

Notes on the genus *Pararhodia* Cockerell, 1914 with description of two new species from mainland of New Guinea (Lepidoptera: Saturniidae)

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Abstract: A short overview of the history and the so far described taxa within the solely Papuan genus *Pararhodia* is given and potential synonymies are discussed briefly. *P. acuminalba* **stat. nov.** van Eecke, 1924 is raised to species level. Two taxa are described as new to science: *P. hiltrautae* **spec. nov.** from Arfak Mts, West Papua Prov. in the Indonesian part of NG and *P. ulrichi* **spec. nov.** from the Southwestern parts of Papua New Guinea, with colour pictures and a map. Finally, an updated checklist for the genus *Pararhodia* is presented.

Rangkuman: Gambaran pendek disajikan tentang sejarah dan takson-takson yang dipertelakan sampai sekarang dari genus *Pararhodia* yang endemik di Papua; nama-nama yang mungkin sinonim didiskusikan. *P. acuminalba* **stat. nov.** van Eecke, 1924 ditingkatkan menjadi spesies penuh. Dua takson dipertelakan: *P. hiltrautae* **spec. nov.** dari Pegunungan Arfak, Prov. Papua Barat, Indonesia and *P. ulrichi* **spec. nov.** dari bagian barat daya Papua New Guinea, termasuk peta dan gambar berwarna. Akhirnya, *checklist* aktual genus *Pararhodia* disajikan.

Key-words: new status, checklist, Indonesia, Papua Prov., West Papua Prov., Papua New Guinea.

Introduction

The genus *Pararhodia* Cockerell in Packard, 1914 contains the smallest members of the family Saturniidae in the Indo-Australian region and is confined to the island of New Guinea. Rothschild & Jordan (1905: 466) erected a new genus *Eurhodia* with type species *E. gyra* Rothschild & Jordan, 1905, described in the same paper. The generic name was preoccupied by *Eurhodia* Haime in D'Archiac & Haime, 1853 (Animalia, Echinoderma) (Fletcher & Nye, 1982: 120), therefore Cockerell (1914: 170) introduced *Pararhodia* as objective replacement name, again with type species *E. gyra*. Conte (1919a: 190; again in 1919b: 22) published formal homonyms of the genus *Eurhodia* and its type species *E. gyra* by giving an exact generic and specific description, citing a type species, and mentioning this as "Nov. Gen." and "nov. sp."; a replacement name

is not necessary because of subjective synonymy of the involved taxa. Bouvier (1928: 675) placed *Pararhodia* in his tribe Rhodiicae, together with the Asian genus *Rhodinia* Staudinger, 1892. Overviews of current knowledge of the genus *Pararhodia* were then published by Seitz (1928: 505, no specimens figured), Schüssler (1933: 87; 1935: 598), Bouvier (1936: 267), D'Abbrera (1998: 78) and Paukstadt & Paukstadt (2012). Generally specimens of the genus *Pararhodia* are quite rare in collections. During preparations of this manuscript all type specimens were examined in different museum collections in Great Britain, France, Indonesia and the Netherlands, plus few further specimens in institutions (MHNL Lyon, BMNH London) and the private collection of D. Lane (Atherton, Australia). Male genitalia structures reveal a near relationship with the Indo-Australian genera *Opodiphthera* Wallengren, 1858 and *Neodiphthera* Fletcher, 1982, but from external habitus all species described in *Pararhodia* form a homogenous and so far monophyletic group, defined by for example the exclusively black antenna in both sexes and the typical pattern in combination with very small size of specimens. The status of some of the few taxa described so far has been repeatedly discussed in literature. While the oldest taxon *P. gyra* is described and known only from females originating from the eastern parts of Papua New Guinea, a second taxon described soon after, *P. meeki* (Jordan, 1909), was described from two males. It is most probable that those two males are counterparts of the females of *P. gyra* (see also Paukstadt *et al.*, 1992: 390; D'Abbrera 1998: 78), but so far this cannot be proved with certainty; DNA studies of more actual topotypic material would help here. Paukstadt *et al.* (1992: 390) and Paukstadt & Paukstadt (2012: 20) note an incorrect TL for *P. gyra* which is clearly stated in the original description as "Angabunga River, a southern affluent of the St. Joseph River, 6000 ft. and upwards" (Rothschild & Jordan, 1905: 454) and noted also on the label of the female holotype (compare also D'Abbrera 1998: 78), and therefore show the wrong location for *P. gyra* on their map (Paukstadt & Paukstadt 2012: 18; compare also the map in this actual work). A third taxon, *P. gyra acuminalba* van Eecke, 1924, is raised here to a new status at species level because it shows differences in pattern (the pinkish postmedian line and the more yellow suffusion with scales of *P. gyra* are missing, the species occurs far from the known distributional area of that taxon in Eastern Papua New Guinea); *P. acuminalba* **stat. nov.** is described from further west in the "Centraal Gebergte, Idenburg riverside" which today is part of the Indonesian province Papua, at around 3°33' S; 139°08' E. The TL can be roughly determined from a map published by Toxopeus (1940: 272) and is nearby that of another taxon, *P. rotalis* Paukstadt *et al.*, 1992, described from higher altitudes. The TL of this species is found also on the map published by Toxopeus (1940) and described *ad extenso* and even figured in a photo by Toxopeus (1940: 13, pl. 1). Both taxa, *P. acuminalba* **stat. nov.** and *P. rotalis*, differ from each other by size and pattern and can easily be separated from each other. The publication in *Novitates Zoologicae* XII.1915, cited in van Eecke

