

New records for the genus *Rothschildia* GROTE from Peru and surrounding countries (Lepidoptera, Saturniidae)

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Abstract: Forthcoming information on the genus *Rothschildia* GROTE, 1896 is given: First records of *R. zacateca* (WESTWOOD, 1854) for high Andean mountains of Central and Northern Peru are mentioned. This showy and rare species so far was known only from Colombia, no records for other countries were existing. Early instars of the species are compared with those of a Colombian population. A photo of the male lectotype from Oxford University Museum, a living Peruvian female and larva are figured for the first time, a second Peruvian mounted female and another male are shown as well.

In addition to this interesting record first data for *R. jacobaeae* (WALKER, 1855) from Peru and Ecuador are mentioned which widen the known range of that species much to the north. The female of *R. renatae* LAMPE, 1985 is described and figured for the first time. New records are also given for *R. aurota* (CRAMER, 1775), one for medium elevation in eastern Peru, others for high elevation in Bolivia. Those data and the specimens' pattern raise considerations of general rectification of the subspecies *R. aurota speculifera* (WALKER, 1855). *Attacus paranensis* BURMEISTER, 1867, is considered not to be a nomen nudum but just not available after examination of the original description.

Zusammenfassung: Es wird eine Zusammenstellung neuer Erkenntnisse zur Gattung *Rothschildia* GROTE, 1896 vorgestellt: *R. zacateca* (WESTWOOD, 1854) wird erstmals für die Anden-Hochlagen von Zentral- und Nord-Peru nachgewiesen. Diese außergewöhnliche hübsche und seltene Art war bisher nur von Kolumbien bekannt. Die Präimaginalstadien der zentral-peruanischen Population werden mit den bereits bekannten aus Kolumbien verglichen. Der männliche Lectotypus, eine lebendes Weibchen, die Raupen aus Peru sowie weitere Falter werden abgebildet.

Ebenfalls Erstnachweise gibt es für *R. jacobaeae* (WALKER, 1855) aus Peru sowie aus Ecuador, was die bekannte Verbreitung dieser Art weit nach Norden ausdehnt. Das unbekannte Weibchen von *R. renatae* LAMPE, 1985

wird beschrieben und abgebildet. Neunachweise für *R. aurota* (CRAMER, 1775) aus mittleren Lagen in Peru sowie Hochlagen in Bolivien werden vorgestellt. Diese nun bekannten Daten und das Erscheinungsbild der behandelten Falter lassen die Berechtigung der Unterart *R. aurota speculifera* (WALKER, 1855) zweifelhaft erscheinen. *Attacus paranensis* BURMEISTER, 1867 wird nach Auswertung der Originalbeschreibung nicht als Nomen nudum, sondern als nicht verfügbares Taxon betrachtet.

Resumen: Se dan informaciones suplementarias sobre el género *Rothschildia* GROTE, 1896: Se mencionan las primeras localizaciones de *R. zacateca* (WESTWOOD, 1854) en montañas de los Altos Andes de Perú central y del norte. Hasta entonces, esta suntuosa y rara especie sólo se conocía de Colombia, no existían localizaciones para otros países. Estadios inmaduros de la especie son comparados con los de una población de Colombia. Una foto del lectotipo macho, perteneciente al Oxford University Museum, de una hembra peruana viva y de una larva, figuran por primera vez; también se muestran una segunda hembra peruana montada y otro macho.

Aparte de esta interesante localización, los primeros datos aportados para *R. jacobaeae* (WALKER, 1855) de Perú y Ecuador extienden la difusión de esta especie bastante hacia el norte. La hembra de *R. renatae* LAMPE, 1985, se describe y figura por primera vez. Nuevas localizaciones se dan también para *R. aurota* (CRAMER, 1775), una para elevaciones medias en el Perú oriental, otras para elevaciones altas en Bolivia. Estos datos y el dibujo del espécimen levantan consideraciones sobre la rectificación general de la subespecie *R. aurota speculifera* (WALKER, 1855). *Attacus paranensis* BURMEISTER, 1867, no se considera como un nomen nudum sino como una especie no disponible después de examinar la descripción original.

Key words: Saturniidae, Attacinae, *Rothschildia*, *zacateca*, *jacobaeae*, *renatae*, *aurota*, *paranensis*, Peru, new records.

Introduction

During last years much material from Peru and nearby countries was imported among which also some very interesting specimens of the genus *Rothschildia* GROTE, 1896 were located. That material mainly extends knowledge about the range of different species as not much was published about the genus since the revision of LEMAIRE (1978). It will be shown that some species have a much wider range than estimated 25 years ago. The

better collecting possibilities in the last decades made also more material available which closed gaps of knowledge and on the other side raised questions of rectification of certain subspecies; especially in that topic much work will have to be done in future, no taxonomic acts are made here.

