian and postmedian lines composed by a row of yellow scales, bordered dark brown to the median area in which a central dark brown dot with yellow center is found. Postmedian area dark brown, becoming lighter greyish brown to the outer margin, forewing apex acute with a small tip. Dorsal hindwings of similar reddish brown colour as the abdomen, with a round eyespot with outer black ring and red center, of 3.0 mm maximum diameter. Postmedian line rounded, dark brown, the postmedian area more vivid reddish, a central row of dark brown patches and in the outer margin suffused with yellow scales. Both fore- and hindwings on the ventral side of reddish brown colour, only markings of the forewing are a black central dot and an outlined brown postmedian line, of the hindwing a very small black dot instead of the dorsal ocellus and a hinted postmedian line. Centrally around the anal margin there is a patch of long greyish yellow hairs. Outer margin with dark fringes.

♂ genitalia (Fig. 106; genitalia no. 706/02 Naumann): Uncus very long, thorn-like, the apical half heavily sclerotized. Saccus broad, valves almost rounded, with a row of outer bristles and an apical internal process turning in dorsal direction. Juxta slender, long, the aedeagus typical for the genus, ending rooflike where a small vesica emerges in ventral direction. The eighth sternite is ending with two small tips, the tergite is almost straight. The genitalia structures were compared with those of *H. hubbelli* LEMAIRE, 1982 from Honduras (Fig. 107; genitalia no. 737/02 Naumann) which come nearest to those of the new species comparing figures in LEMAIRE (2002). That Central American taxon has much larger structures, a stronger sclerotized uncus, dorsal earlike tips and internal long and thin processi of the valves.

♀ (Fig. 29 dorsal, fig. 30 ventral): The female is almost similar to the males aside of the typical sexual dimorphic characters such as larger size and

different antennae; specimens found are all somewhat transparent which also may be caused by the bad condition of conservation. Antennae bipectinate, of 22 segments, rami almost reduced to small tips, in total around 6.0 mm long. Forewing a little rounder than in males, around 31 mm long (paratype; no apex conserved in allotype), with small apical tip.

#### Additional notes

The species was collected at high altitudes of around 2500 m in humid montane forest, at the same habitat from where several other species were found to be undescribed which will be named in this volume, e.g. *Automeris suteri*, *Pseudautomeris boettgeri* or *Cerodirphia peigleri*. Already at light *H. extremex* was believed to be an undescribed taxon by one of the authors (B. W.) due to its unique pattern in this fauna. The new species can easily be separated by details of its wing pattern and structures and size of male genitalia.

The genus *Hylesia* currently consists of around 110 species (LEMAIRE 1996, 2002) which are usually characterized by weak significant characters. LAMY & LEMAIER (1983) recognized two basic groups, depending on the number of tibial spurs: Group 1 with spurs 0-2-3 with around 70 species, and group 2 with spurs 0-2-4 with around 40 species. Within group 1 there exist some few species which have eye-like discal spots on their hindwings, they are grouped into three different subgroups (subgroup of *H. nanus* (WALKER, 1855) with three species, subgroup of *H. gamelioides* MICHENER, 1952 with this single species, and the subgroup of *H. lineata* DRUCE, 1886 with seven species including the here described) (LEMAIRE et al., 2001; LEMAIER 2002). *H. extremex* is compared with its nearest relatives, *H. lineata*, *H. subaurea* SCHAUS, 1900, *H. iola* DYAR, 1913, *H. bertrandi* LEMAIER, 1982, *H. hubbelli*, and *H. hawksi* LEMAIER et al., 2001, all described from Central America. This also points out the surprise to find a member of that group far from the main area of distribution, and opens the possibility to find further high andine members in the area in between in Ecuador or Colombia which may be relicts forming endemic species on high altitude levels.

#### ***Gamelia longispina* NAUMANN, BROSCH, & WENCZEL, new species**

Holotype (Fig. 31 dorsal, fig. 32 ventral): ♂, Peru, Junin province, Satipo, 650 m, VI.1999, leg. I. Callegari, genitalia no. 608/01 Naumann, ex CBWK. The holotype will be deposited in the collections of ZMHU Berlin.

Paratype: ♂, Peru, Puno province, San Gavan, 700 m, VIII.2002, leg. J. Boettger & J. Sandoval, genitalia no. 1120/05 Naumann (CUWA).

Derivatio nominis: The species is named after its unique characters of the genitalia with two very long processi of the juxta, the longest known so far within the genus.

### Description

♂ (Fig. 31 dorsal, fig. 32 ventral): Antennae ochreous brown, 8.5 mm long, longest rami 1.8 mm. Ground colour dark reddish brown on dorsal side, marginally getting lighter; length of right forewing 32 mm. Only markings of the forewings are a small row of yellow scales anticipating a bent antemedian band, a tiny black elongated marking of 1.0 by 1.8 mm diameter with pink center, and an almost straight postmedian line composed of yellowish scales which are bordered dark brown. Outer margin heavily bent outward, forewing apex strongly pointed outward at its tip. Hindwing much lighter than forewing, with a rosy touch basally. Ocellus round, of 7.0 mm diameter, bordered black, inner portion light carmin, with a white basal pupilla. Postmedian line very light grey, bordered on both sides by darker scales. On ventral side of homogenous orange brown ground colour. Forewing ocellus only a black dot, analogue to the dorsal hindwing ocellus is only a yellow shadow of the pupilla visible. Postmedian line of fore- and hindwing basally dark greyish, marginally yellowish white. Thorax and abdomen in ground colour. All measurements are similar for holotype and paratype.

♂ genitalia (Fig. 104; genitalia no. 608/01 Naumann): Uncus, transtilla and saccus almost invisible, juxta much reduced as typical for the genus, but with two very long processi (name !) fused in the proximal two thirds, but separated in the apical part; the processi are bent in an 180° angle ventrally. Sacculus as a strong margin, valves symmetrically with a tall hairy ventral part and a larger, rounded dorsal portion from which internally emerges a strong spine which is bent in dorsal direction at its end. Aedeagus straight, at its medial end with right and left lateral roof-like processus, at its distal part the small vesica emerging ventrally without any spines. 8<sup>th</sup> abdominal segment with typical structures: Tergite with two lateral rounded lobes, sternite long, tall, and ending well sclerotized.

♀ and immature stages: Unkown.

The species is described after only two male specimens, but due its unique characters in genitalia structures we did not hesitate with this act; by these very long processi of the juxta it can easily be separated from the two overall similar species *G. rubriluna* (WALKER, 1862) and *G. lichyi* LEMAIRE, 1973. It was collected before 22.00 h at the same place as type specimens of *Meroleuca (Meroleuroides) verae* VAN SCHAYCK, 2000.

***Gamelia dargei* NAUMANN, BROSCH, & WENZEL, new species**

Holotype (Fig. 33 dorsal, fig. 34 ventral): ♂, Peru, Pasco province, Oxapampa env., 2000 m, 6.IV.2000, leg. B. Wenzel, genitalia no. 660/02 Naumann, ex CBWK. The holotype will be deposited together with the allotype in the collections of ZMHU Berlin.

Allotype (Fig. 38 dorsal, fig. 39 ventral): ♀, Peru, Pasco province, Oxapampa env., high altitude humid forest, 2511 m, 10°38'15.1''S 75°17'14.2''W, 5.–18.IV.2002, leg. B. Wenzel & J. Boettger ex CBWK (ZMHU).

Further paratypes: in total 22 ♂♂ 1 ♀ with following data:

8 ♂♂ Peru, Pasco province, Oxapampa env., La Suiza, 2180 m, 17.VII. & 15.X.2001, 5.–18.IV.2002, 5.–13.VI.2002, leg. B. Wenzel & J. Boettger, genitalia no. 662/02 Naumann (CBWK); 1 ♂, same locality, 5.–18.IV.2002 (CCMC); 1 ♂, same locality, 21.VII.2001 (CSNB); 1 ♂, same locality, no date (CSNB); 2 ♂♂, Peru, Pasco province, Oxapampa env., high altitude humid forest, 2412 m, 10°37'12.1''S 75°17'22.2''W, 5.–18.IV.2002, leg. B. Wenzel & J. Boettger (CBWK); 1 ♂, same locality, 10.–20.VII.2001 at light, leg. B. Wenzel, ex CBWK, genitalia no. 663/02 Naumann (CESB) (Fig. 36, with wrong altitude 3200 m mentioned on label); 1 ♂ 1 ♀, Peru, Pasco province, Oxapampa env., high altitude humid forest, 2511 m, 10°38'15.1''S 75°17'14.2''W, 5.–18.IV & 5.–13.VI.2002, leg. B. Wenzel & J. Boettger (CBWK); 1 ♂, same locality, 5.–18.IV.2002, ex CBWK (CSNB); 2 ♂♂, same locality, 21.IV.–1.V.2003 (CBH); 2 ♂♂, same locality, VI.2002, ex CBWK, genitalia no. 775 & 776/02 Naumann [= CBH-0250 & 0251] (CBH) (Fig. 35, with wrong altitude 3800 m mentioned on label); 1 ♂, Peru, Pasco province, 13,5 km S Oxapampa, 2000 m, 4.IV.2000 at light, leg. E. van Schayck, genitalia no. 664/02 Naumann

(CESB) (Fig. 37); 1 ♂, Peru, Pasco province, Oxapampa, La Suiza, 2180 m, 5.–13.VI.2002, leg. B. Wenczel (CFMP).

Derivatio nominis: The species is dedicated to our friend Philippe Darge, Clénay, France, in recognition of his work on the African Saturniidae.

## Description

♂ (Fig. 33 holotype dorsal, figs. 35, 36, 37 paratypes dorsal, fig. 34 holotype ventral): Obviously colouration in *G. dargei* is quite variable, but in all specimens occur several typical characters and combinations of pattern, colour, or size: Antennae dark orange brown, quadripectinate, with around 30 segments, 8.0 to 9.0 mm long ( $\bar{\varnothing}$  = 8.8 mm, n = 13; holotype 8.0 mm), longest rami 1.4–1.5 mm ( $\bar{\varnothing}$  1.5 mm, n = 13; holotype 1.4 mm), those of last four segments reduced. Length of right forewing 28.0 to 33.0 mm ( $\bar{\varnothing}$  = 30.4 mm, n = 13; holotype 31 mm), ground colour from dark chocolate to very dark brown on dorsal side. The forewing without antemedian band, the ocellus only as small lenticular black and light grey shadow, in few specimens with some internal red scales. The apical part of the median area in all specimens suffused with yellow or ochreous scales, medially with a typical rounded light shadow. Postmedian band in typical form, slightly bent outward at the wing's base, rest straight, and ending around 2 mm in front of the nearly rectangular forewing apex; it consists of a medial dark and a posterior ochreous yellow band. All lighter specimens of *G. dargei* have also a lighter marginal area with light ochreous fringes marginally. Outer margin not bent outside very much. The dorsal hindwing little elongated along the anal margin; it has a quite homogenous periocellular area of light to darker grey, only covered with some darker hairs near the inner margin, and with a nearly round eyespot of 6.5 to 7.0 mm maximum diameter composed by a black outer circle and an inner light

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## Colour figures:

Fig. 33: *Gamelia dargei* ♂ holotype, dorsal view; fig. 34: same specimen, ventral view; fig. 35: *G. dargei* ♂ paratype, dark morph, dorsal view, Oxapampa env., coll. Brosch; fig. 36: *G. dargei* ♂ paratype, light morph, dorsal view, Oxapampa env., coll. van Schayck; fig. 37: *G. dargei* ♂ paratype, greyish morph, dorsal view, Oxapampa env., coll. van Schayck; fig. 38: *G. dargei* ♀ allotype, dorsal view; fig. 39: same specimen, ventral view.

Oxapampa  
2009  
Peru

genitalia prep.  
no. 660102  
date 6.11.2002  
sp. *Chorosemia*  
origin *Per. Pasco*  
Stefan Naumann

Collection  
Bernhard Wenzel  
PERU,  
Pasco province,  
Oxapampa,  
2000 m,  
6.IV.2000.  
leg. B. Wenzel & J. Boettger



33

Oxapampa  
2009  
Peru

genitalia prep.  
no.  
date  
sp.  
origin  
Stefan Naumann

Collection  
Bernhard Wenzel  
PERU,  
Pasco province,  
Oxapampa,  
2000 m,  
6.IV.2000.  
leg. B. Wenzel & J. Boettger



34



35



36

genitalia prep.  
no. 6604102  
date 6.11.2002  
sp. *Chorosemia*  
origin *Per. Pasco*  
Stefan Naumann



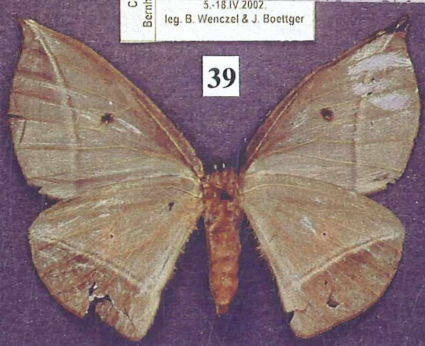
37

PERU, Prov. Pasco,  
13,5 Km südlich v. Oxapampa,  
2000 m, leg. E. van Schayck  
LF. 04.04.2000



38

5-18.IV.2002  
leg. B. Wenzel & J. Boettger



39

5-18.IV.2002  
leg. B. Wenzel & J. Boettger



vivid red part with large central white dot. Postmedian line strongly bent, dark brownish grey, followed by tall line in the ground colour of the median area, and again by a broad area in the dark postmedian band colour. Outer marginal area then again in the lighter colour, but suffused with some orange scales, ending in the yellowish orange outer margin. From ventral side much more colourful, orange-brown. Only pattern elements are the black forewing dot, an ochreous yellow central dot in the hindwing with tiny black centre. Postmedian line of both fore- and hindwing medially greyish black, marginally white, and in the hindwing followed by a darker orange area. Thorax and abdomen in ground colour.

♂ genitalia (Fig. 103; genitalia no. 660/02 Naumann): Uncus very short, rounded; Saccus triangular, juxta with two broad, leaflike and short lateral processes, ending with a heavily sclerotized tip. Valves short, rounded, with hairy dorsal tip and typical inner spiny process which is turned in dorsal direction and has several sharp points on ventral side. Aedeagus broad, with ventral process almost half as long as sclerotized parts of the aedeagus and ventral emerging vesica without any spines or spiculae. Structures of last abdominal segments very typical: Eighth sternite with 2 narrow central processes and two lateral tips, all four of almost same shape. Tergite of seventh segment slender, nearly rectangular.

♀ (Fig. 38 dorsal, fig. 39 ventral): The female shows the genus-typical sexual dimorph characters, such as fasciculate antennae of around 9.0 mm length, larger size (right forewing length 39–40 mm) and a much more produced apical tip of the forewing. Specimens known so far are of dark brown ground colour on dorsal side, have a lenticular forewing ocellus bordered very dark brown with small red centre, a dark postmedian line followed by a tiny row of red scales, the outer margin of the forewing is bent outward and ends in a sharp apical tip. Hindwing with same round ocellus as in males, around 9.0 mm in maximum diameter, with similar light red centre, and similar postmedian and marginal pattern. The underside of dark greyish brown, only markings, similar to males, are the black forewing dot, the yellow hindwing dot with black central dot, and the dark brown postmedian line, followed by whitish area.

#### Additional notes

*G. dargei* obviously is a common species found at different places in Pasco province in altitudes from 2000 to around 2500 m altitude between April and July. It is somewhat variable in colour, but no significance between size, colour, altitude, or month of collecting was noted.

It is nearest related to *G. viettei* LEMAIRE, 1967, described also from Peru, from which it differs by its smaller hindwing ocelli, the more rectangular and not so much rounded forewing shape and a certain yellow shadow of scales posterior to the forewing postmedian line; male genitalia structures of *G. viettei* (fig. 102; genitalia no. 735/02 Naumann from Peru, San Martin Dept.) show much longer and more narrow processi of the juxta and tall internal processes of the valves without any indentation. Also structures of sternite and tergite are different. Furtheron, that species is known only from localities in lower altitudes.

Further species to be compared with the new taxon would be: *G. neidhoeferi* LEMAIRE, 1967 which looks very similar on its wings but differs in the form of the much slender processes of the juxta, the rounded gnathos and the seventh tergite (e.g. genitalia no. 670/02 Naumann from Peru, Cuzco, Manu Nationalpark, 1800 m); *G. rindgei* LEMAIRE, 1967 which has more rounded forewings in the male and larger hindwing ocelli in both sexes, plus different looking processes of juxta, valves, and sternite; *G. denhezi* LEMAIRE, 1967 again looks quite similar but has completely different genitalia structures with its long and very narrow juxta processes; and *G. pyrromelas* WALKER, 1855 which again looks very similar but has very long juxta processes and tall and spiny processes of the valves. Generally, without having examined the holotype specimens there is the problem that genitalia descriptions and figures by LEMAIRE for single species change from one to the next publication, and that no information is given to which certain species a figure belongs. So if possible in our comparisons we strongly refer to those structures figured or described in the original descriptions as they should refer to the name bearing type, and we neglect those figured later in a different way. In cases where no genitalia figure was given in the original description we tried to dissect topotypical specimens from our collections.

### ***Gamelia vanschaycki* NAUMANN, BROSCH, & WENZEL, new species**

Holotype (Fig. 40 dorsal, fig. 41 ventral): ♂, Peru, Junin province, Shima river, 3 km N Rio Tambo, 350 m, 26.III.2000 at light, leg. E. van Schayck, genitalia no. 666/02 Naumann, ex CESB. The holotype will be deposited in the collections of ZMHU Berlin.

Paratype: 1 ♂, same data as holotype, genitalia no. 665/02 Naumann (CESB).

Derivatio nominis: The species is dedicated to our friend Eric van Schayck, Bochum, Germany, who collected the two type specimens during his expedition to Peru together with Bernhard Wenzel in March 2000 and kindly gave us the chance to work on his collection material.

