Description of the supposed female of *Copaxa herbuloti* Lemaire, 1971 (Lepidoptera: Saturniidae, Saturniinae)

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Abstract: The supposed female of *Copaxa herbuloti* is described and illustrated after three recently collected specimens, including the genitalia.

Beschreibung des vermutlichen Weibchens von *Copaxa herbuloti* Lemaire, 1971 (Lepidoptera: Saturniidae, Saturniinae)

Zusammenfassung: Das vermutliche Weibchen von *Copaxa herbuloti* wird nach drei Exemplaren aus Peru, Pasco, Umg. Oxapampa, 2510 m, einschließlich der Genitalarmatur beschrieben und abgebildet.

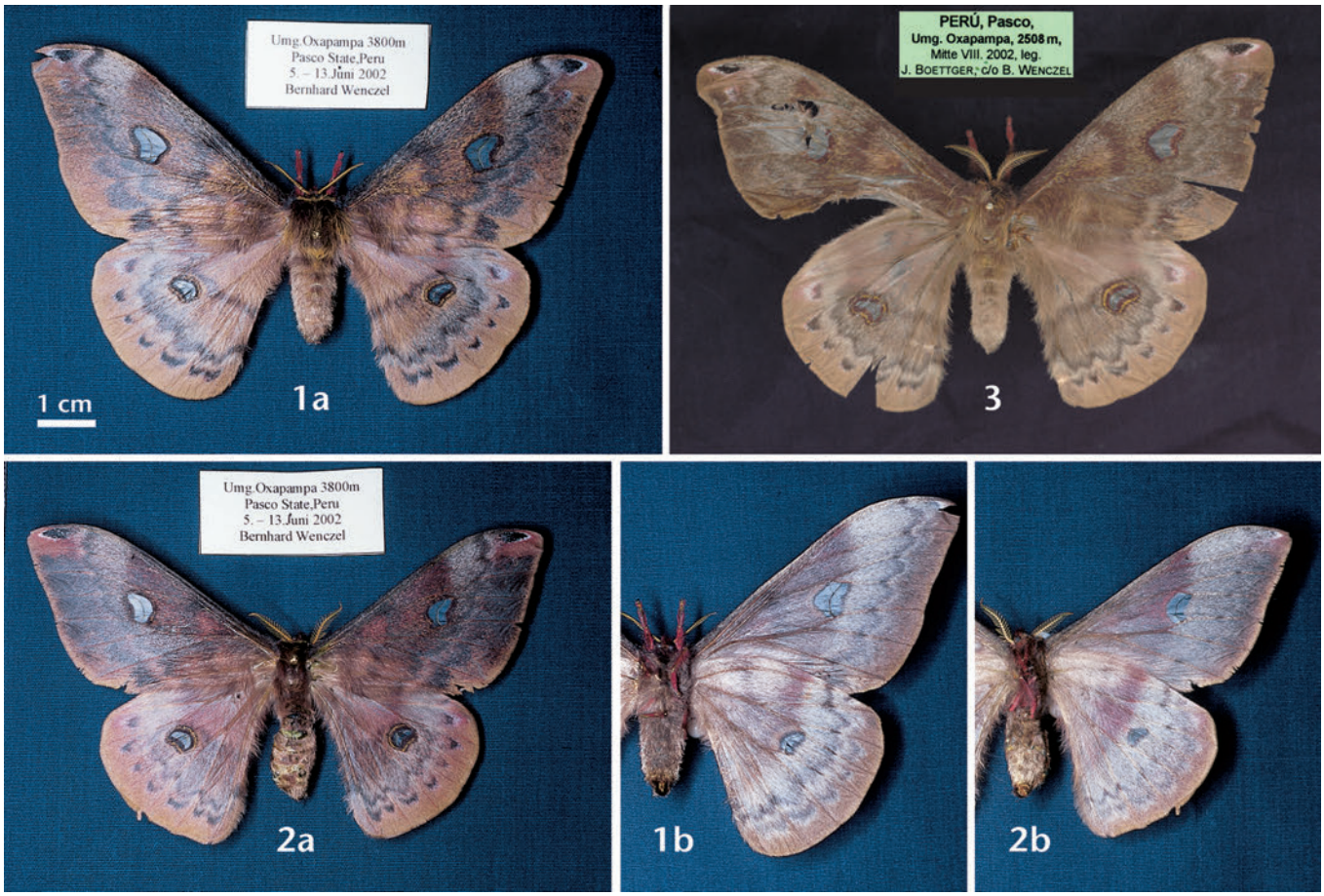
Descripcion de la hembra supuesta de *Copaxa herbuloti* Lemaire, 1971 (Lepidoptera: Saturniidae, Saturniinae)

Resúmen: Se describe y se ilustra la supuesta hembra de *Copaxa herbuloti* Lemaire, 1971 (Lepidoptera: Saturniidae, Saturniinae), incluyendo la genitalia.