(1924: 47) does not exist in the form mentioned there; van Eecke probably refers to the original description of *Eurhodia gyra* published in 1905.

Two further taxa have more recently been described in the genus *Pararhodia*: *P. setekwa* D'Abrera, 1998 from Snow Mts, Upper Setekwa River which is located in the southern slopes of the central cordillera of West Papua. The holotype female resembles somewhat the allotype of *P. rotalis* and some further specimens in RMNH (ex coll. van Groenendael) but as it originates from the southern slopes and *P. rotalis* from the northern slopes and no recently collected material exists for examination, the specific status is not discussed for the moment.

Finally, there is the very distinctive *P. daviesorum* Lemaire, 1979, described from higher altitudes at Mt. Kaindi, Morobe Prov. in central Papua New Guinea (see map). The species can immediately be separated from all other taxa by its intense yellow colouration.

In the following, two more species are described as new to science. The first is the largest species in the genus, known so far only from Vogelkop (= Birdshead) peninsula, Arfak Mts, a locality about 500 km west of all the so far most western *Pararhodia* record. The second taxon from the southern and western highlands of Papua New Guinea appears to be so far undescribed. Both new taxa are known only from females; at the TL in Arfak Mts, it seems that *Pararhodia* representatives come rarely to lights, as other Saturniidae genera were collected in larger quantities at different seasons over the year.

Sample parts of the two described new taxa are forwarded to the barcoding project of the University of Guelph, Canada, to archive the according DNA barcoding results for future studies. Unfortunately most other type material in the genus is of such an old age that reliable barcoding results are not expected, therefore new material from the historic type localities is required for further studies.

Abbreviations

The abbreviations given below have been used throughout the text:

- BMNH – Natural History Museum, London, U.K.
- KSP – Koleksi Serangga Papua, Jayapura, Papua, Indonesia
- MHNL – Muséum d'Histoire naturelle de Lyon, Lyon, France
- MNHN – Muséum national d'Histoire naturelle, Paris, France
- MZB – Museum Zoologicum Bogoriense, Cibinong, Indonesia
- PNG – Papua New Guinea
- RMNH – Naturalis Biodiversity Center (NBC), Leiden (former Nationaal Natuurhistorisch Museum, Leiden), The Netherlands
- SMFL – Senckenberg-Museum, Lepidoptera, Frankfurt am Main, Germany
- TL – Type Locality

ZMA – Zoölogisch Museum Amsterdam, now incorporated in RMNH
ZMHB – Museum für Naturkunde (Humboldt-Universität), Berlin, Germany.

Descriptions

Pararhodia hiltrautae spec. nov.

(Figs 1, 2)

Holotype: ♀, Indonesia, West Papua Prov., Manokwari Regency, Arfak Mts., Maibri village env., 1670 m, 1.–25.III.2013, barcode SNB 5081, coll. S. Naumann. A red holotype label will be added accordingly. No further specimens are known currently. The specimen will be deposited with the author's collection in ZMHB.