Rothschildia zacateca (WESTWOOD, 1854) was described from Bogotá, Colombia after an unnumbered series of specimens in the Hope Department of the Oxford University Museum; therefore LEMAIRE (1978: 101) designated the only existing specimen, a male, in the collection of the Hope Department, Oxford University Museum as lectotype. During studies on historic type specimens of Saturniidae and preparations of a type catalogue for that museum, the junior author located this specimen in the main collection; it so far had not been separated into the type collection, nor was a lectotype label added since 1978 by LEMAIRE. The male lectotype bears the following labels: “*Saturnia zacateca* Westw., Proc. Z. S. [handwritten by Westwood]; ? Type, Hope Reprint 1416 (P. Z. S.); 402 [or 422; dark unreadable label]”, and has 45 mm right forewing length. The specimen was put into the type collection drawers of the museum, and a lectotype label will be added accordingly; although of poor quality, the photo is shown here as the specimen never before was figured (fig. 3).

Interestingly, the publication year of *R. zacateca* always was given as 1853 (BOUVIER 1936: 295; LEMAIRE 1978: 101; AMARILLO-S. & WOLFE 1997: 71). FLETCHER & NYE (1982: 144) clearly indicate that the *Annulosa* for the year 1853 of the *Proceedings of the Zoological Society of London* were published in 1854, a fact which was also found e.g. in the library of Museum Koenig in Bonn. So the right publication date for *R. zacateca* and of course also for *Rothschildia orizaba*, *R. jorulla*, *Copaxa lavendera*, *C. sapatoza*, *Eupackardia calleta*, *Leucanella janeira*, *Paradaemonia phuto*, *Saturnia thibeta*, and *Syntherata melvilla*, all described by WESTWOOD in the same publication, should be mentioned as 1854.

Due to the black antennae and the large hyaline parts of the wings we suppose the male to be diurnal or at least partly day active, although not mentioned by AMARILLO-S. & WOLFE (1997). Similar combination of outer morphology and behaviour was noted for several other Saturniidae species from different continents, such as *Copaxa herbuloti* LEMAIRE, 1971 in South America, *Eosia insignis* LE CERF, 1911 in Africa, or *Saturnia grotei* MOORE, 1859 in the Himalayas.

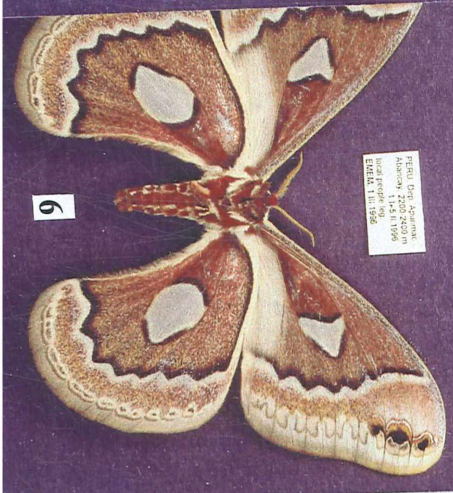
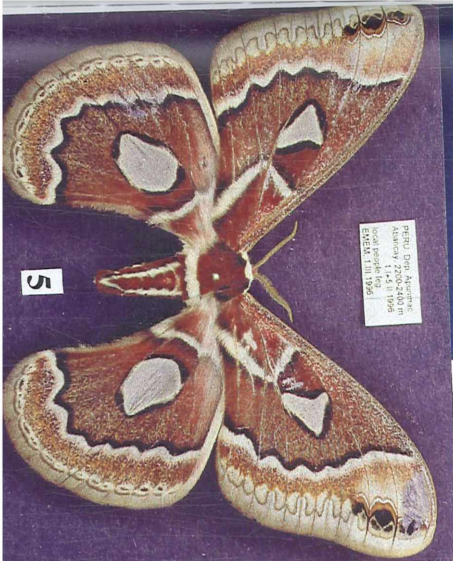
So far *R. zacateca* was only recorded from Colombia: Until 1978 only records from Bogotá and approximately 80 km surrounding area existed (LEMAIRE 1978: 102), and only AMARILLO-S. & WOLFE (1997: 74) in their forthcoming publication on the early instars of the species compiled the old and recent new records for Colombia. It then was known from the Colombian departments of Bogotá, Meta, Cundinamarca, Boyacá, Quindío, Tolima and far south from Nariño, but still not outside the country. The junior author knows of an additional record of a female singleton from the department of Antioquia after a photo from the collection of a local collector in Medellín.