### Description

♂ (Fig. 40 dorsal, fig. 41 ventral): Antennae dark orange brown, quadripectinate, consisting of 32 segments, 7.5 mm long, longest rami 1.2 mm, in the last 7 segments reduced. Length of right forewing 31 mm. Ground colour of dorsal side dark brown, in our samples quite reduced due to the quality after some days on the wing. The forewing ocellus small, pink with black background, postmedian band medially and marginally bordered dark, inner portion ochreous, bent towards the strong falcate apex. Outer margin heavily bent outward. The hindwing more greyish brown, with a large pink ocellus, bordered broadly black, with large internal white spot. Largest diameter of the ocellus 7.0–8.0 mm. Postmedian band thin, dark, followed by a tall lighter band, a broader darker area mainly in the anal part of the hindwing, and a greyish outer margin. On ventral side the species is of nearly homogenous orange brown colour, only pattern elements are the black dot in the forewing, a yellow dot in central hindwing representing the dorsal ocellus, and a tall dark grey and even thinner light grey postmedian band.

♂ genitalia (Fig. 108; genitalia no. 666/02 Naumann): Uncus very small, nearly triangular, saccus much reduced as in other species and nearly embedded inside the two laterally emerging ventral parts of the sacculus. Juxta with two long processi fused in the first half, but separated at their tip, bent backward and in ventral direction. Valves symmetrical with a taller hairy ventral process and a more rounded dorsal one from which internally and marginally emerges a strong heavily sclerotized spine. Aedeagus straight, at its medial end with right and left lateral roof-like process, at its distal part the small vesica emerging ventrally without any spines. 8<sup>th</sup> abdominal segment with typical structures: Tergite with two lateral rounded

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### Colour figures:

Fig. 40: *Gamelia vanschaycki* ♂ holotype, dorsal view; fig. 41: same specimen, ventral view; fig. 42: *Automerina carina* ♂ holotype, dorsal view; fig. 43: same specimen, ventral view; fig. 44: *Molippa luzlessarum* ♂ holotype, dorsal view; fig. 46: same specimen, ventral view; fig. 45: *M. luzlessarum* ♀ allotype, dorsal view; fig. 47: same specimen, ventral view.

genitalia prep.  
no. 166/02  
date 11.02.2002  
sp. *Asanuma*  
origin Peru  
Stefan Naumann

PERU, Prov. Junin, Fluß Shima,  
3 Km nördl. vom Rio Tambo,  
350 m, leg. E. van Schayck  
LF. 07 26.03.2000



40



41



43

Genitalia-  
Preparation  
**CBH-0363**  
Ulrich Brosch  
Hille

PERU:  
Pasco province;  
Oxapampa environment,  
S 10°38'15.1" / W 75°17'14.2"  
humid forest / 2511 m  
April 21 - May 1, 2003  
leg. Bernhard WENZEL  
& José BOETTGER



45

genitalia prep.  
no. 165/02  
date 11.02.2002  
sp. *Asanuma*  
origin Peru  
Stefan Naumann

PERU,  
Dep. Madre de Dios, Rio  
Carbon, Manu National Park,  
Camicana Chico, 1000 m,  
Juli / August 1997.  
via Wilfried Braun  
coll. Stefan Naumann



42

Genitalia-  
Preparation  
**CBH-0357**  
Ulrich Brosch  
Hille

Coll. BROSCH  
D-32479 Hille

PERU:  
Pasco province;  
Oxapampa environment,  
S 10°38'15.1" / W 75°17'14.2"  
humid forest / 2511 m  
April 21 - May 1, 2003  
leg. Bernhard WENZEL  
& José BOETTGER



44

PERU:  
Pasco province;  
Oxapampa environment,  
S 10°38'15.1" / W 75°17'14.2"  
humid forest / 2511 m  
April 21 - May 1, 2003  
leg. Bernhard WENZEL  
& José BOETTGER

PERU:  
Pasco province;  
Oxapampa environment,  
S 10°38'15.1" / W 75°17'14.2"  
humid forest / 2511 m  
April 21 - May 1, 2003  
leg. Bernhard WENZEL  
& José BOETTGER



46



47

lobes, sternite long, and ending well sclerotized. [www.biologiezentrum.at](http://www.biologiezentrum.at)

♀ and immature stages: Unknown.

#### Additional notes

The species has some intermediate characters in male genitalia structures between *G. rubriluna* and *G. longispina*, mainly in the length of the processi of the juxta, the size of the spines of the dorsal parts of the valves, and the size and tallness of sternite and tergite. Shima is a habitat along a small river (by the natives called “SHIMA”, which means “FISH”) in centre of primary forest at around 700 m altitude, surrounded by mountains. Especially remarkable is the enormous mix of typical highland and lowland butterflies for which it is unclear if they occurred always at this place or are attracted by the countless human baits.

#### ***Automerina carina* MEISTER, NAUMANN, & BRECHLIN *in* NAUMANN, BROSCH, & WENCZEL, new species**

Holotype (Fig. 42 dorsal, fig. 43 ventral): ♂, Peru, Dept. Madre de Dios, Rio Carbon, Manu Nationalpark, Camicana Chico, 1000 m, VII./VIII.1997, via Wilfried Braun, genitalia no. 845/02 Naumann, ex CSNB. The holotype will be deposited in the collections of ZMHU Berlin.

Paratypes: 25 ♂♂ with following data:

1 ♂, Peru, Dept. Madre de Dios, Salvacion, Rio Alto de Madre de Dios, Manu Park, 500 m, X./XI.1996, leg. local people, coll. EMEM; Neotropical/Nearctic Saturniidae collection bought June 2004 from Swen Löffler, Lichtenstein / Germany, partly former coll. Eitschberger / EMEM (CSNB); 1 ♂, Peru, Dept. Madre de Dios, Rio Alto de Madre de Dios, Manu Park, 500 m, III.1997 (CFMP); 2 ♂♂, Peru, Dept. Madre de Dios, Manu Park, Camicana Chico, Rio Carbon, 1000–1200 m, VII.1999, genitalia prep. 45/02 FMP (CFMP); 1 ♂, Peru (SE), Dept. Madre de Dios, Manu Park, Camicana Chico, Rio Carbon, 1000–1200 m, VII.1999, received from F. Meister, genitalia no. CBH-0465 (CBH); 1 ♂, Peru (SE), Dept. Madre de Dios, Manu Park, Camicana Chico, ca. 1000–1200 m, X.1999, leg. einheim. Sammler via R. Marx, coll. W. A. Nässig (SMFL); 1 ♂, Peru, Dept. Madre de Dios, Salvacion, 500 m, XI.–XII.1997, genitalia

prep. 46/02 FMP (CFMP); 1 ♂, Peru (S), Dept. Madre de Dios, Salvacion, Manu Park, Rio Alto de Madre de Dios, 500–800 m, I.–II.1998 (CRBP); 5 ♂♂, Peru (SE), Dept. Madre de Dios, Manu Park, Salvacion, ca. 600 m, XI.1999, leg. einheim. Sammler, c/o R. Marx (Aachen), coll. W.A. Nässig (SMFL); 1 ♂, Peru, Dept. Cuzco, Amazonasabhänge, Chontachaca, Manu Park, 800–1200 m, I.1999, via Marx, coll. W.A. Nässig (SMFL); 9 ♂♂, Peru (S), Dept. Cusco, San Pedro near Manu Park, ca. 1800 m, I.–II.1998 (CRBP); 1 ♂, Peru, Dept. Amazonas, Iquitos, 100 m, 4.X.1975, leg. Bauer, Post, Lobin, coll. W.A. Nässig (SMFL); 1 ♂, Peru, Chevas de la Lechuzos, 650–1000m, 11.XII.1998 (CUWA).

Derivatio nominis: Named after the hazelnut red brown ground colour of the male specimens overall.

### Description

♂ (Fig. 42 dorsal, fig. 43 ventral): Forewing length 21.5–24.9 mm (n = 3; holotype 21.5 mm; most specimens are sized in the lower end of the variability, but were not measured, therefore we hesitate to give any average size as this would be not significant. The 24.9 mm specimen in coll. Brosch is extremely large but in all other aspects inclusive genitalia structures corresponds with the holotype). Ground colour hazelnut reddish brown. Antennae in ground colour, around 4.5 mm long, quadripectinate in the first 15 segments, apical eight segments without pectination. Longest rami 0.6 mm long. Thorax and abdomen in ground colour, dorsally with more pinkish hairs, lateral and ventral parts yellow. Legs in ground colour. Costa, antemedian, median and postmedian lines plus apical parts of the forewings also in ground colour, with some lighter, more pinkish parts intermittent. Forewing spot hinted, consisting of two rings in the ground colour. There are some black dots basally to the forewing spot, around two or three between antemedian and median line, and again around three between median and postmedian line. Marginally to the postmedian line a black shadow. Forewing apex pointed outward, outer margin with pink fringes. Hindwing in the upper marginal part in ground colour, rest more pinkish with markings: There is a typical, almost round ocellus of around 3.5 mm diameter which is bordered black, inner part is strawberry red with a white halfmoon like centre. Postmedian and marginal line consisting of black scales, outer margin with yellowish pink fringes. Ventral side of both fore- and hindwings typical in different, ochreous yellow ground colour, only markings are the black dot of the forewing

ocellus with very small white centre, the white dot with pink margin of the hindwing ocellus, and marginal markings: In the forewing the postmedian line and the marginal area are reddish brown, in the hindwing also the postmedian line and joint parts of the postmedian area in this colour, changing to pink in the outer parts, outer margin again in yellow ground colour.

♂ genitalia (Fig. 109, genitalia no. 845/02 Naumann): Uncus membranous, not missing as indicated in LEMAIRE (2002: 34), and only half as long as in *Automerina cypria*, compare fig. 110 (genitalia no. 846/02 Naumann from Argentina, Jujuy). While the tegumen is fused in *cypria* there is a cross-like structure with a membraneous opening and two distal processes in *carina*. Transtilla much reduced, a thin bridge between dorsal part of the valves, almost similar to *cypria*, without any internal spines; in both taxa transtilla and juxta are not absent as indicated by LEMAIRE. Saccus much reduced, sacculus lobed outward, juxta fused with the aedeagus as mentioned by MICHENER (1952: 435) which caused the rapture of the annelus from the main part of the genitalia in preparation no. 845/02 Naumann. Aedeagus almost similar to *A. cypria*, but the dorsally emerging vesica with two lateral lobes is only half as long as in *cypria*, and totally covered with large patches of speculae. 8<sup>th</sup> tergite and sternite as figured, no significant differences to *cypria*, but tergite a little less furcate in *cypria*.

Female and immature stages: Unknown. There are two females in coll. W. A. Nässig > SMFL Frankfurt, two in coll. Meister and two in coll. Brechlin which might belong to that species but cannot be attributed to it with certainty. Therefore they are not included in the type series. They overall look very similar to females of *A. cypria* but are little smaller than other females and have the typical red hindwing ocellus. Most probably only a rearing of both species would clarify the identity of the right female of *A. carina*. Both species occur in Madre de Dios and Cuzco (probably also in Amazonas Dept.) sympatrical, from the known collecting data we hesitate to guess any conclusions about the number of generations of that species.

#### Additional notes

Astonishingly, this widespread species was not found to be undescribed earlier although there are specimens in several collections. *A. carina* can easily be separated in the male gender from its nearest relative, *A. cypria*, by its smaller size and more falcate forewing apex, more reddish brown ground colour and typical red (instead of more pink or carmine in *A. cypria*) centre of the hindwing ocellus, and the details in its genitalia structures, obvious

mainly in the vesica with its large field of speculae. *A. atvala* for which unfortunately a lost male specimen from Surinam was designated as lectotype by LEMAIRE (1974: 535) looks superficially also similar but shows quite different genitalia structures with long internal processi if we trust in the identity of LEMAIRE's genitalia figure (1974, 2002) and his interpretation of that species; however, the origin of his dissected specimen remains unclear.

### ***Molippa luzalessarum* NAUMANN, BROSCH, & WENCZEL, new species**

Holotype (Fig. 44 dorsal, fig. 46 ventral): ♂, Peru, Pasco province, Oxapampa environment, S 10°38'15.1" W 75°17'14.2", humid forest, 2511 m, 21.IV.–1.V.2003, leg. Bernhard Wenczel & José Boettger, genitalia no. CBH-0357 (ex CBH). The holotype will be deposited together with the allotype in the collections of ZMHU Berlin.

Allotype (Fig. 45 dorsal, fig. 47 ventral): ♀, same data as holotype, genitalia no. CBH-0363, (ex CBH) in ZMHU Berlin.

Further paratypes: 1 ♂ 5 ♀♀ in the following collections:

1 ♀, same data as holotype (CBH); 2 ♀♀, same data as holotype (CSNB); 1 ♂ 2 ♀♀, same data as holotype (CBWK).

Derivatio nominis: Dedicated after a proposal by José Boettger, Oxapampa, the collector of this new species, to his mother Luzia and his daughter Alessandra (species-group name formed according to Art. 31.1.2 [ICZN 1999; 2000]).

#### **Description**

♂ (Fig. 44 dorsal, fig. 46 ventral): Antennae reddish brown, quadripectinate, consisting of 31 segments, ca. 9.0 mm long, longest rami 2.1 mm long, the last 5 segments with reduced rami. Ground colour dark greyish brown. Head and thorax with hair in ground colour, on dorsal side of the prothorax two lateral tufts of pink hairs and central single long grey hairs, dorsal side of the abdomen ringed yellow and dark brown with median dark line. On ventral side head, thorax including legs, and abdomen in ground colour, at the basis of the legs pinkish violet hair. Length of right forewing 42 mm. Wings with few typical markings: In the forewing antemedian field darker, bordered with a black zigzag line to the median field which contains the



typical large dark patch with two tips turned outward, the lower one longer than the costal one. Median and postmedian area in ground colour, separated by a darker zigzag line. Forewing apex almost rectangular, any pattern in that area missing. Hindwing also very homogenous in ground colour, only with very few pink hairs on the anal basis. Hindwing ocellus slightly indicated, as well as the rounded postmedian line. Outer margin of both fore- and hindwing with a row of dark brown fringes, alternated by ivory-coloured at the veins. Underside of wings very homogenous in lighter grey, only markings are small darker lenticular dots of both fore- and hindwing ocellus, a hinted postmedian line and at the basal side of the forewing a pinkish grey portion.

♂ genitalia (Fig. 94; genitalia no. CBH-0357): Very typical for the genus, the uncus is downcurved and has a dorsal row of small teeth. Saccus relatively broad for the genus, juxta with two lateral processes which are broader than in *M. bertrandi* LEMAIRE, 1982. Valves with two ventral protuberances and a typical inner bent spine. Dorsal margin of the valves almost rectangular. Aedeagus short, with two typical lateral and basal processes, the vesica emerging on ventral side.

♀ (Fig. 45 dorsal, fig. 47 ventral): Generally, very similar to the male with same dark grey ground colour, but pattern elements more distinct. Antennae of reddish brown colour, fasciculate, with 33 segments, in total ca. 10 mm long. Hair of thorax suffused with more and longer single pink and ochreous hair, dorsal part of the abdomen broadly ringed yellow and black. On the emerging area of the hindwings and the last abdominal segments there are broad tufts of rusty pink scales and hairs. Ventral side of thorax covered with pink hair, that of the abdomen with rust-coloured tufts. Right forewing length 44.0 mm (n = 3); in addition to the forewing markings which are described for the male already, there is a black subapical field and a darkened submarginal zone in the forewing, and the hindwing has more pinkish transparent parts basal to the postmedian line and a pinkish transparent submarginal zigzag band. Wing undersides similar to the male, but there is an additional submarginal dark zigzag band on both fore- and hindwings.

♀ genitalia (Fig. 116; genitalia no. CBH-0363): Relatively small compared to the size of the specimen. Anal papilles furcate, lamella postvaginalis subsclerotized, lamella antevaginalis furcate, but not as much separated centrally as figured by Lemaire (2002: fig. 144, no. 4) for *M. azuelensis* LEMAIRE, 1976, with heavily sclerotized posterior central margin. Anterior and posterior apophyses of almost similar length.

Nearest relatives of that new taxon are *M. azuelensis* from Ecuador and *M. bertrandi* from Peru. While the first can easily be separated by the missing dark forewing dot and the missing inner spines of the valves in male genitalia structures, the latter one has very similar genitalia structures. Specimens of *M. bertrandi* from Peru, Pasco Dept. in our collections are smaller (length of right forewings 36 mm on average), have a more rounded forewing apex and a slightly convex outer margin, the dark forewing marking has a more triangular form, and the hindwing is typically of pink colour in the inner part; while in *M. bertrandi* the hindwing ocellus is touching the postmedian line or is at least nearby, this element is clearly separated in *M. luzalesarum* in both male and female specimens. Additionally, that species differs in the male genitalia structures (genitalia no. 874/03 Naumann) by having a more slender and triangular saccus and and thinner and less sclerotized processes of the juxta.

Generally, all three species form a group which occurs at moderate to high elevations and goes ahead with relatively large size compared to other members of the genus which occur at lower altitudes. All those species are coloured very dark. Another species of that group just was collected at even higher altitudes in Peru which again is much larger, the description is in preparation already.

### ***Automeris tatieae* NAUMANN, BROSCH, & WENZEL, new species**

Holotype (Fig. 48 dorsal, fig. 49 ventral): ♂, Peru, Pasco province, Oxapampa env., La Suiza, 2180 m, 10°37'1S 75°30'0W GPS, VI.2002, leg. Bernhard Wenzel & José Boettger, genitalia no. CBH-0237, ex CBH. The holotype will be deposited together with the allotype in the collections of ZMHU Berlin.

Allotype (Fig. 50 dorsal, fig. 51 ventral): ♀, Peru, Pasco province, Oxapampa env., La Suiza, 2180 m, 10°37'1S 75°30'0W GPS, 21.VII.2001, leg. Bernhard Wenzel & José Boettger, ex CBH (ZMHU).