Diagnosis:

The largest species known so far in the genus *Pararhodia* which is unique by its broad white submarginal line on both fore- and hindwings and the combination of dark violet brown colour with intense yellow coloured veins plus large wing ocelli.

Description:

Forewing length, measured from basis to apex 39 mm, the forewings rounded and of typical form for the genus. Length of antennae 7.0 mm, longest rami 0.7 mm, with 25 segments in total, quadrupectinate up to the apical 8 segments, there with reduced rami; they are of black colour. The head, thorax and abdomen are of homogenous dark reddish brown colour and covered with long hair, the tibia and tarsi of all legs are black. Both fore- and hindwings are of a quite homogenous dark violet brown ground colour; typical markings are the accentuated yellow veins which end marginally in a tiny yellow marginal band, and an intense white submarginal band which is somewhat wavy on the forewing and less wavy on the hindwing, and ends on both fore- and hindwings in a large white apical dot. Ante- and postmedian lines are not existent, the marginal part of the median area is somewhat suffused with white scales. The hyaline wing ocelli are almost round, of 6.0 mm diameter on the forewing and 4.1 mm on the hindwing, and surrounded by a tiny darker violet ring. Both fore- and hindwings have a row of marginal dark violet fringes. The ventral side is an exact image of the dorsal one, there are absolutely no differences.

Distribution:

P. hiltrautae spec. nov. is known only by the holotype from the TL. The collecting site is located at around 1° 24' S; 134° 01' E in the Arfak Mountains, on the eastern mountain chain of the so-called Vogelkop Peninsula (see map).

Etymology: The species is dedicated with love to the author's mother, Hiltraut Naumann.

Pararhodia ulrichi spec. nov.

(Figs 3, 4)

Holotype: ♀, Papua New Guinea, Southern Highlands, Tari Ambna [sic, recte: Ambua], 11.II.1987, via L. Hart, ex coll. D. Rolfe, barcode SNB 1135, coll. S. Naumann. A red holotype label will be added accordingly. The specimen will be deposited with the author's collection in ZMHB.

Paratype: ♀, Papua New Guinea, Western Province, Hindenburg Wall, ca 5° 07' S; 141° 15' E, 1770 m, 27.II.2013, leg. C. J. Müller, coll. D. Lane (Atherton, Australia). A blue paratype label will be added accordingly.

Diagnosis:

Generally a small species with vivid yellow ornamentation on reddish brown background and broad pinkish white postmedian line, a combination of markings which is unique for the genus. Ornamentation on both dorsal and ventral sides is almost similar.

Description:

Forewing length, measured from basis to apex 30 mm, the forewings rounded and of typical form for the genus. Length of antennae unknown, the holotype has only a rudiment of 9 segments of one antenna existing which is quadrupectinate, longest rami 0.8 mm, of black colour. The head, thorax and abdomen including legs are of homogenous dark orange brown colour. Both fore- and hindwings have a chestnut brown ground colour which is suffused heavily with yellow and pinkish white ornamentation. In contrast to *P. hiltrautae spec. nov.*, described above, there are zigzag ante- and postmedian lines on both fore- and hindwings which are of yellow colour and bordered to the median area with a darker brown shadow. The veins in this median area are partly accentuated with yellow scales, and the whole area is more or less suffused with yellow scales as well. The hyaline forewing ocellus is of ovoid form, with 4.2 mm maximum diameter, surrounded by a darker brown, narrow ring, the hyaline part of the hindwing ocellus very small, more lentiform, and surrounded by a little broader dark brown ring. The undulate postmedian line is followed by a very typical pinkish white second undulate band in the marginal area which ends alongside a large white apical dot on both fore- and hindwings. The marginal area again in ground colour, all veins highlighted with yellow scales. As in *P. hiltrautae spec. nov.* the ventral side is an exact image of the dorsal one, there are no differences visible aside of a more basally located antemedian line.

Distribution:

P. ulrichi **spec. nov.** is known only from two places in the western parts of central Papua New Guinea: The TL is located in the Southern Highlands Prov., Tari – Ambua Highlands highway, at around 5° 57' S; 143° 03' E in an altitude of approximately 1800 m, and a recently collected paratype specimen originates from Western Province, Hindenburg Wall in 1770 m altitude close to the border with Papua, Indonesia (see map).

Etymology:

The species is dedicated with love to the author's father, Ulrich Naumann.