In September 2001, the senior author surprisingly received a single female from Oxapampa environments in around 2,500 m altitude Province Pasco, Peru which was found by a local collector, together with some few deposited ova. The resulting larvae were bred in Switzerland without difficulties to cocoons on *Ligustrum ovalifolium*, but the larvae did never pupate, probably due to high temperatures or less humidity. Fortunately, with the help of Viktor Suter the early stages were recorded and therefore easily can be compared with those of a Colombian population which was figured perfectly by AMARILLO-S. & WOLFE (1997) some years earlier. Aside of some individual variation in last (fifth) instar no differences were found, and the cocoons were spun in same manner and form. Last instar larvae from Peru had a little more colourful abdominal prolegs and anal shield and more whitish intersegmental stripes. Peruvian larvae in 1st, 2nd, 3rd and 5th instar and cocoon are figured (figs. 7–11).

During an expedition to the same collecting place in Peru in June 2002, the senior author collected a second female (fig. 12) which again deposited some ova; the 2001 specimen (figs. 1, 2) is now in the junior author's

Colour figures:

Fig. 1: *Rothschildia zacateca* ♀, Peru, Pasco province, coll. S. Naumann, dorsal view; Fig. 2: same specimen, ventral view; Fig. 3: *R. zacateca*, ♂ lectotype, Colombia, Bogotá, Oxford University Museum, dorsal view; Fig. 4: *R. zacateca* ♂, Peru, Amazonas province, Cordillera de Nieva, coll. L. Racheli, dorsal view; Fig. 5: *R. renatae* ♀, Peru, Apurímac province, Abancay, coll. S. Naumann, dorsal view; Fig. 6: same specimen, ventral view.





Rothschildia zaccata
Pasco province,
Quapampa environment,
Humid forest, 2311 m,
10° 38' 15.1" S, 5° 17' 14.2" W,
17.IX.2001,
leg. José Boettiger

Rothschildia zaccata
Pasco province,
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Humid forest, 2311 m,
10° 38' 15.1" S, 5° 17' 14.2" W,
17.IX.2001,
leg. José Boettiger



? TYPE
José Boettiger
1416-15257



collection which later will be deposited in the Museum für Naturkunde der Humboldt-Universität zu Berlin, the 2002 specimen will be kept by the senior author. A third female specimen collected at the same locality in May 2004 is deposited in collection Brosch (Hille). Another record of *R. zacateca* came to our knowledge recently when Luigi Racheli (Roma) sent us data and a photo of a male collected in Northern Peru, Dept. Amazonas, Cordillera de Nieva, 3000 m, VIII.2003, leg. B. Calderon. The specimen (fig. 4) is now in his collection. All those Peruvian specimens share all characters of typical specimens from Colombia.