Further paratypes: 36 ♂♂ 19 ♀♀, 2 larvae preserved in alcohol and 2 pupae/cocoons with following data:

1 ♂, Peru, Pasco province, Oxapampa env., La Suiza, 2180 m, 10°37'1S 75°30'0W GPS, VI.2002, leg. Bernhard Wenzel & José Boettger, genitalia no. 787/02 Naumann (CSNB); 1 ♂, Peru, Pasco province, Oxapampa env.,

La Suiza, 2412 m, 10°37'12.1S 75°17'22.2W GPS, humid forest, IX.2002, leg. José Boettger, received from B. Wenczel (CSNB); 1 ♂, same data, IX.2002 (CBH); 1 ♂, same data, VI.2002, genitalia no. CBH-0236 (CBH); 4 ♂♂, Peru, Pasco province, Oxapampa env., La Suiza, 2180 m, VI.2002, leg. Bernhard Wenczel & José Boettger (CESB); 1 ♂, Peru, Pasco province, Oxapampa env., La Suiza, 2180 m, 10°37'1S 75°30'0W GPS, 20.VII.2001, leg. Bernhard Wenczel & José Boettger (CBWK); 5 ♂♂, Peru, Pasco province, Oxapampa env., La Suiza, 2180 m, 10°37'1S 75°30'0W GPS, 5.–13.VI.2002, leg. Bernhard Wenczel & José Boettger (CBWK); 10 ♂♂ 13 ♀♀, Peru, Pasco province, Oxapampa env., La Suiza, 2180 m, 10°37'1S 75°30'0W GPS, ex ovo 20.XI.–22.XII.2002, 2 ♀♀ 4. & 13.III.2003 on *Fagus sylvatica* in Switzerland, cult. B. Wenczel & V. Suter (CBWK); 1 ♂ 1 ♀, same locality, ex ovo 20.XI.–22.XII.2002, received from B. Wenczel (CCMC); 1 ♀, same locality, leg. Bernhard Wenczel & José Boettger, 25.–26.IV.2003 (CBH); 1 ♀, same data, emerged 13.III.2003 (CBH); 1 ♀, same data, emerged 22.XII.2002 (CSNB); 3 ♂♂, Peru, Pasco province, Oxapampa env., La Suiza, 2180 m, 10°37'1S 75°30'0W GPS, ex ovo 19.–30.XI.2002 on *Fagus sylvatica* in Berlin, Germany, cult. S. Naumann (CSNB); 1 ♂ 1 ♀, Peru, Pasco province, Oxapampa env., La Suiza, 2180 m, 10°37'1S 75°30'0W GPS, ex ovo 28. & 29.XII.2002 on *Fagus sylvatica* in Germany (CESB); 7 ♂♂ 1 ♀, Peru, Oxapampa, Pasco province, La Suiza, 2000–2300 m, 12.–18.VII.2004, leg. Hubert Meyer (CFMP); 2 larvae in alcohol, Peru, Pasco province, Oxapampa env., La Suiza, 2180 m, 10°37'1S 75°30'0W GPS, reared XI.2002 on *Fagus sylvatica* in Berlin, Germany (CSNB); 2 pupae with cocoons, Peru, Pasco province, Oxapampa env., La Suiza, 2180 m, 10°37'1S 75°30'0W GPS, ex ovo VIII.2002 on *Fagus sylvatica* in Switzerland, cult. B. Wenczel & V. Suter (CBH, CSNB).

Derivatio nominis: The new species is dedicated to the former wife of Bernhard Wenczel, Tatia Wenczel-Montrone, in recognition of her help and support during expeditions in Venezuela and rearing efforts in Switzerland.

## Description

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### Colour figures:

Fig. 48: *Automeris tatieae* ♂ holotype, dorsal view; fig. 49: same specimen, ventral view; fig. 50: *A. tatieae* ♀ allotype, dorsal view; fig. 51: same specimen, ventral view; fig. 52–55: *A. tatieae*, larvae; fig. 52: second instar; fig. 53: third instar; fig. 54: fifth instar; fig. 55: eighth and final instar.



Genitalia-  
Preparation  
CBL-D332  
Ulrich  
Hille

Coll. BROSCH  
D-32479 Hille

P. E. R. U. :  
Patio province:  
Opatzgraben  
S 03731 / W 03730 / 390  
LA Scheib / 2180 m / June 2002  
Hg. Bernhard Witzel  
K. 3541 Böttger

P. E. R. U. :  
Patio province:  
Opatzgraben  
S 03731 / W 03730 / 390  
LA Scheib / 2180 m / July 21, 2001  
Hg. Bernhard Witzel  
K. 3541 Böttger

Coll. BROSCH  
D-32479 Hille

P. E. R. U. :  
Patio province:  
Opatzgraben  
S 03731 / W 03730 / 390  
LA Scheib / 2180 m / July 21, 2001  
Hg. Bernhard Witzel  
K. 3541 Böttger

Coll. BR  
D-32479  
S 03731 / W 03730 / 390  
LA Scheib / 2180 m / July 21, 2001  
Hg. Bernhard Witzel  
K. 3541 Böttger

♂ (Fig. 48 dorsal, fig. 49 ventral): The species was reared, so there is a relatively large type series; generally, in our following description we mention only measurements of wild collected specimens. Ground colour of freshly hatched specimens is a dark reddish to violet brown, but when reared specimens were on the wing for one night they became coloured like the wild collected specimens which show a more dark brown colour with heavy markings in black, suffused with yellow scales and hairs. Antennae ochreous, quadripectinate with 32 segments, around 12.0–13.0 mm long (holotype 12.5 mm), longest rami 2.3 mm long, reduced only in the two last segments. Head and dorsal thorax dark chocolate brown, with white setae on the basis of all four wings, abdomen on dorsal side vivid orange. Ventral side of thorax and abdomen covered with long carmine brown hair. Forewing length 55–58 mm ( $\bar{\text{O}} = 56.3$  mm,  $n = 3$ ; holotype 58.0 mm), reared specimens slightly smaller, from 52–57 mm forewing length. The base of the wings covered with a row of white hair. Antemedian line oblique, little darker than ground colour, in the median area the typical almost rectangular discal spot with suffused white central spot and five peripheral dark dots, one of them near to or on the postmedian line which is black proximal and yellow in its outer portion. Postmedian area broad due to the proximal position of the postmedian line, again in the ground colour, with an outer zigzag band which separates the submarginal area. All those markings more intensive in flown specimens as shown in the figured holotype. Hindwing in basal area covered with long orange hairs, medial area ochre with large black ocellus with a central dot of black and white scales encircled again with ochre, with a maximum diameter of 13–15 mm (holotype 15.0 mm). The ocellus is very near to the black postmedian band which is followed by ochreous ring and another black submarginal band of variable width, followed by the submarginal area in ground colour. The wing undersides completely of homogenous violet brown colour; only markings in the forewing are a black central forewing patch with white centre, a black postmedian line and a darkened apex, in the hindwing median and postmedian line and a white spot representing the dorsal centre of the ocellus. All dark markings become more intensive in older flown specimens.

♂ genitalia (Fig. 90; genitalia no. 787/02 Naumann): Uncus tall, heavily sclerotized, with irregular lateral thorns. Gnathos almost rectangular, with a triangular tip at its end. Saccus long, squarelike, juxta inconspicuous, only a lateral sclerotization. Sacculus of the valves with a small projection in ventral direction, valves bilobed, with a row of bristles on its margin between the two lobes, and without any inner spines, the dorsal lobe falcate. Aedeagus straight, vesica emerging on ventral side.

♀ (Fig. 50 dorsal, fig. 51 ventral): Very similar to the male, including same ground colour, with the typical differences due to sexual dimorphism: Antennae fasciculate, with 34 segments, in total 11.0–12.0 mm long. The central forewing patch is not bordered by the dark dots, the forewing is more rounded and has a forewing length of 62 mm in the wild collected allotype; reared specimens are of similar size, from 61.0–70.0 mm ( $\bar{\phi}$  = 63.9; n = 12). Also wing undersides similar to the males.

#### Additional notes

*A. tatiæ* easily can be separated from all nearly related species, the members of the group of *A. egeus* (CRAMER, 1775), by some typical characters such as the very proximal situated postmedian line which is connected with the forewing central patch and which is followed by a very wide postmedian area even in the apical parts of the forewing. In all other related species including *A. egeus* and *A. boops* R. FELDER in C. FELDER & ROGENHOFER, 1874 which probably is the nearest relative, the central patch is clearly separated. Also the rami of the male antennae are very long, all other members have taller antennae. Generally, no other species of that group was found at such high altitudes as *A. tatiæ*. For comparison several genitalia preparations of the group were examined which showed conformity with those figured by LEMAIRE (2002: Fig. 48, nos. 3–6; fig. 49, no. 1) for each member of the group; also here we found typical structures in the form of the uncus. While it is short, tall and covered with few lateral projections in *A. tatiæ*, it is much longer and bent downward in *A. egeus* (e.g. genitalia no. CBH-0248, specimen from Peru, Pasco, 400–700 m) and longer and broader in *A. boops* (e.g. genitalia no. CBH-0249; specimen from Peru, Cuzco, 800–1200 m); in both species any lateral projections are missing. The gnathos of the latter two is triangular, in *A. egeus* even less sclerotized, the dorsal lobes of the valves of both species are rounded, spoonlike, and the aedeagus is more massive and longer.

Below we shortly give a description of the immature stages of *A. tatiæ* which additionally showed peculiar details and differ from those of *A. egeus* and *A. larra* WALKER, 1855. Generally, larvae of that group mainly differ by different colours for different species as noted by LEMAIRE (2002: 371).

Immature stages (Figs. 52–55; 2<sup>nd</sup>, 3<sup>rd</sup>, 5<sup>th</sup>, & 8<sup>th</sup>, final instar): *A. tatiæ* was reared successfully in Switzerland on *Fagus sylvatica*, early instars can be compared with those of *A. egeus*, as well from Peru but from lower elevations. The larva shows typical features for the group, with very long

dorsal and subdorsal scoli covered with urticating bristles of thoracic and last three abdominal segments. While in last instar larvae of *A. egeus* they are brown (compare also LEMAIRE 2002: plate ES5, figs. 4–6), they tend to be even longer and of light bluish violet colour in *A. tatiæ*. Generally, the last instar larva is of purple ground colour; earlier instars are of yellowish green colour, later they become quite colourful with purple and whitish blue scoli covered heavily with bristles. While most other species of the genus *Automeris* spin their cocoons between leaves or short twigs, *A. tatiæ* tends to walk around on the ground before pupating in mossy soil with only few filaments of silk. We figure here only three instars of that species.

### ***Automeris diabolanda* NAUMANN, BROSCH, & WENCZEL, new species**

Holotype (Fig. 56 dorsal, fig. 57 ventral): ♂, Peru, Pasco province, Oxapampa env., humid forest, 2511 m, 10°38'15.1''S 75°17'14.2''W, early V.2002, leg. José Boettger, genitalia preparation no. 709/02 Naumann, ex CBWK. The holotype will be deposited together with the allotype in the collections of ZMHU Berlin.

Allotype (Fig. 58 dorsal, fig. 59 ventral): ♀, Peru, Pasco province, Oxapampa env., La Suiza, 2180 m, 10°37'1S 75°30'0W GPS, 21.VII.2001, leg. B. Wenczel & J. Boettger, ex CBWK (ZMHU).

Further paratypes: 49 ♂♂, 58 ♀♀, 3 larvae in alcohol, 14 cocoons, deposited in the following collections:

1 ♀, same locality as holotype, but VI.2002, leg. B. Wenczel & J. Boettger (CBH); 4 ♀♀, same data (CESB); 1 ♀, same locality, but 18.VIII.2001 (CESB); 12 ♂♂ 4 ♀♀, same locality, 21.IV.–1.V.2003, leg. B. Wenczel (CBWK); 1 ♀, same locality as allotype, but 19.VII.2001, leg. B. Wenczel & J. Boettger (CSNB); 2 ♀♀, same locality as allotype, but 20. & 21.VII.2001 (CBWK); 1 ♀, same locality as allotype, but 5.–18.IV.2002, leg. B. Wenczel & J. Boettger (CBH); 1 ♀, same locality as allotype, but

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#### **Colour figures:**

Fig. 56: *Automeris diabolanda* ♂ holotype, dorsal view; fig. 57: same specimen, ventral view; fig. 58: *A. diabolanda* ♀ allotype, dorsal view; fig. 59: same specimen, ventral view; fig. 60–61: *A. diabolanda*, larvae; fig. 60: second instar; fig. 61: third & forth instar; fig. 62: fifth instar; fig. 63: sixth and final instar.

Collection  
Bernhard Wenzel

PERU,  
Pasco province,  
Oxapampa environment,  
humid forest, 2511 m,  
10°38'15.1"S 75°17'14.2" W,  
early V.2002,  
leg. José Boettger

Exhibits Number  
genitalia prep.  
no.  
date  
coll.  
origin  
Stefan Naumann



56

Collection  
Bernhard Wenzel

PERU,  
Pasco province,  
Oxapampa environment,  
La Suiza,  
10°37'15.075" S 75°30'00" W GPS,  
2180 m, 21.VII.2001,  
leg. B. Wenzel & J. Boettger



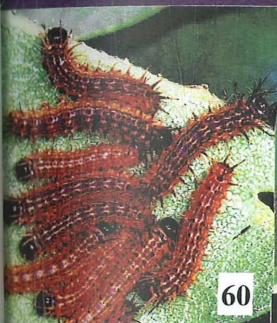
58



57



59



60



62



61



63



5.–13.VI.2002, leg. B. Wenczel & J. Boettger (CWAN > SMFL); 1 ♀, same locality as allotype, but VIII.2003, leg. J. Boettger (CBH); 1 ♀, same locality as allotype, but IX.2002, leg. J. Boettger (CBH); 1 ♀, same locality as holotype, 5.–18.IV.2002, leg. J. Boettger (CBH); 1 ♀, same locality as holotype, VI.2002, leg. J. Boettger (CBH); 1 ♂, same locality as holotype, 21.IV.–1.V.2003, leg. B. Wenczel (CBH); 1 ♀, same locality as allotype, but VI.2002, leg. B. Wenczel & J. Boettger, genitalia no. 848/02 Naumann (CSNB); 1 ♀, same locality, but VII.2002, leg. J. Boettger (CBWK); 1 ♀, same locality, but 5.–13.VII.2002, leg. B. Wenczel (CBWK); 1 ♀, same locality, VIII.2003 (CSNB); 1 ♂, Peru, Pasco, Oxapampa env., 2500 m, 21.IV.–1.V.2003, leg. B. Wenczel (CFMP); 1 ♀, Junin province, Calabaza, 2700 m, III.1998, leg. local collector (CESB); 2 ♀♀, Junin province, Calabaza, 2000 m, 9.IV.1998 & V.1999, leg. I. Callegari (CBWK); 3 ♂♂ 4 ♀♀, reared from stock of same locality as allotype in California, emerged 17.II., 21.II.(2x), 22.II., 2.III., 7.III., & 8.III.2003 (CKWE); 2 ♂♂, same origin, emerged 2. & 8.V.2004 in Escondido, received V.2004 from K. Wolfe (CSNB); 1 ♂, same origin, reared on *Fagus sylvatica* by Uli Weritz, emerged 13.III.2003 (CBWK); 1 ♂, same origin as holotype, reared ex ovo IV.2004, cult. B. Wenczel (CSNB); 24 ♂♂ 25 ♀♀ reared from stock of same locality as allotype, emerged V.2003, cult. B. Wenczel (CBWK); 2 ♂♂ 2 ♀♀, Peru, Pasco, Oxapampa env., 2500 m, 21.IV.–1.V.2003, leg. B. Wenczel (CCMC); 1 ♂, same data (CSNB); 11 cocoons, 1 ♂ 1 ♀, emerged IV.2004, reared in Switzerland from stock of same locality as allotype, cult. B. Wenczel (CBH); 3 larvae 2<sup>nd</sup> instar in alcohol, same locality, reared on *Fagus sylvatica* VIII.2002 in Switzerland (CBH, CSNB, ZMHU); 3 cocoons, reared in Germany by U. Weritz in 2002 on *Fagus sylvatica* (CSNB, ZMHU).

**Derivatio nominis:** The name is derived from the Spanish word for “dayflying” due to the typical behaviour of the male, and also, somewhat ambiguous, due to its nearly black colour gives a hint to the underworld.

### Description

♂ (Fig. 56 dorsal, fig. 57 ventral): Ground colour variable, among the reared series were very dark brown with greyish or even greenish shadows and chocolate brown specimens, all of them are a little transparent in their outer portions of the wings. Antennae quadripectinate, with 29 segments, 7.0 mm long, longest dorsal rami 0.95–1.0 mm ( $\emptyset = 0.95$  mm,  $n = 16$ ;

holotype 0.95 mm), longest ventral rami 0.45–0.5 mm ( $\varnothing = 0.45$  mm, n = 16; holotype 0.45 mm), chocolate brown. Forewing length 27.0–28.0 mm ( $\varnothing = 27.7$  mm, n = 5; holotype 28.0 mm). Thorax, abdomen and forewing almost uniform in the ground colour, visible markings are the small white forewing spot which has a dark circle around darker than the ground colour, and the darker postmedian band. Marginal area darkened and a little transparent. Hindwing purplish brown in basal area, the round black hindwing ocellus of maximum 6 mm diameter with small round white centre, surrounded completely or in some specimens at least posterior with yellow and reddish brown, followed by black submarginal band. Outer margin again in the ground colour. On ventral side the species is quite variable, even so much that if not known that reared specimens were resulting from a single female, one would not imagine that it is a single species. There are different ground colour morphs, from reddish brown, greenish brown to dark brown. Thorax and abdomen in that ground colour, only an anal tuft of hairs on the last segment is always dark brown. Tarsi of all six legs violet. Forewing basally and marginally in the ground colour, in between there is an area of different extension in creamy yellow or ochreous orange with round black ocellus of 4.0–6.0 mm maximum diameter (holotype 5.0 mm) and white centre. The extension of the yellowish part goes from just only around the ocellus to two thirds of the forewing surface, so that in some specimens the dark postmedian line is visible. Hindwing completely in the ground colour, only marking is the white central spot of the ocellus. The dorsal dark markings of ocellus and postmedian line are hinted as shadow.