Introduction

When Claude Lemaire in 1971 described *Copaxa (Sagana) herbuloti*, the female was still unknown. Also in his 1978 revision, where Lemaire reduced the subgenus *Sagana* Walker, 1855 to a mere synonym of *Copaxa* Walker, 1855, the ♀ still remained unknown, and the species was still only known from the ♂ holotype, figured in black and white by Lemaire (1971, 1978). This holotype specimen, deposited in the Lemaire collection in the Muséum national d'histoire naturelle in Paris, France, was later illustrated in colour by d'Abrera (1998: 14).

The type locality of this species is published to be (Lemaire 1971, 1978) Peru, Piura province, Huancabamba, in the North of Peru close to the Ecuadorian border, at about 2000 m elevation (and it is written in this way on the



Colour Figs. 1–3: Three ♀♀ of supposedly *Copaxa herbuloti;* a = upperside, b = underside. **Figs. 1–2:** specimens from June 2002. **Fig. 3:** specimen from August 2002. Figs. 1 & 2 are slightly too reddish in print; Fig. 3 is slightly too brownish, the real spcimen is more greyish. — Photographs 1–2 W. A. Nässig; Fig. 3 is a direct scan from the specimen. — Scale 1 cm, valid for Figs. 1–2; Fig. 3 has 47 mm length of right forewing.

[1] 61st contribution to the knowledge of the Saturniidae.

specimen's label). However, there is more than one place named "Huancabamba" in Peru, and other opinions guessed that the placing of this Huancabamba into the province of Piura in the original description might possibly be incorrect and the correct locality might be that one in Pasco province close to Oxopampa, close to where the females dealt with below were collected (G. Lamas, K. Wolfe, pers. comm.). Regrettably, we were not able to solve this problem within our study, therefore we do not intend to discuss this speculation.

The species *C. herbuloti* belongs to the species-group of *Copaxa sapatoza* (named after the oldest taxon included), comprising the high Andine taxa *sapatoza* (Westwood, 1853), *semioculata* (C. & R. Felder, [1875]), *herbuloti* Lemaire, 1971, and *orientalis* Lemaire, 1975.

A collecting expedition by B. Wenczel to Peru in June 2002 resulted in two *Copaxa* ♀♀ collected in Pasco province, near Oxapampa, at an elevation of 2508 m above sea level on a mountain top. (The elevation "3800 m" written on the labels is based on an incorrect elevation provided in an old local map; the labels will be corrected accordingly. The correct elevation was measured with professional GPS equipment in late summer 2002 by José Boettger.) These two ♀♀ are illustrated here in Figs. 1 & 2.

A third ♀ was collected by J. Boettger in mid-August 2002 at the same place. Although this specimen is much less reddish and more dark greyish, it obviously belongs to the same species (see the wing ocelli and genitalia). This ♀ oviposited, but the larvae did not develop. In October 2002, this specimen arrived in Switzerland.

We believe that these three ♀♀ most likely belong to *C. herbuloti*, according to the general colouration (at least of the first two ♀♀) and external morphology, especially to the size, shape and colouration of the eyespots on the wings, although they were found about 750 km further to the South than the presumed type locality in Piura. At medium to high elevations of the Andes the distribution of a species is usually restricted by micro-habitat effects of moisture, local climate and elevation, but not necessarily by distance.

We describe the supposed females of *C. herbuloti* and illustrate them here for the first time.

It seems that the ♂♂ of *C. herbuloti* are diurnal, because they were never found at light during many collecting occasions at the locality where the three ♀♀ appeared. This behaviour is evidently also shared by the ♂♂ of other species in the *sapatoza*-group.

Description

The first two ♀♀ (Figs. 1–2) were found in the period June 5th–13th, 2002, the third specimen (Fig. 3) was collected in mid-August, 2002. Length of forewing is 50 mm (of the specimen in Fig. 1), 44 mm (in Fig. 2), and 47 mm (in Fig. 3).