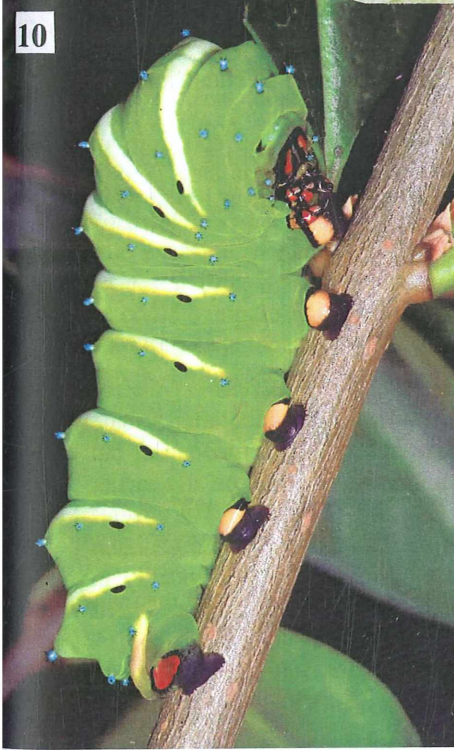
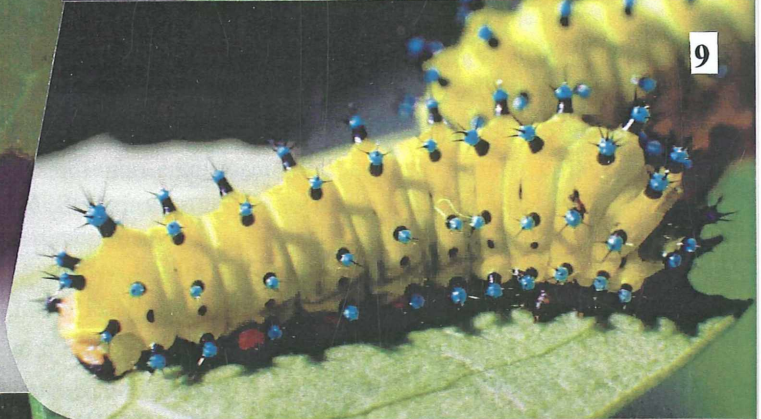
The records from Peru show that *R. zacateca* has a much wider range than supposed earlier; the locality in Oxapampa, Peru is approximately 1600 km south of Bogotá and 1100 km south of the so far southernmost record in the department of Nariño. Reliable records from Peru in meanwhile three different years show that there are stabile populations of that rare moth at similar or even higher altitudes and comparable biotopes, and that the record of 2001 was not only a single mislabelled collector's specimen; at least the locality in Oxapampa is similar to the habitat described and figured by AMARILLO-S. & WOLFE (1997). Secondly, the Peruvian records open speculations about the complete distribution of the species: At least for higher elevations in Ecuador it should be awaited, but does it live as well in further southern parts of Peru or even in Bolivia ? And third, what about other species of Saturniidae which so far were thought to be endemics of Colombia, e.g. *Copaxa sapatoza* ? After the new *R. zacateca* record it would not be a big surprise to find also this species which recently was relocated in department of Cundinamarca by Thibaud Decaëns & D. Bonilla (WOLFE et al., 2003) also further south in Ecuador or Peru with more efforts at the right time.

***Rothschildia jacobaeae* in Peru and Ecuador**

LEMAIRE (1978: 37) mentions this species for southeastern Brazil, northern Argentina, Uruguay, Paraguay and a single record from eastern Bolivia.

Colour figures:

Figs. 7–11: Early instars of *R. zacateca* from Peru, Pasco province. Fig. 7: first instar; Fig. 8: second instar; Fig. 9: third instar; Fig. 10: fifth instar; Fig. 11: cocoon; Fig. 12: *R. zacateca*, living ♀ in its habitat in Peru, Pasco province.



Meanwhile material from Bolivia, Peru and, surprisingly, also from highlands of Ecuador was received which extends the distribution of the species at least further 2000 km to the northwest. Data of the specimens are as follows:

Ecuador: 1 ♂, La Merced, Jondachi [most probably Napo Dept.], 4000 m, 18.VII.2001, leg. I. Callegari, coll. B. Wenzel, genitalia 789/02 Naumann.

Peru: 1 ♂, Pasco Dept., Oxapampa env., La Suiza, 1810 m, 10°37'1''S 75°30'W, 17.VII.2001, B. Wenzel leg., coll. S. Naumann, genitalia no. 788/02 Naumann; 2 ♂♂ 1 ♀, Puno Dept., Sandia Provincia, Limbani Distrito, Carcel Punko, 2593 m, humid rain forest, S 14°05'57.4" W 069°41'10.2", V.2005, leg. José BOETTGER, coll. S. Naumann; 1 ♂, same data, coll. Brosch.

Bolivia: 1 ♂, Tarija province, 25 km S Padcaya, 1900 m, 3.XI.1999, bought from S. Löffler, coll. S. Naumann; 1 ♂, Chuquisaca province, Muyupampa, 1650 m, 18.X.2001, 3.00 h, leg. P. Schmit, coll. S. Naumann; 1 ♂, La Paz province, Miguillas, 1600 m, 3.XI.1999, 3.00h, leg. P. Schmit, coll. S. Naumann; 1 ♂, Cochabamba province, Chapare, S. Jacinto, 2800 m, 1.IV.1998, leg. A. Ugarte, received from B. Wenzel, coll. S. Naumann.

All those specimens mentioned are completely inside the spectrum of variation of the species, there are no significant differences in size, colour, pattern, or male genitalia structures, compared with lowland material from southeastern Brazil, northeastern Argentina or Paraguay.