♂ genitalia (Fig. 112; genitalia no. 709/02 Naumann): The male genitalia structures are somewhat unique within the genus, nearest come those of *A. muscula* (VUILLOT, 1892). Uncus helmetlike, curved in ventral direction, strongly sclerotized, with some bristles dorsally. This structure is complemented by a large squarelike heavily sclerotized bifurcate gnathos. Saccus very typical and unique for the genus, with several incurvations, like the body of a violine. Juxta small, rounded, bristles on ventral side, without processes. Sacculus with a very small tip at the base of the valves, which are slender and rounded apically. There is a very long bent spine emerging from inner dorsal margin. Aedeagus relatively short, vesica emerging on ventral side, without any spiculae, generally the form of this structure is not very significant. Sternite (not figured) of eighth abdominal segment broad, with central incurvation and two posterior almost central tips. Last tergite rounded.

♀ (Fig. 58 dorsal, fig. 59 ventral): Ground colour almost similar to the males, a little transparent, including the variability of specimens. The allotype is a dark brown specimen, but there exist also greyish and reddish to violet brown specimens. Generally, there are the typical sexual dimorphic differences to the male, such as larger size, less falcate forewings, and different antennae. Those are ochreous brown, fasciculate, with around 26 segments, 7.0–8.5 mm long ( $\bar{\phi}$  = 8.0 mm, n = 12; allotype 8.5 mm). Head, thorax, and abdomen on dorsal side dark greyish brown with long hair in that colour, suffused with single longer ochreous hairs which emerge more densely on the last abdominal segments. On ventral side thorax in ground colour, but tarsi of the legs, similar to the male, violet, and abdomen in the dorsal wing ground colour covered heavily with long ochreous bristles. Forewings from basis to apex 32.0–39.0 mm ( $\bar{\phi}$  = 35.6 mm, n = 10; allotype 37.0 mm), several wild collected paratype specimens with incomplete forewings), of rounded shape with small apical tip. Antemedian area little darkened, dark forewing patch of 5–8 mm maximum diameter, postmedian line distinct, straight or little concave, turned directly to the apex. Submarginal zone a little lighter. Hindwing from basal to postmedian band in ground colour, only submarginal zone little lighter. The hindwing ocellus black with small or reduced white lenticular centre, surrounded by thin yellow line. It is of almost round form, in few specimens with straight basal margin, maximum diameter 4.5–8 mm ( $\bar{\phi}$  = 6.15 mm, n = 16; allotype 6.0 mm). Ventral side of the wings very homogenous in ground colour, only visible markings are the dark forewing patch and the hindwing ocellus plus the postmedian band on fore- and hindwing.

♀ genitalia (not figured; genitalia no. 848/02 Naumann): Anal papilles widely furcate, with several longitudinal sclerotizations in between on ventral side. Lamella postvaginalis almost rectangular, with infurcation at its posterior end, laterally fused with the eighth tergite. Lamella antevaginalis medially separated to two lateral rounded shields, not fused medially and to lateral tergite structures. Anterior apophyses only as half as long as posterior ones. Sternite of eighth segment with rounded posterior margin.

#### Additional notes

*A. diabolanda* can easily be separated from *A. muscula* and *A. boudinoti* LEMAIRE, 1982 which probably are the nearest relatives. The latter one was described after a female singleton (LEMAIRE 1982: 68) from nearby Huánuco province in Peru which was figured in the original description and

later (LEMAIRE 2002: pl. 63, fig. 11) in colour; males of that species are not known and probably are also day-active. The female holotype has very homogenous forewings, only very small forewing ocelli, and the black hindwing ocellus is surrounded by an orange zone, all three characteristics which cannot be found in a series of 16 females of *A. diabolanda*. The female genitalia figured by LEMAIRES (1982: fig. 24; 2002: fig. 167, no. 1) clearly differ from those of *A. diabolanda* by the “subtriangular” lamella postvaginalis, the “subsclerotized” lamella antevaginalis, and the “subequal” length of the apophyses. *A. muscula* from southeastern Brazil looks quite different both in males and females but shares the dark colour and the long internal processes of valves in male genitalia; most probably the male is also day-active as it is known from nearly related *A. styx* LEMAIRES, 1982 from own rearing experiments.

Immature stages (Figs. 60–63; 2<sup>nd</sup>, 3<sup>rd</sup> & 4<sup>th</sup>, 5<sup>th</sup>, & 6<sup>th</sup> and final instar): *A. diabolanda* was reared twice successfully in Switzerland from eggs deposited by wild caught females, and again once in Germany and in California, USA. The early instars are figured in colour; they live gregariously in the first four instars and accepted *Quercus x turneri* Willd. “*pseudoturneri*” (Fagaceae) and *Carpinus betulus* L. (Corylaceae) in European captivity. In California the species was reared on *Robinia* (Fabaceae) which was not accepted in Switzerland. Some comments reached us from Kirby L. Wolfe who mentioned that males emerged from cocoons before or at dawn, females between 7.00–9.00h a.m. A calling female was placed at 12.15h with a fresh male in a flying cage, and copulation took place at 12.30h already; it lasted until 16.00h when the male released the female but remained near her until after dark. Next morning he had slightly changed his position in the cage but apparently had not spent much time flying.

### ***Automeris suteri* NAUMANN, BROSCH, & WENCZEL, new species**

Holotype (Fig. 64 dorsal, fig. 65 ventral): ♂, Peru, Pasco province, Oxapampa env., high altitude humid forest, 2511 m, 10°38'15.1''S 75°17'14.2''W, 5.–18.IV.2002, leg. B. Wenczel & J. Boettger, ex CBWK. The holotype will be deposited together with the allotype in the collections of ZMHU Berlin.

Allotype (Fig. 66 dorsal, fig. 67 ventral): ♀, same data as holotype, in ZMHU Berlin.

Further paratypes: 23 ♂♂ 12 ♀♀ with following data: 20 ♂♂ 8 ♀♀ with same data as holotype, deposited in the following collections: 12 ♂♂ 3 ♀♀ (CBWK); 1 ♂ 2 ♀♀ (CCLL); 1 ♂ 1 ♀ (CESB); 1 ♂ (CFMP); 2 ♂♂ 1 ♀, male genitalia nos. 693 & 694/02 Naumann (CSNB); 1 ♂ 1 ♀ (CBH); 2 ♂♂ (CWAN > SMFL); 1 ♂ 1 ♀, Peru, Pasco, Oxapampa env., 2500 m, 21.IV.–1.V.2003, leg. B. Wenczel (CFMP); 1 ♂ 1 ♀, same data (CCMC); 1 ♀, same locality, 20.IV.2003, leg. J. Boettger (CSNB); 1 ♀, same locality, VI.2002, leg. J. Boettger (CBH); 1 ♂, same locality, 20.IV.2003, genitalia no. CBH-0403 (CBH).

**Derivatio nominis:** The species is named in honour of Viktor Suter, Zürich, Switzerland who is supporting the scientific work of the authors with his rearing success and photo series of livestock material of South American Saturniidae since long time.

## Description

♂ (Fig. 64 dorsal, fig. 65 ventral): Ground colour intensive orange brown. Antennae quadripectinate, with 26 segments, 8.0–8.5 mm long ( $\bar{\varnothing}$  = 8.1, n = 16; holotype 8.5 mm), longest dorsal rami 0.95–1.0 mm ( $\bar{\varnothing}$  = 0.95 mm, n = 16; holotype 0.95 mm), longest ventral rami 0.45–0.5 mm ( $\bar{\varnothing}$  = 0.45 mm, n = 16; holotype 0.45 mm), orange. Thorax with hairs in ground colour, only tarses of last pair of legs little darker and reddish. Forewings from basis to apex 26.0–29.0 mm long ( $\bar{\varnothing}$  = 27.2 mm, n = 16; holotype 26.8 mm), from dorsal in ground colour with more or less mixed yellow and reddish brown scales. Only markings are the white central forewing dot of approximately 1 mm diameter with darker shadow around, and a dark brown line from basal margin to the apex which is bordered anterior only with yellow scales and posterior with reddish ones. The hindwing basally and marginally with red hairs, prior to the not lunular black ring a dark yellow area with a black eyespot which is approximately 6 mm in maximum diameter and has a white central spot of around 1 mm diameter. Marginally

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## Colour figures:

Fig. 64: *Automeris suteri* ♂ holotype, dorsal view; fig. 65: same specimen, ventral view; fig. 66: *A. suteri* ♀ allotype, dorsal view; fig. 67: same specimen, ventral view; fig. 68: *Pseudautomeris boettgeri* ♂ holotype, dorsal view; fig. 69: same specimen, ventral view.



Collection  
Bernhard Wenzel

PERU,  
Pasco province,  
Oxapampa environment,  
humid forest, 2511 m,  
10°38'15.1" S, 75°17'14.2" W,  
3.-18.IV.2002,  
leg. B. Wenzel & J. Boettger

64



Collection  
Bernhard Wenzel

PERU,  
Oxapampa province,  
Oxapampa environment,  
humid forest, 2511 m,  
10°38'15.1" S, 75°17'14.2" W,  
5.-18.IV.2002,  
leg. B. Wenzel & J. Boettger

65



Collection  
Bernhard Wenzel

PERU,  
Pasco province,  
Oxapampa environment,  
humid forest, 2511 m,  
10°38'15.1" S, 75°17'14.2" W,  
5.-18.IV.2002,  
leg. B. Wenzel & J. Boettger

66



Collection  
Bernhard Wenzel

PERU,  
Pasco province,  
Oxapampa environment,  
humid forest, 2511 m,  
10°38'15.1" S, 75°17'14.2" W,  
5.-18.IV.2002,  
leg. B. Wenzel & J. Boettger

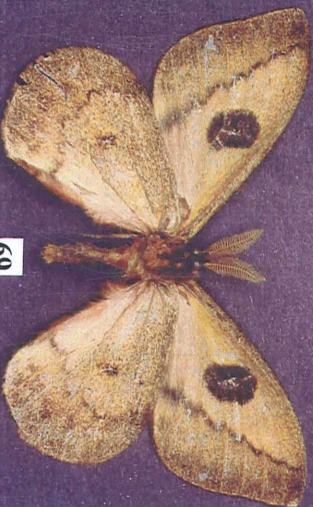
67



Collection  
Bernhard Wenzel

PERU,  
Pasco province,  
Oxapampa environment,  
humid forest, 2511 m,  
10°38'15.1" S, 75°17'14.2" W,  
5.-18.IV.2002,  
leg. B. Wenzel & J. Boettger

68



Collection  
Bernhard Wenzel

PERU,  
Pasco province,  
Oxapampa environment,  
humid forest, 2511 m,  
10°38'15.1" S, 75°17'14.2" W,  
5.-18.IV.2002,  
leg. B. Wenzel & J. Boettger

69

to the black ring a purple red zone, outer margin again in the orange ground colour. The wing undersides generally lighter, only markings of the forewing are the black eyespot with white central spot, the black diagonal band and few apical dark scales. The hindwing with less markings, only dark violet scales on the outer half of the wing and a straight interrupted violet band from the inner margin to the wing apex, the black elements of dorsal side outlined as shadows. The abdomen in ground colour, only the first four segments covered with red hair.

♂ genitalia (Fig. 111; genitalia no. 693/02 Naumann): Uncus nearly triangular, less sclerotized than in *A. grammodes* JORDAN, 1910 (Fig. 101; genitalia no. 692/02 Naumann, specimen from Peru, Cusco) and *A. heppneri* LEMAIRE, 1982. Valves of same form, but without the typical harpes which are strongly sclerotized in both related species and nearly totally reduced to a small internal processus in the new species. The gnathos is the most sclerotized structure of the genitalia, with a broad rounded basis and a strong apical spine, while it is a long "subtriangular" (cf. LEMAIRE 1973: 350) structure with short apical spine in *A. grammodes* and nearly reduced in *A. heppneri*. Juxta with two lateral ventral lobes, Saccus long, a little triangular. The aedeagus of similar form as in the others, bulbus ejaculatorius shorter than the aedeagus. Tergite less elongated than in *A. grammodes*, sternite with more rounded distal processi.

♀ (Fig. 66 dorsal, fig. 67 ventral): Ground colour much paler than in the male, more ochreous. Antennae bipectinate, with 25–26 segments, 7.5–8.5 mm long ( $\bar{\varnothing} = 7.9$  mm,  $n = 8$ ; allotype 7.5 mm), longest processi only 0.2 mm long, orange-brown. Head with dark brown hairs, thorax with long hairs in ground colour, but legs much darker, greyish brown with ochreous hairs. Wings with the same markings as in the male, only differently coloured and sized: Forewings from basis to apex 33.0–36.0 mm ( $\bar{\varnothing} = 34.7$  mm,  $n = 8$ ; allotype 34.8 mm), the white dot with approximately 1.6 mm diameter again with shadow around, caused by the black underside marking. The dark diagonal line black, with proximate yellow border. Hindwing basally more pinkish, ocellus with approximately 6.5–7 mm diameter with white triangular center, surrounded by yellow area. From basal to marginal a black ring, followed by a purple, pink and ochreous area. The underside pale ochreous, the markings similar to the male with the typical black forewing dot with white centre and the black diagonal line, in the hindwing the black diagonal band and the shadowed ocellus. All marginal parts of the wings interspersed with small dots of black scales. The abdomen ringed black and ochreous, respectively red in the anterior dorsal parts.

The males were attracted to light in April 2002 from 18.15 to 18.30 h, the females from 20.00 to 21.30 h. The males are very active flyers and never sit down on a screen or on the ground, sometimes even disappeared when not caught, and came to light by two or three at the same time. The females arrived very slowly just 15 cm maximum above ground, in most cases crawling on the ground and sitting on blades of grass (Poaceae). Most probably there is only one generation per year, as at the same locality no specimens were found so far during expeditions in other months.

The collecting site is situated just 50 m altitude below timberline in sight to this "border", the flora there is mainly an assembly of grass, 3 m high bamboo, fern and heath (Ericaceae). Due to the missing trees there are stormy winds, and the collecting place was chosen at little lower elevation inside the sheltering humid montane forest. Specimens always arrived at light when wind calmed down and some fog came up.

Nearest relatives of *A. suteri* are *A. grammodes* (with junior subjective synonym *A. unifasciatus* BOUVIER, 1927; cf. DRAUDT in SEITZ, 1929: 741) and *A. heppneri* which both can easily be separated by their forewing discocellular field without white dot, the missing red parts of the hindwings, and details in male genitalia morphology such as the totally reduced internal process of the valves which are well developed and sclerotized in both other species (LEMAIRE 1973: 349; 1982: 67; 2002: 543, 545, 1041). Both *A. grammodes* and *A. heppneri* are found at lower elevations: *A. heppneri* is recorded only from its type locality at 290 m altitude in Madre de Dios, Eastern Peru and few further specimens from localities around, but *A. grammodes* (with type locality Peru, Santo Domingo, Carabaya, 6000 ft.; *A. unifasciatus*: Ecuador, Province de Bolivar, Balzapamba) was also found to occur sympatrically with the species described here; single males arrived at light between 19.00 and 20.00 h. *A. grammodes* was reared successfully on bamboo plants (*Phyllostachys nigra* [Lodd. ex Lindl.] Munro; Poaceae) by one of the authors (B. W.) and Viktor Suter in Switzerland from material resulting from Oxapampa. Obviously that foodplant choice was known to JORDAN when naming his new species in 1910 but never noted in literature so far; notes on grass-feeding Hemileucinae exist for *Pseudautomeris grammivora* JONES, 1908 (name !) in literature (BOURQUIN 1933, 1945; DE BIEZANKO et al., 1957). A revisional work on the group of *A. grammodes* is in preparation by NAUMANN & BROSCH.



*Pseudautomeris boettgeri* NAUMANN, BROSCH, & WENCZEL, new species

Holotype (Fig. 68 dorsal, fig. 69 ventral): ♂, Peru, Pasco province, Oxapampa env., high altitude humid forest, 2511 m, 10°38'15.1''S 75°17'14.2''W, 5.–18.IV.2002, leg. B. Wenczel & J. Boettger, ex CBWK. The holotype will be deposited together with the allotype in the collections of ZMHU Berlin.

Allotype (Fig. 72 dorsal, fig. 71 ventral): ♀, Peru, Pasco province, Oxapampa env., high altitude humid forest, 2412 m, 5.–18.IV.2002, leg. B. Wenczel & J. Boettger, ex CBWK (ZMHU). Added to the pin of the specimen is an alcohol tube with 4 ova laid by the allotype female.

Further paratypes: 56 ♂♂ 8 ♀♀ with following data:

33 ♂♂ 6 ♀♀ with same data as holotype, deposited in the following collections: 23 ♂♂ 3 ♀♀ (CBWK); 1 ♂ (CCMC); 2 ♂♂ 1 ♀ (CESB); 1 ♂ (CFMP); 3 ♂♂ 1 ♀, male genitalia no. 698 & 699/02 (CSNB); 1 ♂, genitalia no. CBH-0201 (CBH); 2 ♂♂ 1 ♀ (CWAN > SMFL); 22 ♂♂ 1 ♀ with same data as allotype, deposited in the following collections: 17 ♂♂ (CBWK); 1 ♂ (CESB); 1 ♂ (CFMP); 1 ♂ (CSNB); 1 ♂ 1 ♀ (CBH); 1 ♂ (CWAN > SMFL); 1 ♀, same locality as holotype, but VI.2002 (CBH); 1 ♂, same locality as holotype, but 21.IV.–1.V.2003 (CBH).

Derivatio nominis: The species is dedicated to our friend José “Pepe” Boettger from Oxapampa, Pasco province, Peru. With his kind help in Peru parts of the valuable material could be collected.