Checklist of the genus *Pararhodia* with all known localities

Including the two new described species, eight species of the Genus *Pararhodia* are known from New Guinea; in order of publication as follows. As *Pararhodia* specimens generally are very rare in collections, the few so far known localities of all specimens examined are given, partly in more detail than in their original descriptions or on the data labels.

***P. gyra* (Rothschild & Jordan, 1905)**

Eurhodia gyra Rothschild & Jordan, 1905

Papua New Guinea [British New Guinea], Angabunga River (TL - cf. D'Abrera 1998: 78); → PNG, Central Prov., ca 8° 31' S; 146° 41' E, ca 200 m.

PNG [British New Guinea], Mambare River, Biagi (TL - cf. Paukstadt *et al.*, 1992: 390; error!); → PNG, Oro Prov., ca 8° 14' S; 147° 59' E, lowlands.

Papua New Guinea [British New Guinea], Herzog Mts (W), Edie Creek. (D'Abrera 1998: 78); → PNG, Morobe Prov., 7° 23' S; 146° 39' E, ca 1950 m.

Papua New Guinea, Morobe Prov., Kwaimunga Mt, 2100 m, IV.1987 (SMFL) → ca 7° 19' S; 146° 28' E.

***P. meeki* (Jordan, [1909])**

Eurhodia meeki Jordan, [1909]

Probably synonym of *gyra*

NE PNG, Kumusi River, low elevation, VI./VII.1907 (TL); → PNG, Oro Prov., ca 8° 38' S; 147° 58' E, lowlands.

Papua New Guinea (C), Crater Mt, WMA, Haia, II.2002, barcode SNB 1559 (coll. D. A. Lane); → PNG, Chimbu Prov., ca 6° 43' S; 145° 00' E, ca 700 m.

***P. acuminalba* stat. nov. (van Eecke, 1924)**

Eurhodia gyra acuminalba van Eecke, 1924

Beginning of hills of "Centraal Gebergte" Idenburg riverside, Prauwenbivak [SW of Jayapura], XI.1920 (TL); → Indonesia, Papua Prov., perhaps around 3° 33' S; 139° 08' E, ca 500 m.

***P. daviesorum* Lemaire, 1979**

Papua New Guinea, Morobe Prov., summit of Mt. Kaindi, 13 miles S Wau, 2350 m, 24.IV.1970 (TL). → PNG, Morobe Prov., ca 7° 22' S; 146° 42' E, ca 1600 m.

***P. rotalis* Paukstadt, Paukstadt, & Suhardjono, 1992**

Indonesia, Papua Prov., Jayawijaya Mts (N), ca 230 km SW Jayapura, 2100 m, Top Camp, 17.I./5.II.1939 (TL, figured by Toxopeus 1941, 7 (1): pl. 1); → Indonesia, Papua Prov., ca 3° 33' S; 138° 52' E, ca 2100 m.

Araucaria Camp, 26.III.1939; → Indonesia, Papua Prov., ca 3° 31' S; 139° 07' E, ca 800 m.

Indonesia, Papua [Ned. NW Guinea], Achterland Hollandia [south of Jayapura], 200-1200 m, 13.II.1936, W. Stüber leg. (coll. Van Groenendael, ZMA); → Indonesia, Papua Prov., ca 3° 40' S; 140° 30'.

Indonesia, Irian Jaya [Nouvelle Guinée, Irian], Ilaga West, no data (coll. G. Terral, MHNL); → Indonesia, Papua Prov., 4° 05' S; 137° 31' E, ca 2330 m.

Indonesia, western part of New Guinea, Abmisibil, 31.VIII.1985 (KSP); → ca 4° 38' S; 140° 33' E, 1800 m.

***P. setekwa* D'Abrera, 1998**

Probably synonym of *rotalis*

Indonesia, Irian Jaya [Dutch New Guinea], Snow Mts., upper Setekwa River, 2000-3000 ft, 1910 (TL); → Indonesia, Papua Prov., ca 4° 29' S; 137° 20' E, ca 700-1000 m.

***P. hiltrautae* spec. nov.**

Indonesia, West Papua Prov., Manokwari Regency, Arfak Mts, Maibri village env., 1670 m, 1.-25.III.2013, barcode SNB 5081 (TL); → Indonesia, West Papua Prov., ca 1° 24' S; 134° 01' E, 1670 m.