The unknown female of *Rothschildia renatae*

In 1985 Rudolf E. J. LAMPE described a subspecies *R. jacobaeae renatae* from Peruvian highlands in Cuzco [*recte* Apurímac] province after a male singleton; well justified due to its external differences to *R. jacobaeae*, but without giving any reasons at all for a taxonomic act or a hint on any earlier change, it was cited in full species rank by LEMAIRE (1997: 48). The species was also figured by D'ABRERA (1998: 103). Examination of male genitalia of a specimen in the junior author's collection from the type locality in Abancay, Apurímac province (genitalia prep. 1111/04 Naumann), collected

in June/July 1995, confirmed the rectification of the specific status: *R. renatae* shows typical structures in the valves and the aedeagus and differs in those structures evidently from *R. jacobaeae* and other *Rothschildia* species. Compared to *R. jacobaeae* and also *R. condor* STAUDINGER, 1894, the central process of the valves is shorter, less developed. The saccus is broad, the juxta has two lateral tips, unlike *R. jacobaeae*. The aedeagus has one left lateral spine and a short vesica with a small apical thorn.

Earlier in 2004, the junior author purchased the former Neotropical and Nearctic Saturniidae collection of U. Eitschberger from S. Löffler in which a small series of that species, including two females, was located; one of them is figured here for the first time (fig. 5 dorsal, fig. 6 ventral view). All those specimens bear similar labels reading: Peru, Dept. Apurímac, Abancay, 2200–2400 m, I.I.–5.II.1996, local people leg., EMEM, 1.III.1996. The females are almost similar to the males but show some genus-typical sexual dimorphism such as heavier body mass, rounder forewings, and taller antennae, the figured one has a right forewing length of 61 mm.

***Rothschildia aurota* in Peru and Bolivia**

As already mentioned by earlier authors (e.g., LEMAIRE 1984: 94; D'ABRERA 1998: 102), *R. aurota* is a most variable species. Originally described from the lowlands of Surinam, Lemaire synonymized it with the Peruvian taxon *R. aurota andensis* ROTHSCHILD, 1907 but recognized the subspecies *R. aurota speculifera*. Since publication of his revision much further material was accumulated, and today we probably have a wider sight of distribution of several species as already shown before. For *R. aurota*, we could examine specimens e.g. from Peru, Bolivia (as new country record), or Central Brazil, Mato Grosso, including their male genitalia structures, and could compare those with specimens from Southeastern Brazil and e.g. with almost syntope flying specimens of *R. chiris* ROTHSCHILD, 1907 from Bolivia, Chuquisaca province, a species which was handled as subspecies of *R. aurota* by e.g. BOUVIER (1936: 297). Andean material of *R. aurota* examined has following data:

Peru: several ♂♂, Pasco province, Pozuzo env., 400–700 m, ex w./c. female leg B. Wenzel & J. Boettger IV.2002, reared on *Ligustrum ovalifolium* by Viktor Suter, emerged VI.2002, in colls. Brosch, B. Wenzel, and S. Naumann, genitalia no. 738/02 Naumann.

Bolivia: 1 ♂, Chuquisaca province, Muyupampa, 1650 m, 18.X.2001, 3.00 h, leg. P. Schmit, coll. S. Naumann, genitalia no. 759/02 Naumann; 1 ♂, La Paz province, Yacumo, 950 m, 25.X.1997, bought from S. Löffler, partly former coll. EMEM, coll. S. Naumann; 1 ♀, La Paz province, Charomaya, 850 m, 22.X.2000, bought from S. Löffler, partly former coll. EMEM, coll. S. Naumann.

Already LEMAIRE himself in his revision mentioned that there are no differences in genitalia structures between the nominate *R. aurota* and its southeastern subspecies *R. aurota speculifera*, and that specimens from Minas Gerais and Goiás, Brazil, are hardly to be referred to a certain taxon. Same happens with populations from Mato Grosso in our hands. We also found that the Eastern Andean populations from Peru and Bolivia do not differ constantly from other populations although there is a general tendency to more dentated postmedian lines. If one considers the synonymisation of *R. aurota andensis* by LEMAIRE it remains unclear why *R. aurota speculifera* still is handled on subspecific rank, and if it would not be more consistent to synonymize also this taxon with its nominate subspecies.

***Attacus paranensis* BURMEISTER, 1867**

This taxon was named inside some minutes of proceedings in a journal from Argentina, it was mentioned as *Ataccus [sic] paranensis* from Corrientes. The very hard cocoon is mentioned as well. This taxon was cited by LEMAIRE (1978: 102) as nomen nudum. As in the descriptive text it is clearly noted that BURMEISTER himself reserves to a later description when he has more literature available, the taxon is just unavailable after the regulations of the CODE (ICZN 1999, Art. 1.3.1., exclusion of names for hypothetical concepts); furthermore, the descriptive notes would fulfill the requirements for validity of descriptions before 1931, so the species would also be a species inquirenda but no nomen nudum per definitionem (ICZN 1999).

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