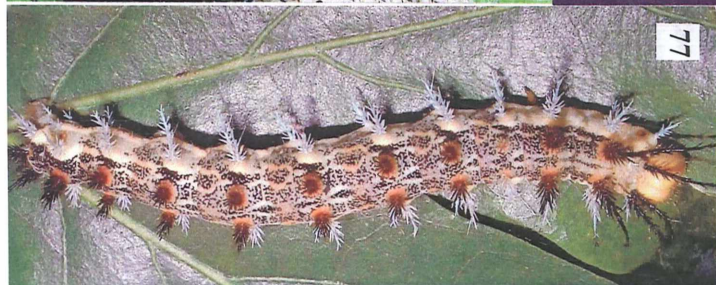
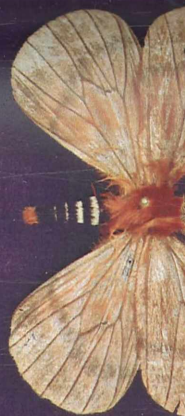
### Description

♂ (Fig. 68 dorsal, fig. 69 ventral): Ground colour (Fig. of head, thorax including legs and forewings dark chocolate brown. Antennae quadripectinate, with 29 segments, 11.5–13.5 mm long ( $\bar{\varnothing}$  = 12.3 mm, n = 7; holotype 13.5 mm),

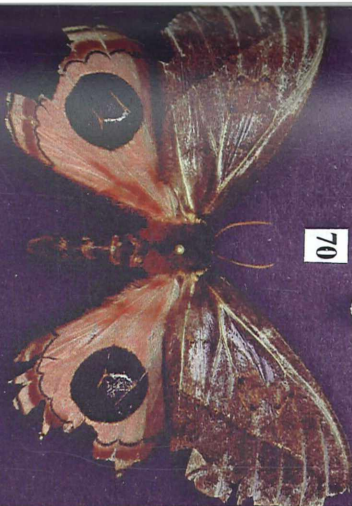
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### Colour figures:

Fig. 70: *Pseudautomeris boettgeri* ♀ allotype, dorsal view; fig. 71: same specimen, ventral view; fig. 72: *Cerodirphia peigleri* ♂ holotype, dorsal view; fig. 73: same specimen, ventral view; fig. 74: *C. peigleri* ♀ allotype, dorsal view; fig. 74: same specimen, ventral view; fig. 76: *C. peigleri*, larvae, third instar; fig. 77: *C. peigleri*, larva, sixth instar.



PERU,  
Pasco province,  
Oxapampa environment,  
humid forest, 2412 m,  
10°37'12.1" S 75°17'22.2" W,  
e887) 5.-18.IV.2002,  
leg. Josef Boettiger



70

PERU,  
Pasco province,  
Oxapampa environment,  
humid forest, 2412 m,  
10°37'12.1" S 75°17'22.2" W,  
e887) 5.-18.IV.2002,  
leg. Josef Boettiger



71

PERU:  
Pasco province,  
Oxapampa environment,  
humid forest, 2511 m,  
10°39'38.151" S 75°17'14.2" W,  
April 5-18, 2002,  
leg. Bernhard WENZEL  
& JOSE BOETTIGER



72

humid forest, 2511 m,  
10°39'38.151" S 75°17'14.2" W,  
5.-18.IV.2002,  
B. Wenzel & J. Boettiger



75

73



longest dorsal rami 1.6–1.7 mm ( $\bar{\varnothing}$  = 1.7 mm, n = 7; holotype 1.7 mm), longest ventral rami 1.0–1.1 mm ( $\bar{\varnothing}$  = 1.1 mm, n = 7; holotype 1.1 mm), ochreous brown. Forewings from basis to apex 37.0–45.0 mm long ( $\bar{\varnothing}$  = 41.2 mm, n = 55; holotype 43.5 mm), at their basis a small tuft of yellow hairs. The internal angle is quite rounded. There is a tight antemedian band, composed medially of a row of yellow scales, followed marginally by black ones. The discocellular field with two darker elements proximal, and three marginally; the postmedian line composed again by a tiny row of black and orange scales. The upper margin of the hindwing in the ground colour of the forewing, rest of the hindwing in a pink carmine colour. The large hindwing eyespot with 10.4–13.5 mm maximum diameter ( $\bar{\varnothing}$  = 11.6 mm, n = 6) intensive black, bordered outside with yellow scales, center with white scales and a proximal white “boomerang”, the lower and upper veins nearest to this white center with a yellow scratch. The marginal area with an lunulated black band, a dark violet and a groundcoloured area, outer margin black with dark pink fringes. On the underside both fore- and hindwings are covered with dark brown and yellow scales, showing some more yellow areas basally and postmedially in the forewing and at the inner margin of the hindwing, and some darker areas in the rest. The forewing discocellular area and the broad postmedian band are the only totally black markings in the forewing, only proximately to the latter one is found a small pinkish area. The hindwing shows a black zigzag postmedian band and slightly the intensive white parts of the hindwing ocellus. The abdomen basally with long carmine hairs, all segments dorsally black with red hairs intersegmental, from ventral nearly totally dark yellow brownish hairs. No differences in all those characteristics were found for specimens from both collecting sites at 2412 and 2511 m.

♂ genitalia (Fig. 115; genitalia no. 698/02 Naumann): Generally the genitalia is somewhat smaller than in *Ps. pohli* LEMAIRE, 1967 (fig. 114; genitalia fig. 696/02 Naumann) and *Ps. yourii* LEMAIRE, 1985. Uncus more slender, shorter, valves of same form, but the internal processus shorter and less sclerotized. The gnathos ending with a distal plain part whereas there is a more or less heavily indented end in both other species mentioned here; saccus quite short and triangular; aedeagus of same length as in both others, but nearly as half as tall; the vesica similar to *Ps. pohli*, but the two distolateral lobes emerging ventrally. Bulbus ejaculatorius nearly as long as the aedeagus. Tergite similar to *Ps. pohli*, but processus of the sternite more separated than in the latter one.

♀ (Fig. 70 dorsal, fig. 71 ventral): There are mainly differences to the males due to the sexual dimorphism in the sizes, for the other features females are almost similar if not mentioned in the following: Antennae bipectinate, 11.8–13.2 mm long ( $\bar{\varnothing}$  = 12.5 mm, n = 4; allotype 13.0 mm), longest processi only 0.15 mm long, orange brown. Forewings from basis to apex 46.0–50.0 mm ( $\bar{\varnothing}$  = 47.6 mm, n = 6; allotype 48.0 mm). Hindwing ground colour much paler, more pink, with a larger eyespot of 13.4–14.5 mm maximum diameter ( $\bar{\varnothing}$  = 14.0 mm, n = 2). On the undersides the yellow scales of the males are replaced by pink ones, so the main impression is somewhat greyish pink. The abdomen almost black, intersegmental greyish pink from dorsal, ventrally with totally dark grey hairs.

#### Additional notes

The males of this species came to the light just after those of *Automeris suteri* from 18.30 to 20.30 h, after 20.00 h also single females were observed. Specimens of both sexes directly rested on the screen.

It was tried to obtain living ova, and for this purpose females were brought back alive to the basis in Oxapampa at around 1810 m altitude where they showed no accustoming to lower altitudes, they refused to deposit any ova. Brought back to around 2400 m, the females started depositing. During several years of light collecting near the type-locality of *Ps. boettgeri* at around 2000 to 2200 m altitude in several months never any specimen of the new species was found. Specimens so far were collected only at the type locality, at around 2500 m altitude in humid montane forest.

From male genitalia and general appearance we conclude that probably *Ps. pohli* LEMAIRE, 1967 and *Ps. yourii* LEMAIRE, 1985 stand nearest to the species described here as *Ps. boettgeri*. All are members of the so-called “groupe de *Pseudautomeris salmonea*” (LEMAIRE 1974: 426; 2002: 600), an entity established tentatively for certain assemblages of taxonomic convenience, with the missing “calcar”, a supposed processus of the anellus (MICHENER 1952: 428). No *Pseudautomeris* species ever before was found at altitudes higher than around 2200 m (LEMAIRE 1974: 423 ff.; 1985: 49; the type locality of *Ps. yourii* is mentioned here as Ecuador, Oriente, Napo, route de Baeza à Tena, 5,5 km sud de Cosanga, 2170 m; for *Ps. pohli* altitudes from 1700 to 1800 m are reported by LEMAIRE & VENEDICTOFF (1989: 26; LEMAIRE 2002: 600 ff.). Generally, the new species can be separated from the two taxa cited for comparison, and also from all other species of the genus *Pseudautomeris*, by the combination of its size, the size

of the antennae, the hindwing colouration, and slight differences in genitalia and the form of the sternite and tergite of the eighth segment of the male.

***Cerodirphia peigleri* NAUMANN, BROSCH, & WENZEL, new species**

Holotype (Fig. 72 dorsal, fig. 73 ventral): ♂, Peru, Pasco province, Oxapampa env., high altitude humid forest, 2511 m, 10°38'15.1''S 75°17'14.2''W, 5.–18.IV.2002, leg. B. Wenzel & J. Boettger, ex CBH. The holotype will be deposited together with the allotype in the collections of ZMHU Berlin.

Allotype (Fig. 74 dorsal, fig. 75 ventral): ♀, same data as holotype, ex CSNB (ZMHU).

Paratypes: 120 ♂♂ 5 ♀♀ with following data:

1 ♂ 1 ♀, Peru, Pasco province, Oxapampa env., La Suiza, 10°37'1S/075°30'0W GPS, 2180 m, ♂ 22.VII.2001, ♀ 24.VII.2001, leg. B. Wenzel (CBWK); 1 ♂, same data, but X.2003, leg. J. Boettger (CBH); 1 ♂, Peru, same locality, 5.–18.IV.2002, leg. B. Wenzel & J. Boettger (CBH); 1 ♂, Peru, same locality, 5.–13.VI.2002, leg. B. Wenzel & J. Boettger (CSNB); 1 ♂ 1 ♀, Peru, Pasco province, Oxapampa env., high altitude humid forest, 10°37'12.1''S 75°17'22.2''W, 2412 m, 26.VII.2001, leg. B. Wenzel (CBWK); 2 ♂♂, same data (CFMP); 13 ♂♂, same data as holotype, 2511 m (CBWK); 2 ♂♂, same data (CSNB; one of those will be given to Ric Peigler, San Antonio); 2 ♂♂, same data, genitalia no. CBH-0202 (CBH); 3 ♂♂, same data, but VIII.2003 & IX.2002, X.2002, leg. J. Boettger (CBH); 1 ♂, same data, but 21.IV.–1.V.2003, leg. B. Wenzel & J. Boettger (CBH); 2 ♂♂, same data (CSNB); ♂, same data (CCMC); 19 ♂♂, same data as holotype (CBWK); 1 ♂, same data as holotype, genitalia no. 705/02 Naumann (CSNB); 1 ♀, same data as holotype (CBH); 62 ♂♂, same locality as holotype, 5.–13.VI.2002 (CBWK); 1 ♂, same data (CCMC); 1 ♀, same data (CSNB); 2 ♂♂, same data (CWAN > SMFL); 1 ♂, same locality, IV.2003 (CSNB); 1 ♂, Oxapampa env., 10°38'15.1S 75°17.14.2W GPS, 2511 m, humid forest, IX.2002, leg. J. Boettger (CSNB); 1 ♂, Peru, Pasco, Oxapampa env., 2500 m, 21.IV.–1.V.2003, leg. B. Wenzel (CFMP); 1 ♀, same locality, 21.IV.2003 (CCMC); 1 ♂, same locality as holotype, ex CBH (MHNL).

No type material: 2 ♂♂, Peru, [Huánuco ?], Region Carpich, Santa Teresita, 2707 m, 10.XII.1998, genitalia no. 142 & 147 Meister (CFMP).

Derivatio nominis: This delightful species is dedicated to our good friend Ric Peigler from San Antonio, Texas, USA

## Description

♂ (Fig. 72 dorsal, fig. 73 ventral): Ground colour orange brown, older specimens which have been on their wing for some days turn to an ochreous or reddish brown colour. Antennae quadripectinate, with 30 segments, 10.0–13.0 mm long ( $\bar{Q} = 11.4$ ,  $n = 101$ ; holotype 11.0 mm), longest ventral rami 1.8–1.9 mm ( $\bar{Q} = 1.85$  mm,  $n = 102$ ; holotype 1.85 mm), reduced only in the last two segments, ochreous. Head dark brown, thorax with long hairs of intensive orange brown colour, legs ochreous, of same colour as antennae. Abdomen with orange brown hairs on first segment, further segments ringed black and white on dorsal and lateral side, ventral side again in orange, last segment with a tip of vivid orange bristles. Forewings from basis to apex 36.0–42.0 mm long ( $\bar{Q} = 38.4$  mm,  $n = 102$ ; holotype 38.5 mm), almost uniformly but with genus-typical markings: All veins are clearly visible in dark brown. Antemedian line missing, postmedian band as shadow of black scales. The white marking Y-shaped, with a black border to apical direction, forewing apex rounded. Hindwing rounded, without any markings aside of the dark postmedian band. On ventral side lighter brown, only markings of both fore- and hindwing are the hinted postmedian band, and in the hindwing the upper margin is white, bordered by black scales basally.

♂ genitalia (Fig. 117; genitalia no. 705/02 Naumann): Uncus heavily sclerotized, with one large ventral process and two dorsolateral protuberances. In the genitalia easily gnathos and transtilla can be separated from each other: The more dorsal gnathos with sclerotized margin, the lower transtilla as rounded plate. Saccus triangular, juxta rounded, without any projections. Valves rounded with sclerotized triangular posterior tip; the complete margin is covered with lots of small bristles. Aedeagus short, vesica composed by two short right and left ventrolateral bulbs. Sternite of eighth abdominal segment with typical central prominent sclerotization with small central cone; eighth tergite as slender central process.

♀ (Fig. 74 dorsal, fig. 75 ventral): Ground colour similar to males. Antennae bidentate, with 36 segments, 11.0 mm long ( $\bar{Q} = 11.0$  mm,  $n = 5$ ; allotype 11.0 mm), longest rami 0.4 mm, each one with a long terminal bristle, reduced in the last five segments, ochreous. There are few differences to males which are stated here: Legs more orange brown,

Abdomen with similar orange brown hairs on first segment, further segments ringed black and white on dorsal and lateral side, ventral side again in orange but bordered to the ringed portion with purple bristles. Forewings from basis to apex 43.0–47.0 mm long ( $\bar{\varnothing}$  = 45.0 mm, n = 5; allotype 47.0 mm), almost similar to the males. The Y-shaped marking is of light yellow colour proximal, with same black border to apical direction, and there ending white. Forewing apex almost rectangular. In the centre of the hindwing is a small white discal spot. Both fore- and hindwings are bordered with white fringes marginally, interrupted by dark brown ones at the end of the veins. On the ventral side wings similar, of slightly lighter colour, white markings of the dorsal side represented as white shadows, postmedian line distinct, followed by a darker brown outer portion of the marginal area.

#### Additional notes

*C. peigleri* can easily be separated from its two probably nearest relatives, *C. radama* (DRUCE, 1904) and *C. harrisae* LEMAIRE, 1975 by the male genitalia structures and, more hardly, from superficial wing pattern and colouration. All three species look very similar, although *C. radama* has a more vivid colouration, more slender forewings and a larger portion of the white part of the Y-shaped forewing marking, especially to the marginal side; *C. harrisae* has a very similar wing form, but also more white parts in the marking. Differences of *C. radama* in the male genitalia are the uncus with a “pair of preapical points” (LEMAIRE 2002: 776) and the dorsal protuberance which also is pairsty and makes the uncus having four projections (compare fig. 118; genitalia no. 703/02 Naumann, specimen from Peru, Pasco, Oxapampa, 1810 m) in that species; furtheron, that species has a broader saccus, the vesica has two lobes each ending with a bent apical spine. The eighth sternite has an inconspicuous rounded central projection. Although we had no specimens of *C. harrisae* in our hands, the genitalia structures of that species can be separated after the text descriptions and figures of LEMAIRE (1975a: Fig. 4; 2002: Fig. 91, no. 3) by having four endings of the uncus, lateral large rounded projections of the transtilla, short valves and a simple vesica with apical small cornutus. The central projection of the eighth sternite as shown by LEMAIRE (1975, 2002) is more acute and triangular, while it is rounded with a very small apical spine in *C. peigleri*.

Both species, similar to *C. peigleri*, occur mainly in higher altitudes. We strongly restrict the type locality of *C. peigleri* to only a very small area of high altitude in Pasco province as there obviously is a high rate of



endemism for single mountain regions in that genus. Those specimens mentioned to originate from Santa Teresita are most probably conspecific, but the locality cannot be assigned to a certain province with certainty.

Immature stages (Figs. 76 & 77; 3<sup>rd</sup> and 6<sup>th</sup>, final instar): The larvae were reared successfully in Switzerland by one of the authors and Viktor Suter on *Quercus x turneri* “*pseudoturneri*”, pupated in the soil; the few resulting pupae died, probably due to wrong climate in lowland for such a highland species. In the first five instars larvae lived gregariously and are of creamy white ground colour. The head is yellow, dorsal tubercles are black, those on thoracic segments much longer than on abdominal segments and pointed forward, those on the first abdominal segment almost completely reduced, on eighth abdominal segment there is a single central tubercle. Subdorsal and lateral tubercles turquoise. From fourth instar on the dorsal skin becomes more brownish, in the last instar there is a dorsal longitudinal pattern composed by several small black dots on pink background, bases of tubercles brownish to reddish pink.

***Dirphia centrifurca* NAUMANN, BROSCH, & WENCZEL, new species**

Holotype (Fig. 78 dorsal, fig. 79 ventral): ♂, Peru, Pasco province, Oxapampa env., 2412 m, 10°37'12.1S 75°17'22.2W GPS, humid forest, 19.VII.2001, leg. Bernhard Wenzel & José Boettger, genitalia no. 712/02 Naumann, ex CBWK. The holotype will be deposited in the collections of ZMHU Berlin.