***P. ulrichi* spec. nov.**

Papua New Guinea, Southern Highlands, Tari Ambua., 11.II.1987, barcode SNB 1135 (TL); → PNG, Southern Highlands Prov., Tari-Ambua Highlands Highway, ca 5° 57' S; 143° 03' E, ca 1800 m.

→ PNG, Western Province, Hindenburg Wall; ca 5° 12' S; 141° 18' E, 883 m.

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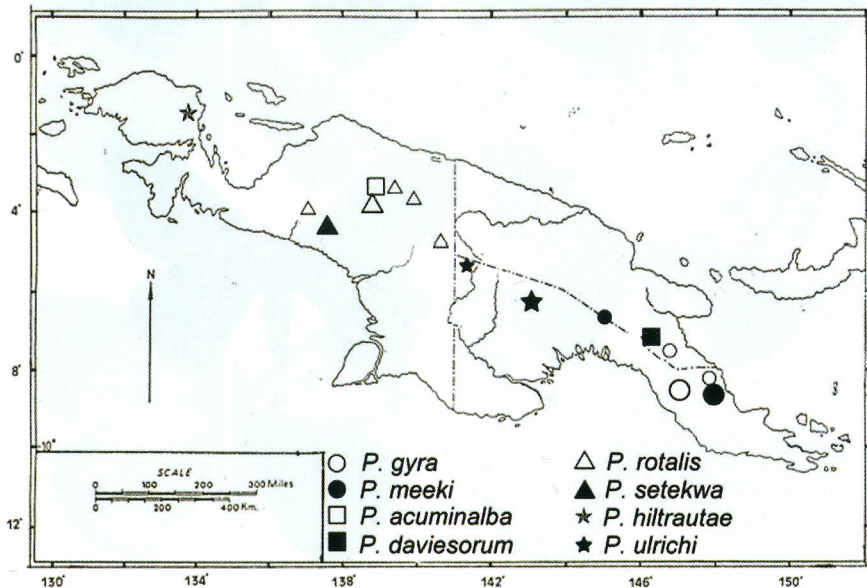
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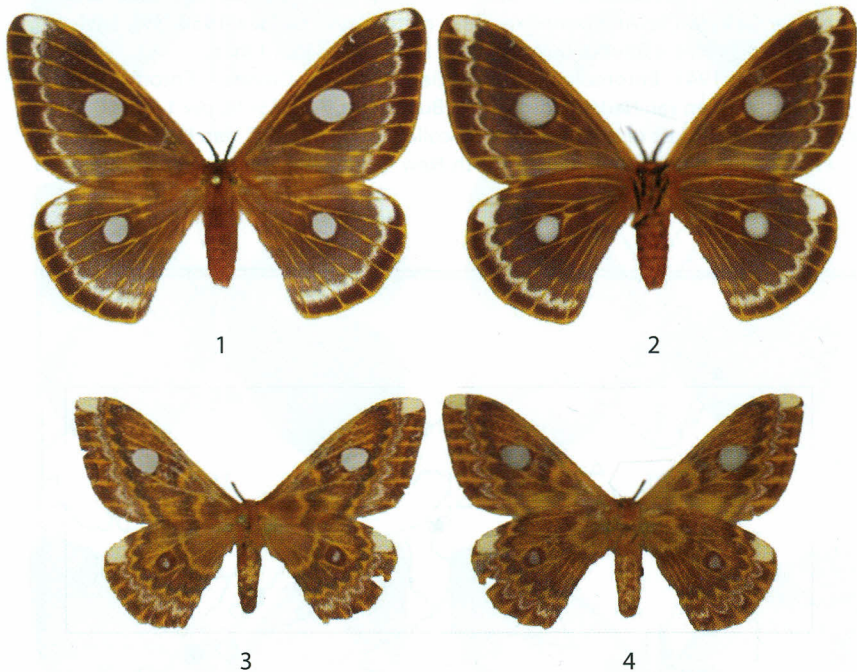
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Map of New Guinea, showing all known localities of *Pararhodia* specimens. Type localities in bold symbols.

Figs 1-2. *Pararhodia hiltrautae* **spec. nov.**, ♀ holotype:

1. dorsal view; 2. ventral view;

Figs 3-4. *Pararhodia ulrichi* **spec. nov.**, ♀ holotype:

3. dorsal view; 4. ventral view.