The antennae are yellowish, ca. 1,2 cm long (measured in the August ♀, where they are bent) and bipectinate; the longest proximal rami are approx. 1,1 mm long. The distal rami are reduced, but in the middle of the antenna there is ventrally on the distal side of each antennal segment one little cone, which appears to be a remnant of one of the distal rami found in ♂ antennae.

The wings are thinly scaled, the membrane reflecting the camera flash on the left wings in Figs. 1 & 2. The wings of all three specimens are darker than in the ♂ figured by d'Abrera (1998: 14), with the fasciae more clearly marked. The third specimen is much more dark greyish, nearly without any reddish colours (except for the legs); it has damaged wings on the left side, probably from the collecting. Head and thorax are largely dark brown (dark greyish in the third specimen), with the legs standing out in clear dark reddish colour. The wings are more reddish in the specimen in Fig. 2, the specimen in Fig. 1 has a greater proportion of brighter colours especialy basally, while the specimen in Fig. 3 nearly lacks red colour on the wings (except the few red scales at the tips of the marginal triangles on the hindwing). The general similarity to the other members of the *sapatoza*-group is clearly visible.

Figs. 4–5: ♀ genitalia of supposedly *Copaxa herbuloti*. **Fig. 4:** ♀ from June 2002 figured in Fig. 2, GP no. 1610/02. **Fig. 5:** ♀ from August 2002, GP no. 1620/02. — Direct scans from the genitalia in fluid (70 % ethanol), contrast slightly enhanced digitally by W. A. Nässig. — Scale 1 mm, strictly valid only for GP no. 1620/02 (actual size approximately the same for both).

The eyespots on the wings are much wider than in *C. sapatoza, semioculata* and *orientalis* and strongly resemble those of the ♂ of *C. herbuloti*. This is the main cause why we think that these are the ♀♀ of *C. herbuloti*.

The two earlier arrived ♀♀ are deposited in coll. B. Wenczel, Kloten, Switzerland; the third ♀ of August is now deposited in the Lepidoptera collection of the Senckenberg-Museum, Frankfurt am Main, Germany (SMFL).

♀ Genitalia. The genital of the smallest ♀ (GP no. 1610/02 W. Nässig/SMFL; Fig. 4) was taken out from the softened abdomen under a binocular microscope, because the senior author did not want to cut off the distal part of the body for standard maceration procedures. During this preparation the apophyses broke off, but the bursa and other parts of the genitalia are in good shape. The genitalia were then macerated in cold (at room temperature) NaOH solution (ca. 2%) over night. – The genital of the August specimen (GP no. 1620/02 W. Nässig/SMFL; Fig. 5) was dissected in standard manner, with cutting away the distal part of the abdomen, macerating it in ca. 3% NaOH solution at 98° C for ca. 1 h, etc.

The genitalia are basically similar to those of *C. sapatoza* and also resemble those of *C. semioculata* (see Lemaire 1978: figs. 154 and 157; probably of ssp. *orientalis?*). The entrance to the ductus bursae is simply funnel-shaped, there is no sclerotisation (similar to *sapatoza,* but different from *semioculata,* where the entrance is sclerotised, see also Lemaire's [1978: 197] note about the lamella antevaginalis). The ductus bursae is doubly curved; this appears to be a clear difference to *C. sapatoza* (where the ductus bursae is more or less straight with a slight bending just before the bursa) and *semioculata* (where there is also one curve only before the bursa, but a much stronger one). The bursa copulatrix itself is small, slightly pear-shaped, without sclerotisation (nearly circular and very small in *sapatoza,* longer and oval in shape in *semioculata*). There is no sclerotisation proximally to the entrance of the ductus bursae (i.e., no defined lamella antevaginalis), and there is distally only a somehow wrinkled, weakly sclerotised field within a little distance (= lamella postvaginalis, only visible in Fig. 4); this also differs in comparison to Lemaire's drawings (*sapatoza:* only a weakly sclerotised, slightly wrinkled l. postvaginalis very close to the entrance; *semioculata:* a well developed l. postvaginalis with sclerotisation and some well-defined shape, also very close to the entrance). Similar to *C. sapatoza* and *semioculata,* the ductus seminalis originates from the ductus bursae approximately at $^2/_3$ of the distance from the entrance to the bursa (it is only overlapping with the bursa in the projection seen in Fig. 4).

The genitalia of the June ♀ are for the time being deposited in SMFL, as well as the other one.

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