Allotype (Fig. 84 dorsal, fig. 85 ventral): ♀, Peru, Pasco province, Oxapampa env., humid rain forest, 2511 m, 10°38'15.1S 75°17'14.2W, “Antenna”, III.2005, leg. José Boettger, received via B. Wenzel, ex CSNB (ZMHU).

Paratypes: 39 ♂♂ 5 ♀♀ with following data:

5 ♂♂, Peru, Pasco province, Oxapampa environment, high altitude humid forest, 2511 m, 10°38'15.1''S 75°17'14.2''W, 5.–18.IV.2002, leg. B.Wenzel & J. Boettger (CBWK); 5 ♂♂, same locality, 5.–13.VI.2002 (CBWK); 11 ♂♂, same locality, IX.2004, leg. J. Boettger (CBWK); 1 ♀, Peru, Pasco province, Oxapampa env., 2500 m, 21.IV.–1.V.2003, leg. Bernhard Wenzel (CBWK); 1 ♂, same data (CCMC); 1 ♂ 1 ♀, Peru, Pasco province, Oxapampa env., 2500 m, VI.2002 & XI.2004, via B. Wenzel (CCMC); 1 ♂, Peru, Pasco province, Oxapampa env., high altitude

humid forest, 10°37'12.1''S 75°17'22.2''W, 2412 m, 5.–18.IV.2002, leg. B. Wenczel & J. Boettger, genitalia no. CBH-0345 (CBH); 1 ♂, same locality, 5.–13.VI.2002, genitalia no. CBH-0350 (CSNB); 1 ♂, Peru, Pasco province, Oxapampa env., 1800 m, I.2000, leg. I. Calleghari (CESB); 4 ♂♂, Peru, Pasco province, Oxapampa env., humid rain forest, 2511 m, 10°38'15.1S 75°17'14.2W, “Antenna”, IV.2004, leg. José Boettger (CBWK); 1 ♂, Peru, Pasco province, Oxapampa, La Suiza, 2800 m [recte around 2500 m, area has no higher elevation], Antenne, 15.–20.VI.2004, leg. Hubert Meyer (CFMP); 1 ♂, Peru, Pasco province, Oxapampa env., humid rain forest, 2511 m, 10°38'15.1S 75°17'14.2W, “Antenna”, III.2005, leg. José Boettger, received via B. Wenczel (CBH); 1 ♀, same locality, IV.2005, leg. José Boettger, received via B. Wenczel (CBH); 1 ♂ 1 ♀, same locality, V.2005 (CSNB); 1 ♂, same data (CBH); 2 ♂♂, same locality, 3.VII.2005 (CSNB); 1 ♂ 1 ♀, same data (CBH); 2 ♂♂ 1 ♀, same data (CBWK).

Derivatio nominis: The name is composed from names of the two probably nearest relatives, *D. centralis* F. JOHNSON & MICHENER, 1948 and *D. crassifurca* LEMAIRE, 1971, and also points out the central white furcation of the forewing.

#### Description

♂ (Fig. 78, 80 dorsal, fig. 79 ventral): head and dorsal sides of thorax and abdomen with long dark chocolate brown hairs. Antennae ochreous, quadripectinate, with around 30 segments, 9.5–10.5 mm long ( $\bar{\varnothing}$  = 10.0 mm, n = 12; holotype 10.5 mm), longest dorsal rami 1.1 mm ( $\bar{\varnothing}$  = 1.1 mm, n = 12; holotype 1.1 mm), ventral rami shorter. Forewings from basis to apex 33.0–37.0 mm long ( $\bar{\varnothing}$  = 34.8 mm, n = 12; holotype 35 mm). Ground colour of dorsal side of forewings dark chocolate brown, with white markings. Antemedian field white, median field in ground colour with

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#### Colour figures:

Fig. 78: *Dirphia centrifurca* ♂ holotype, dorsal view; fig. 79: same specimen, ventral view; fig. 80: *D. centrifurca* ♂ paratype, coll. Brosch; fig. 81: *D. centralis* ♂ from type locality of *D. centrifurca*, coll. Brosch; fig. 82: *D. crassifurca* ♂, Colombia, coll. Naumann; fig. 83: *D. centralis* ♂, black morph from Oxapampa, coll. Wenczel.

genitalia prep.  
no. 742.102  
date 19.12.2002  
sp. *Diplois*  
origin *Peru*  
Stefan Naumann

PERU,  
Pasco province,  
Oxapampa environment,  
humid forest, 2412 m,  
10°37'12.1" S 75°17'22.2" W,  
19.VII.2001,  
leg. B. Wenzel & J. Boettger



78

genitalia prep.  
no. 742.102  
date 19.12.2002  
sp. *Diplois*  
origin *Peru*  
Stefan Naumann

PERU,  
Pasco province,  
Oxapampa environment,  
humid forest, 2412 m,  
10°37'12.1" S 75°17'22.2" W,  
19.VII.2001,  
leg. B. Wenzel & J. Boettger



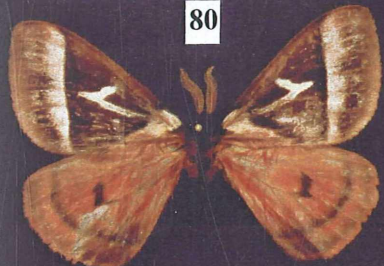
79

Coll. BRODSCH  
Hille  
PERU,  
Pasco province,  
Oxapampa environment,  
humid forest, 2511 m,  
10°38'15.1" S 75°17'14.2" W,  
5-18.IV.2002  
leg. B. Wenzel

Genitalia-  
Preparation  
CBH-0345  
Ulrich Brosch  
Hille

Genitalia-  
Preparation  
CBH-0353  
Ulrich Brosch  
Hille

P. E. R. U. :  
Pasco province;  
Oxapampa environment,  
S10°37'11"W075°30'0"  
La Suiza / 2180 m / June 2002  
leg. Bernhard WENZEL  
& José BOETTGER.



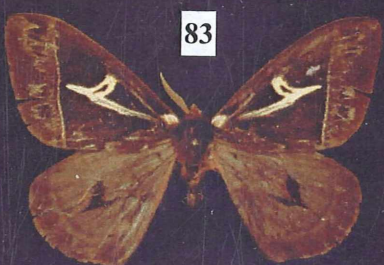
80



81



82



83

*Diplois crassifurca*  
of  
COLOMBIA, Caldas, Municipio  
Aguazá, Quebrada Las Frías  
EL 2400m, 1. AGR 1995, ex-♀ of  
HW light, K. Wolk, S. Simoes,  
A. Amarillo, C. Sarriena  
Reared on *Nhus*, em. 5. Mar 1996

collection  
Stefan Naumann

PERU, May-99  
Junin prov.,  
Calabaza 2000m

genitalia prep.  
no. 742.102  
date 19.12.2002  
sp. *Diplois*  
origin *Peru*  
Stefan Naumann

typical Y-shaped white marking, the white postmedian line is straight. Postmedian area suffused with dark brown and orange scales, the shape of the wing is quite rounded. The dorsal hindwing is of orange colour, has a dark brown central discal spot, and a dark brown postmedian line. The marginal area again is orange, only the outer margin suffused with dark scales. Marginal fringes orange. The ventral side of both fore- and hindwing is uniformly coloured in orange, only the white markings of the upperside are visible as light shadows. Thorax and abdomen are covered with long carmine hairs, legs ochreous orange.

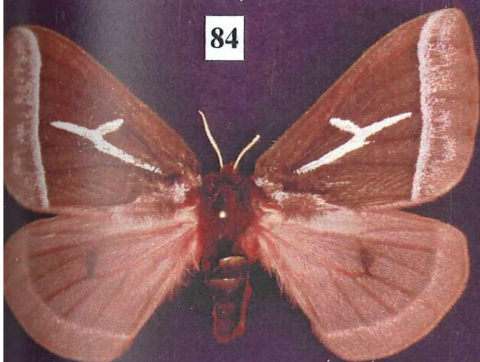
♂ genitalia (Fig. 119; genitalia no. 712/02 Naumann): *D. centrifurca* has typical genitalia structures for the group of *D. tarquinia* (CRAMER, 1775) which means that they are very compact. Uncus heavily sclerotized, bent ventrally, with two rounded small lateral tips. Transtilla bilobed with central indentation, lateral arms are somewhat rough dorsally. Valves very short, sclerotized on their tips, Saccus round and more prolonged than in other related species where it is more triangular and shorter. Aedeagus broad, typical for the genus, but the vesica shows unique characters: There is a ventral area with small spiculae and posterior to those two lateral heavier sclerotized areas of that structure, one dorsal process with sclerotized thorn apically and a typical ventral process which is covered nearly completely with small spiculae. The structures for *D. crassifurca* (fig. 120; genitalia no. 527/01 Naumann, from Venezuela) are presented for comparison.

♀ (Fig. 84 dorsal, fig. 85 ventral): As in many other *Dirphia* species there is also some sexual dimorphism in *D. centrifurca*. The female is of dark brown ground colour, head and dorsal sides of thorax with long dark chocolate brown hairs. Antennae ochreous, fasciculate with very short pectination, with 33 segments, 10.5 mm long (allotype). Forewings from basis to apex 41.0 mm long (allotype), with rounded apex and same markings as in the males. There is a small antemedian area of greyish hairs, brown median area with the typical central Y-shaped white marking (in one paratype a little interrupted), and the whitish postmedian band turned apically at its costal end. The postmedian area suffused with white scales,

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#### Colour figures:

Fig. 84: *Dirphia centrifurca* ♀ allotype, dorsal view; fig. 85: same specimen, ventral view; fig. 86: *D. mielkeorum* ♂ holotype, dorsal view; fig. 87: same specimen, ventral view; fig. 88: *D. aculea* ♂ holotype, dorsal view (ZMHU); fig. 89: same specimen, ventral view.



84

PERU: Dept. Cuzco, Manu  
Nationalpark, Chontachaca  
800 - 1200 m. 1-1999.  
leg. Rainer Marx  
Coll. Stefan Naumann



85

PERU: Dept. Cuzco, Manu  
Nationalpark, Chontachaca  
800 - 1200 m. 1-1999.  
leg. Rainer Marx  
Coll. Stefan Naumann



86

Coll.  
Staudinger

*Dirphia* type  
*aculea* Vuill.

*Dirphia*  
*Aculea*  
Vahlst

Origin.

Staudinger  
et. Hbl.



87

Coll.  
Staudinger

*Dirphia* type  
*aculea* Vuill.

*Dirphia*  
*Aculea*  
Vahlst

Origin.

Staudinger  
et. Hbl.



88



89

outer margin again in the ground colour. The hindwings of similar ground colour, but with some reddish shadow basally and a little transparent so that veins easily can be seen. There is a central Y-shaped dark brown marking and a hinted postmedian band. The colour of ventral side is chocolate brown, only visible markings are a yellow shadow of the central forewing marking and suffused whitish postmedian bands. The abdomen is coloured black with short hairs on dorsal half, on ventral side thorax and abdomen purple.

Additional notes: At the type locality *D. centrifurca* occurs sympatrically with the quite similar looking *D. centralis* (figs. 81 & 83), but seems to be much rarer than its nearest relative. Only 13 specimens of the new species were caught at light between April and June 2002, but more than 200 specimens of typical *D. centralis* were recorded during same period at the same location. Specimens were attracted to light in Oxapampa from 19.00 to 20.00 h and started resting on the screen very soon while the syntope flying *D. centralis* arrived only after 21.00 h at light and was quite restless. *D. centrifurca* shows somewhat intermediate characters between *D. centralis* and *D. crassifurca* (fig. 82): The Y-shaped forewing mark is very similar to that of *D. crassifurca*, but in the new species the postmedian line is straight, not concave, the postmedian area is not suffused with dark brown submarginal spots but with few orange scales, and the shape generally is more rounded. The hindwing has a dark discal spot, while it is absent in *D. crassifurca*, and an orange margin which is more brownish or greyish in *D. crassifurca* and also *D. centralis*. Also *D. centralis* has different forewing characters, with a much larger Y-shaped marking reaching or almost penetrating the postmedian line and with internal dark marking, the postmedian line is little convex, postmedian area hardly suffused with dark brown submarginal spots, and the apex is more falcate. The hindwing shows a similar or somewhat smaller dark brown discal spot. On ventral side *D. centrifurca* is nearly uniform pinkish orange while *D. centralis* is darker and shows a black central dot on all four wings, and *D. crassifurca* is greyish in marginal areas. Male genitalia differ from the two other species mentioned by the more elongated saccus, rough lateral dorsal margin of the transtilla, and a typical ventral process in the vesica which is covered completely with small spiculae.

***Dirphia mielkeorum* NAUMANN, MEISTER, & BROSCHE in NAUMANN, BROSCHE, & WENCZEL, new species**

Holotype (Fig. 86 dorsal, fig. 87 ventral): ♂, Peru, Dept. Cusco, Manu Nationalpark, Chontachaca, 800–1200 m, I.1999, via Rainer Marx, ex CSNB. The holotype will be deposited in the collections of ZMHU Berlin.

Paratypes: 7 ♂♂ with following data:

3 ♂♂, same data as holotype, genitalia no. 528 & 529/01 Naumann (CSNB); 1 ♂, same data as holotype, IV.1999 in coll. W.A. Nässig (SMFL); 2 ♂♂, Peru, Dept. Amazonas, Muyo Oliva, ca. 480–650 m, V.–VI.1999, via R. Marx, XI.1999 in coll. W. A. Nässig (SMFL); 1 ♂, Peru, Dept. Madre de Dios, Manu Park, Camicana Chico, Rio Carbon, 1200 m, VIII/IX.1997 (CFMP).

Derivatio nominis: The species is named in honour of our friend Carlos Guilherme C. Mielke and his father, Prof. Dr. Olaf. H.H. Mielke from Carambeí, Paraná, Brazil, in recognition of their entomological work.

**Description**

♂ (Fig. 86 dorsal, fig. 87 ventral): Antennae ochreous brown, 10.5–12.0 mm long ( $\bar{\varnothing}$  10.9 mm,  $n = 7$ ), quadripectinate, with around 39 segments, the four last with reduced or without pectination, longest rami 1.4 mm long. Head and dorsal thorax covered with long dark brown hair, dorsal side of the abdomen orange ringed with brown hairs intersegmental. On ventral side the anterior part of the thorax including first pair of legs is greyish brown, posterior part and ventral abdomen orange. The length of the right forewing from basis to apex is 35 to 41 mm ( $\bar{\varnothing}$  39.9 mm,  $n = 7$ ; holotype 39.0 mm), ground colour of the forewing is a light grey. The wings of most specimens of the type series are somewhat worn, but in two samples the complete pattern is conserved which shows an almost homogenous surface in ground colour, an irregular row of brown patches in postmedian area, and a typical central dark brown field with Y-shaped white marking. That central field is rounded in most specimens, with a brown costal margin as counterpart, but two specimen have those two brown parts combined. The upper, costal part of the Y has a brown center, similar to *D. tarquinia* (CRAMER, 1775). Generally, the forewings are of quite rounded shape. Hindwings in the basal part orange up to an around 5 mm long lenticular black vertical dot; posterior to this the wing colour changes to a dark grey with outlined slightly darker postmedian and submarginal circular band. On

ventral side both fore- and hindwing homegenous ochreous grey without any markings.

♂ genitalia (Fig. 105; genitalia no. 528/01 Naumann): generally very compact, but very similar to most other *Dirphia* species of the relationship of *D. tarquinia*. Uncus strong, bent ventrally, gnathos rounded dorsally, without any indentation on its surface, with broad basis. Saccus very broad, prominent and rounded. Valves typical for the whole group, with a ventral sclerotized process and a dorsal tip-like with hairy rand. Aedeagus very strong, vesica emerging ventrally with two long tube-like processes: a left lateral one which turns downward and then in dorsal direction, ending with a bent slender spine, and a second right lateral one which is directed in distal and ventral direction without any spines. Eighth sternite and tergite ending rounded, without any significances.

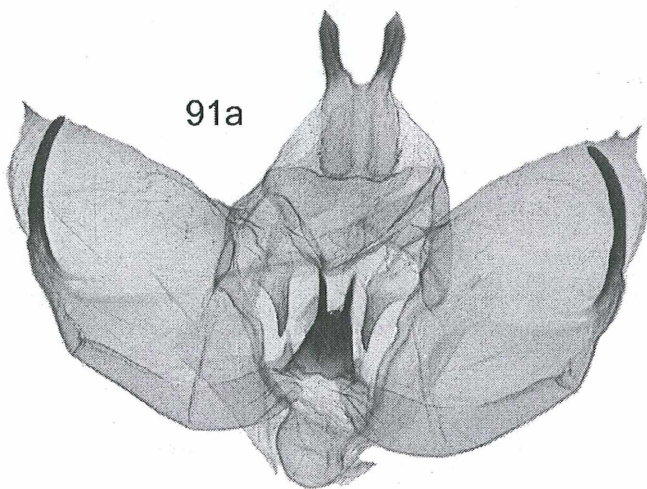
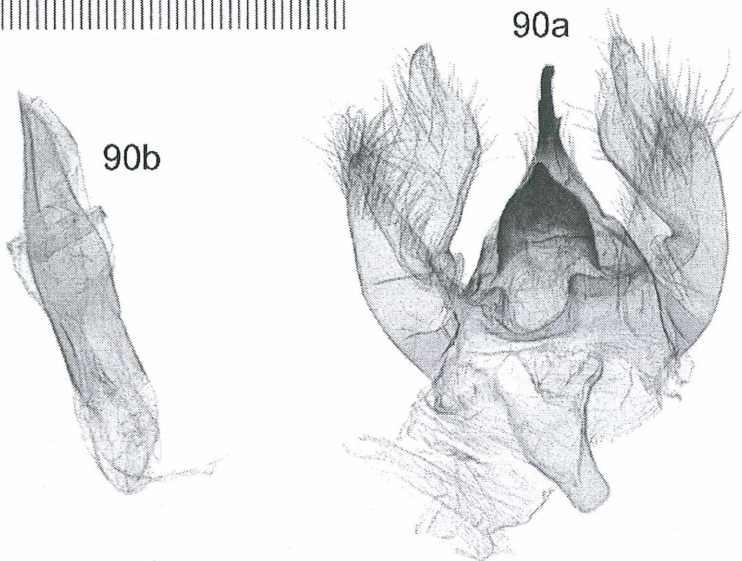
Female and immature stages: Unknown.

#### Additional notes

We first hesitated to describe that species as new due to the overall similarity with and uncertainty with related taxa, namely *D. aculea* VUILLOT, 1892 and *D. subhorca* DOGNIN, 1901. Finally, after publication of the Hemileucinae revision by LEMAIRE (2002), studying type material at different museum collections and after preparation of nearly 100 genitalia within the group of *D. tarquinia*, we found that there are some small but most diagnostic and always stable features in male genitalia structures which makes it possible to differ easily between different species. The form of the gnathos always seems to be very stable, as well as the form, spiculae and thorns on the emerged vesica. This was also already found by MEISTER & WENZEL (2002) for *D. tarquinia* and two other members of the genus.

*D. mielkeorum* shows a form of the uncus which is nearest to *D. subhorca* within the genus but specimens of the latter one look completely different due to their dark brown forewing band, and that species is spread in the western slopes of the northern Andes in Ecuador and Colombia. *D. aculea*, described from Brazil, Amazonas, Manaus, of which we figure here the male holotype for the first time from ZMHU collections (Figs. 88 & 89) is smaller than *D. mielkeorum*, the holotype has a right forewing length of only 31 mm which may be not diagnostic; unfortunately the antennae and parts of the abdomen are missing from that type specimen, but the male specimen figured by LEMAIRE (2002: plate 89, fig. 4) under that taxon originating from Ecuador, Oriente, Napo, shares all characters with the

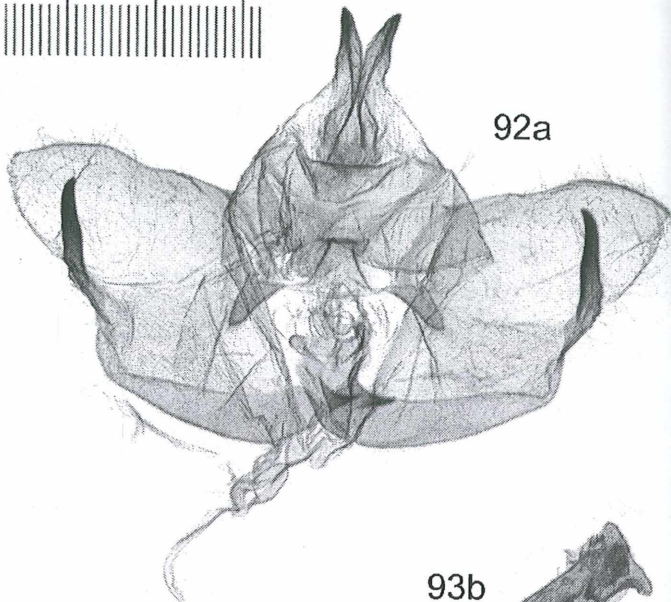




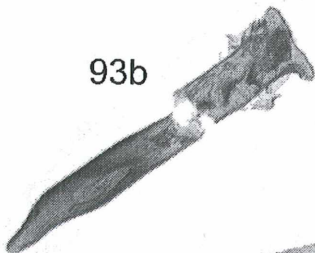


92a

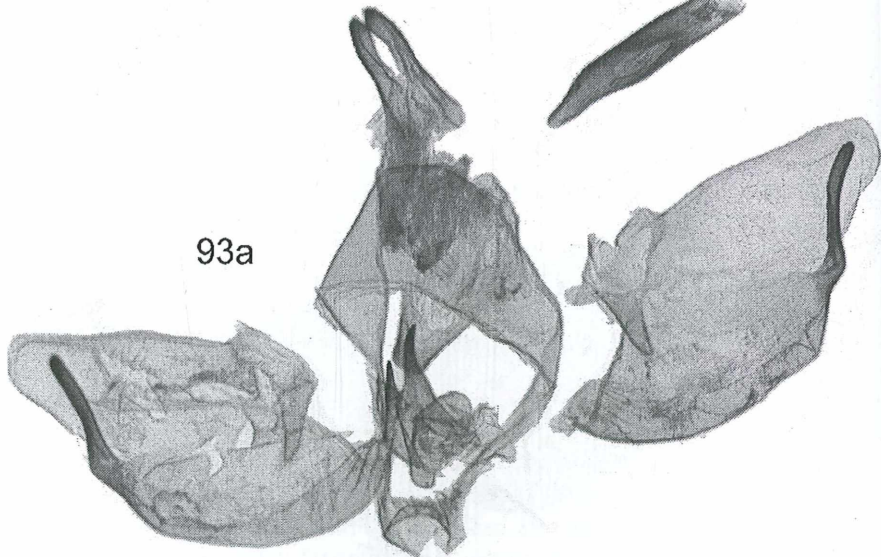
92b

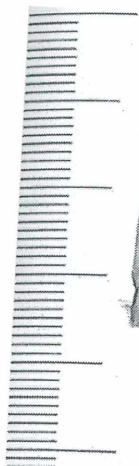


93b

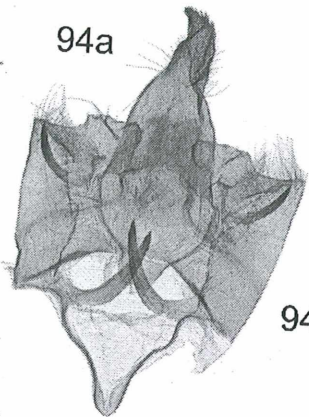


93a





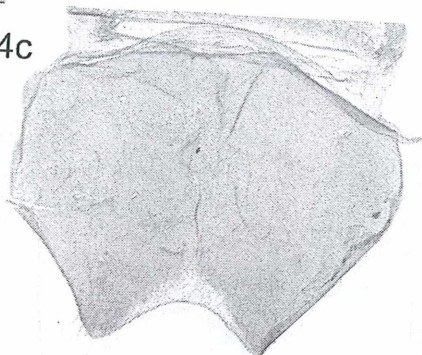
94a



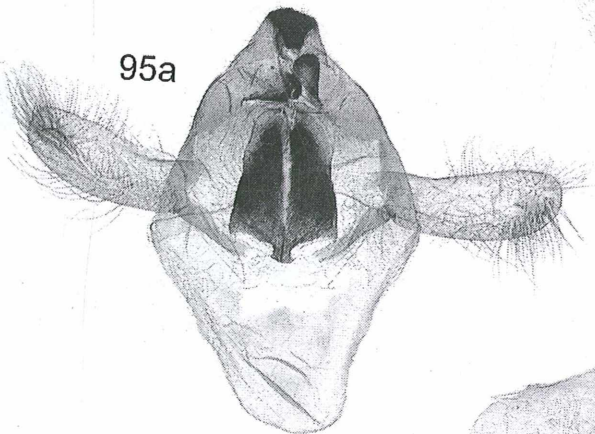
94b



94c

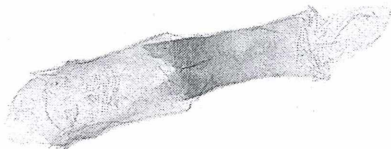


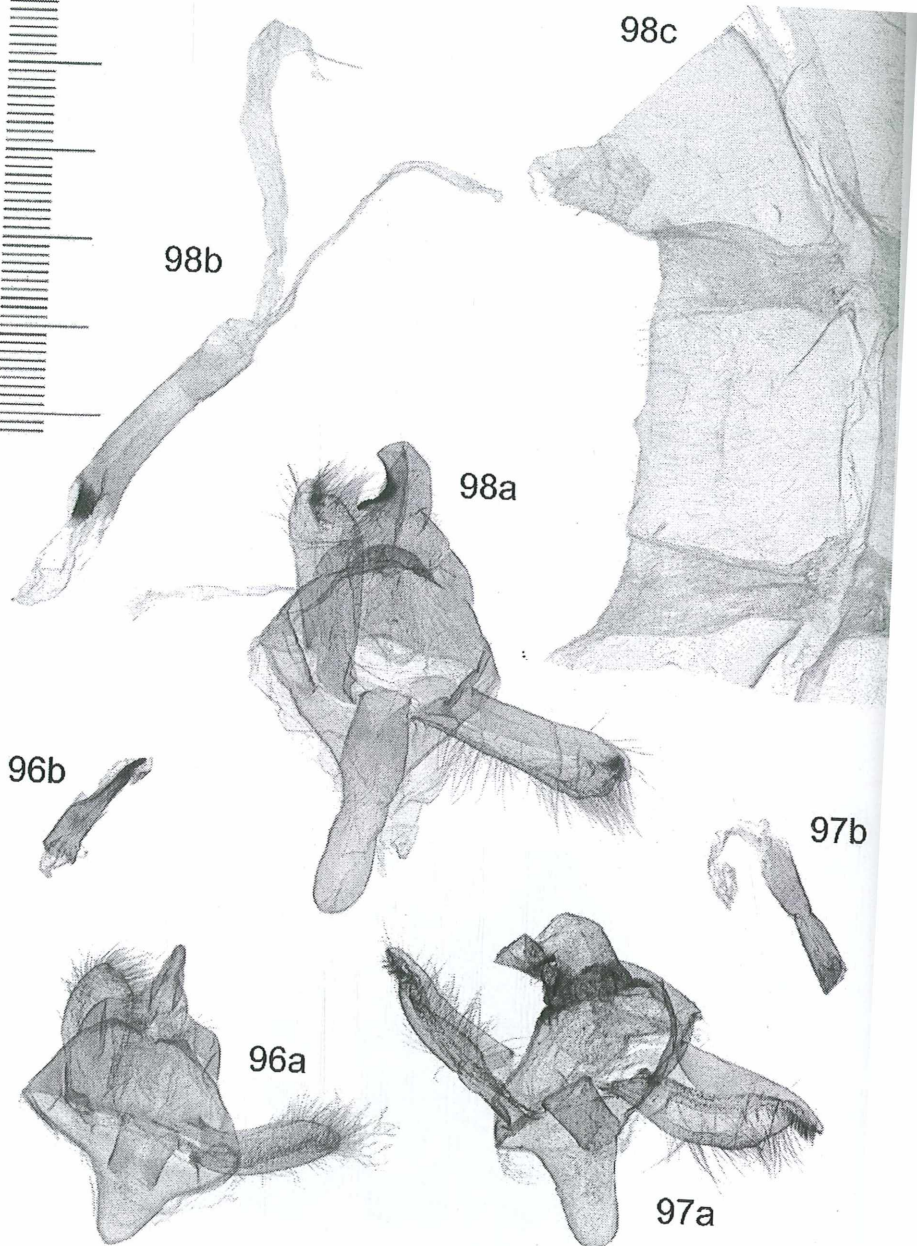
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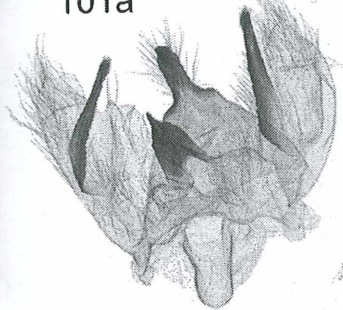
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95b

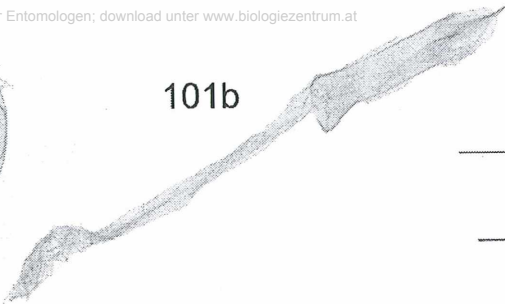




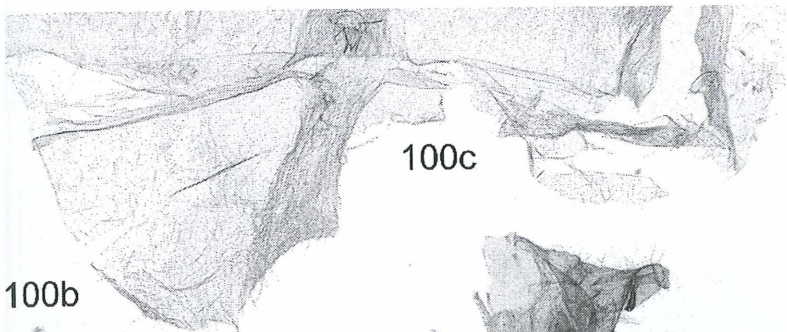
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101b



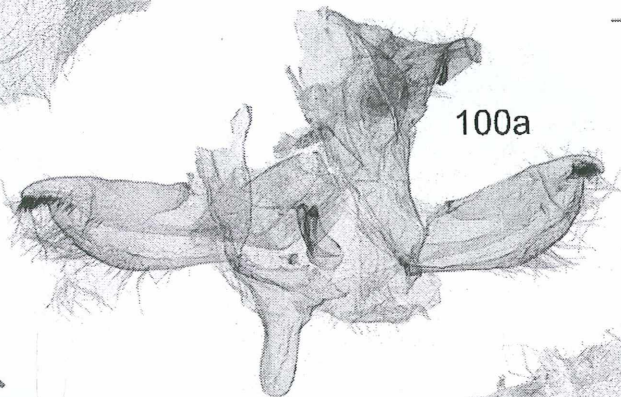
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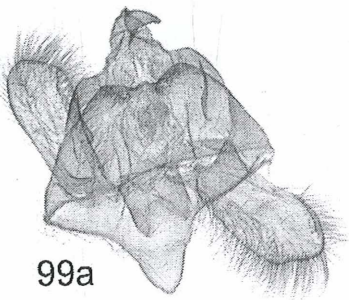
100b



100a



99a



99b



99c

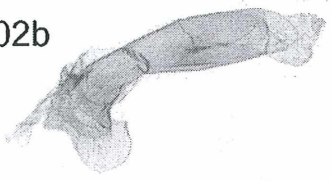




102c



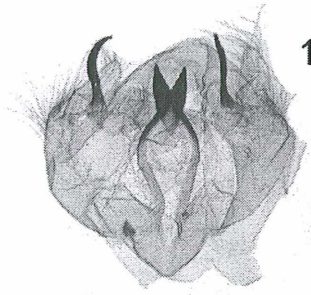
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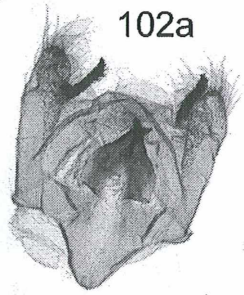
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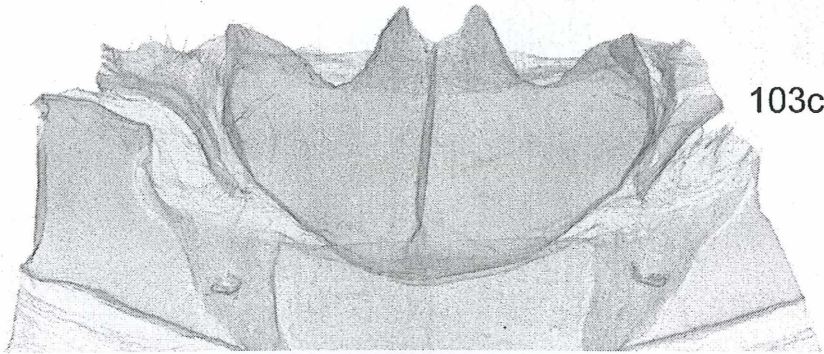
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102a

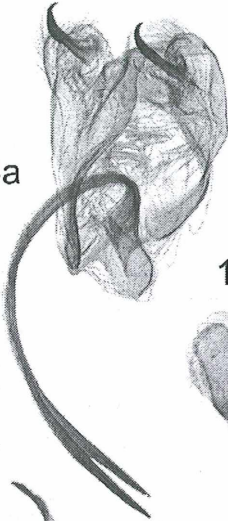


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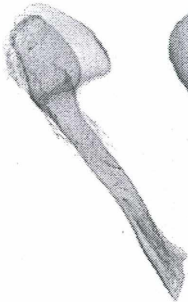




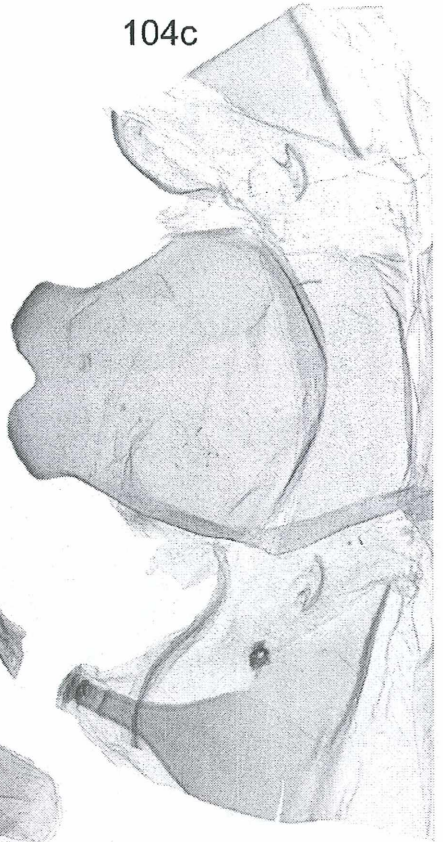
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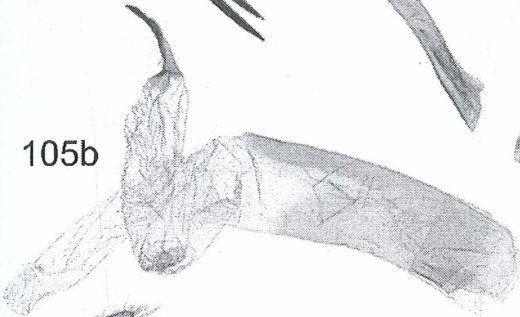
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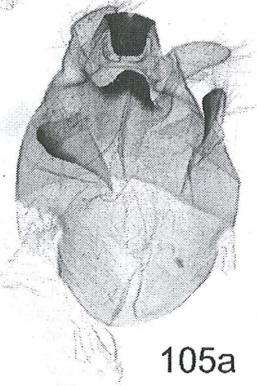
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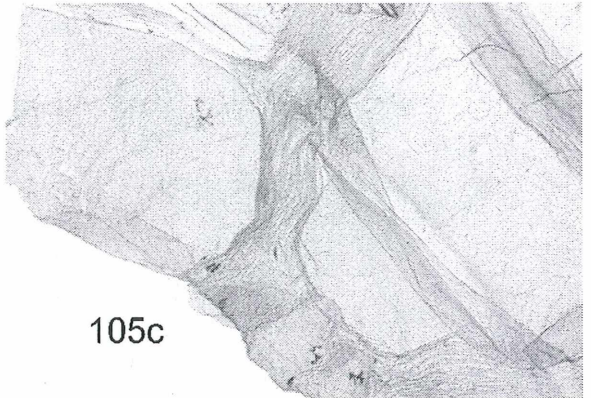
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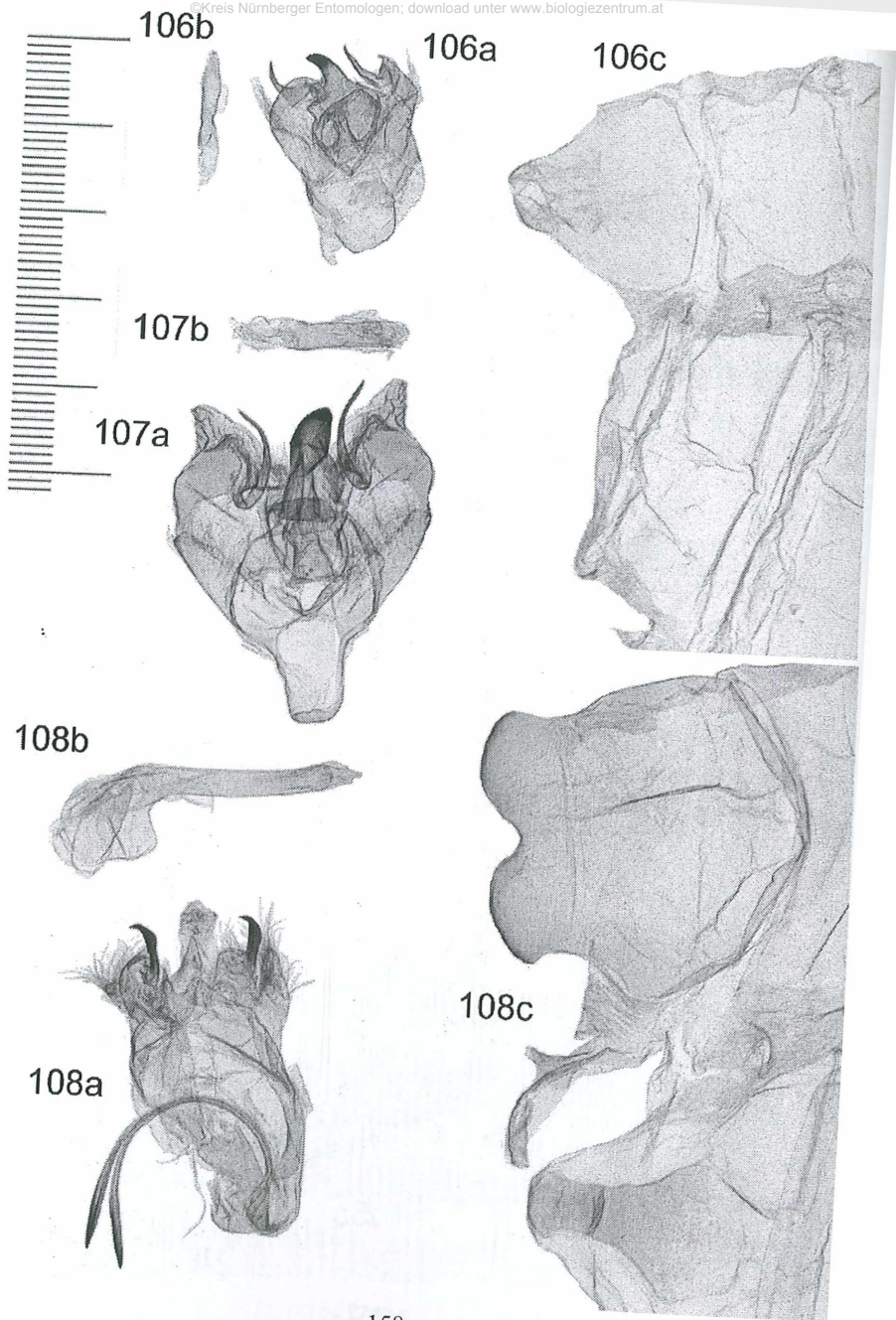


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105c

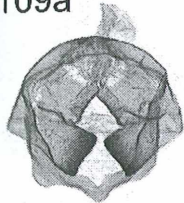




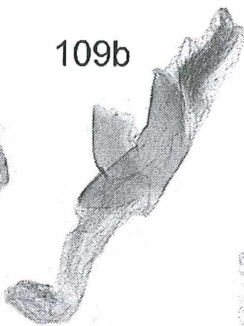




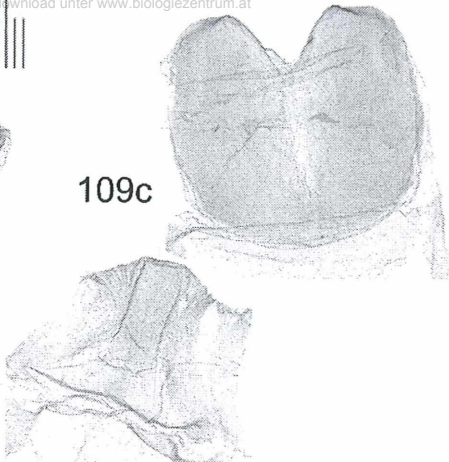
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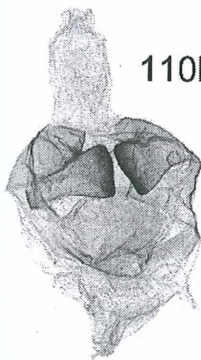
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109c



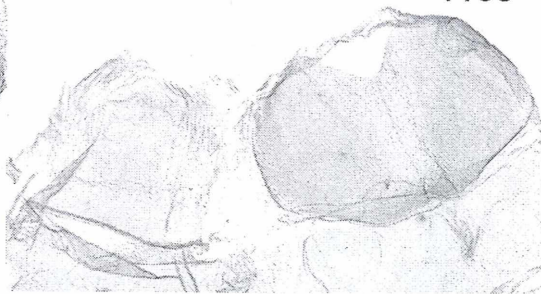
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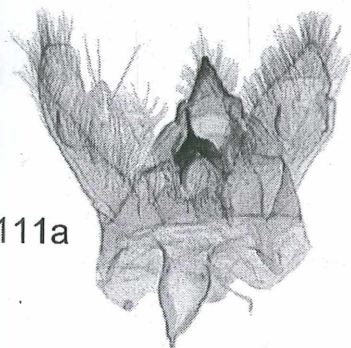
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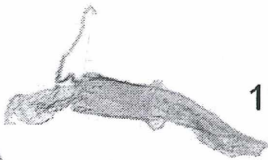
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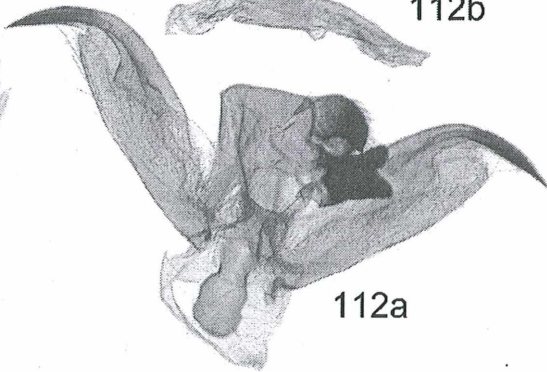
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112b



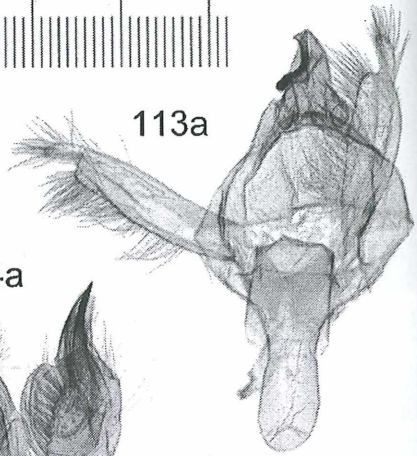
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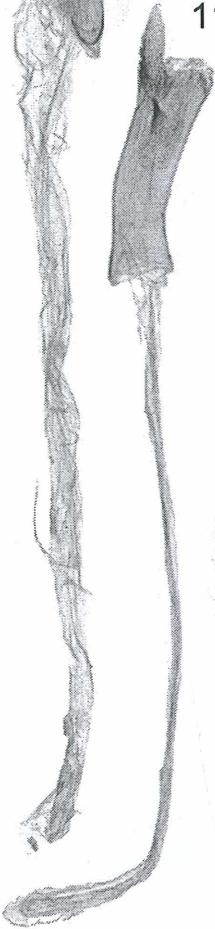
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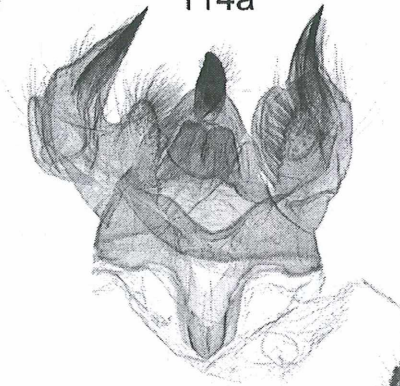
113a



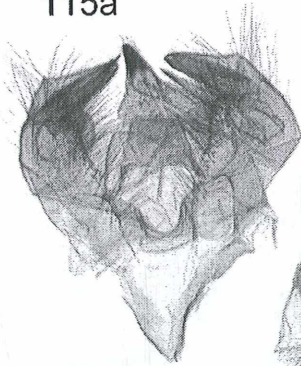
113b



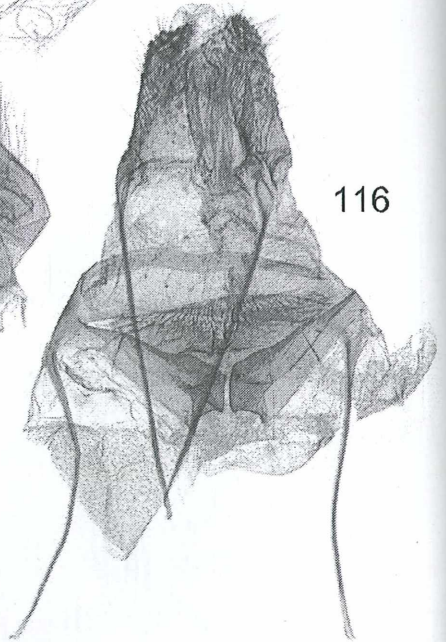
114a



115a

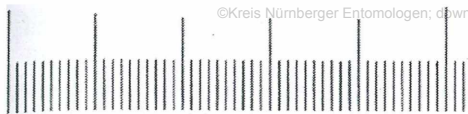


116



115b

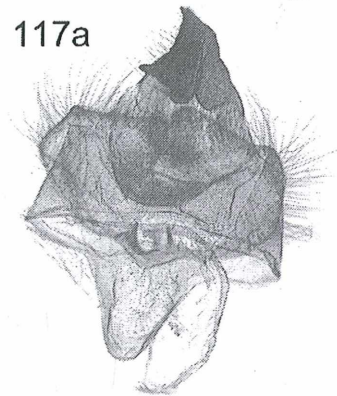




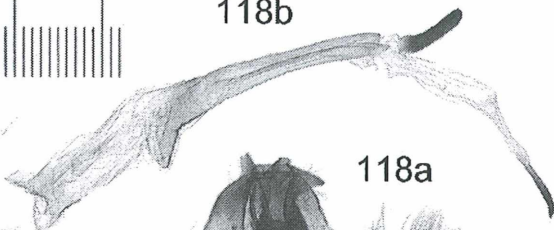
117b



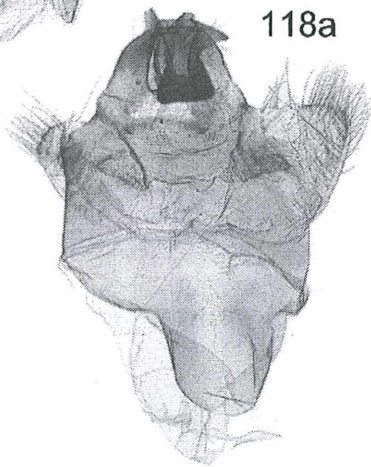
117a



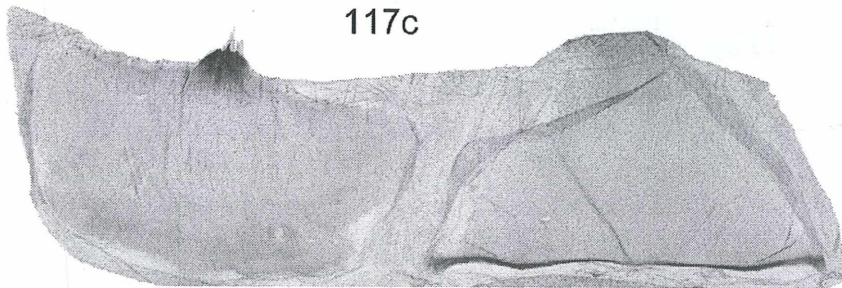
118b



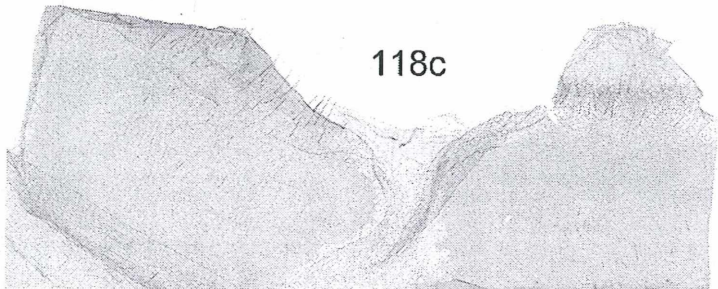
118a



117c

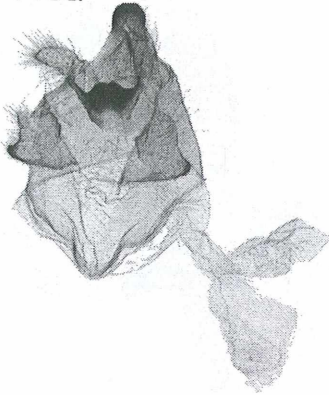


118c

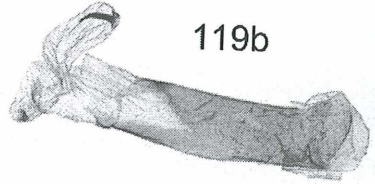




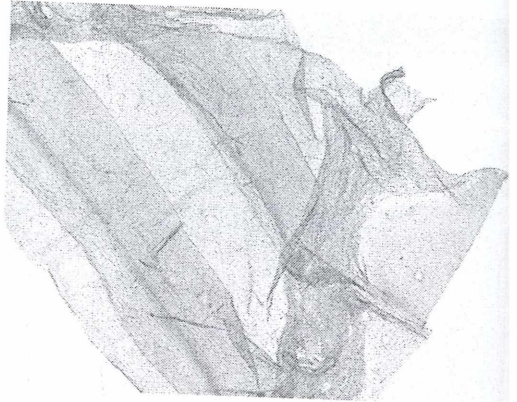
119a



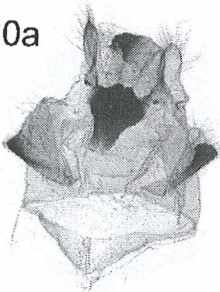
119b



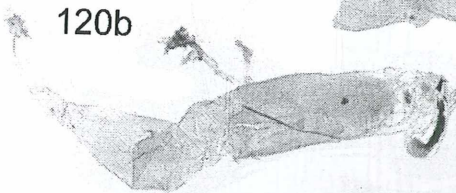
119c



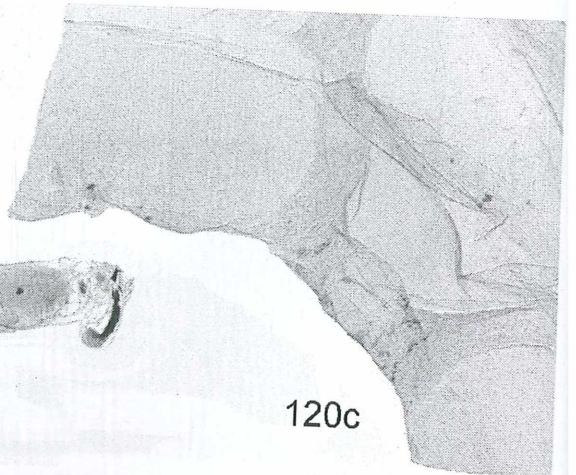
120a



120b



120c



holotype such as brown forewing field, a little falcate and not rounded forewings and the central dark postmedian line of the hindwing by which it can easily be separated from *D. mielkeorum*. If we imagine that the genitalia figure of LEMAIRE (2002) for *D. aculea* is from a preparation of a specimen from that population (unfortunately no hint is given by the author), genitalia differ by the form of gnathos and vesica as well. The *D. aculea* specimens mentioned by LEMAIRE (2002: 789) with same data as our holotype probably belong to *D. mielkeorum*.

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