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Taxonomic notes on Parides erlaces (GRAY [1853]) with Description of a new Subspecies from Inambari S.E. Peru*

(Lep. Papilionidae)

by
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Abstract: A new subspecies of *Parides erlaces* (GRAY [1853]) from S.E. Peru and N.W. Bolivia is described an named *yaminahua*. The relationships between the populations of *P. erlaces* from Ecuador to Bolivia are compared in the light of ecological and historical factors.

Introduction

Upon examination of the extensive collections of the British Museum of Natural History, London and other private collections, the authors found that the populations of *Parides erlaces* from SE Peru and NW Bolivia belong to a new subspecies on account of their genitalic and pattern characters.

Parides erlaces **y a m i n a h u a** subspec. n. (figs. 5-8)

Material examined. A series of 23 ♂♂, 8 ♀♀ as follows:
Type: Holotype, male. Peru, Cuzco, Quincemil, 900 m, 10.X.1975 (leg. SCHUNKE), in coll. RACHELI in coll. Museo di Zoologia, Universita di Roma (figs. 5-6).

External characters: Palpi black, patagia red, a series of red tufts scale-parches along the thorax and on the first, second and fourth abdominal segment. Valvae ringed with red scales. FW length 48 mm.

Upperside FWs: Olive-green discal band extending from anal margin to S2; a few green scales basally to nervule 1a and in S3. Fringes white.

Underside FWs: Completly black without any dot.

Upperside HWs: Strong opalescence on the red band formed by three elongate spots; the spot in S2 is thinner than that in S3, that in S4 smaller and rounded. The spots are well separated by the veins.
Fringes white. Underside HWs: A series of pinkish-red spots from S1a to S5; the first two small and irregular, the third one discal and thin shaded with black, the next two larger and the last one is only a dot. Large abdominal fold with white hair inside and with brownish hair along the anal margin and S1b.
Male genitalia (fig. 1a, b).
Superuncus slender and long, uncus slightly sclerotized on its dorsal edge. Harpe

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regular with seven teeth from the apex towards the base. A very minute tooth preceding a strong tooth at ventral margin, bearing another small projection at its base.

P. erlaces guillerminae PISCHEDDA & RACHELI 1986 from Napo shows a superuncus more stout, smaller uncus, harpe with six teeth, and the strong tooth is shorter and more regular (fig. 2a, b).

Material examined:
Paratypes ♂♂: 1 ♂ Peru, Luzco, Quincemil 900 m 18.X.1975 (leg. SCHUNKE); 1 ♂, idem, 6.X.1975 (leg. SCHUNKE); 1 ♂, idem, 16.X.1975; 1 ♂, idem, 21.XI.1975; 1 ♂, S.E. Peru, Quincemil, 25.IX.1973 (leg. KÖNIG); 1 ♂, Peru, Cuzco, Quincemil, 900 m, XII 1974 (leg. KÖNIG); 1 ♂, idem, 700 m, IV 1975 (leg. KÖNIG); 1 ♂, S.E. Peru, Salvacion, Ob. Manu VI 1976 (leg. KÖNIG). Alle specimens in coll. RACHELI in coll. Museo di Zoologia dell'Universita di Roma. 4 ♂♂, E. Peru, Marcapata 4500 ft. (ROTHSCHILD bequest B.M. 1939-1); 1 ♂, Peru, Cuzco, Callanga, 1500 m, 1898 (leg. O. GARLEPP) (ROTHSCHILD bequest B.M. 1939-1); 1 ♂, Caradoç, Marcapata 4000 ft. II.01 (leg. OCKENDEN) (ROTHSCHILD bequest B.M. 1939-1); 3 ♂♂, Peru, Cuzco (ROTHSCHILD bequest B.M. 1939-1); 1 ♂, Cuzco, Cajon X 1901 (leg. GARLEPP) (ROTHSCHILD bequest B.M. 1939-1); 2 ♂♂, Yungas de la Paz, Bolivia, sept. 1899, 1000 m (GARLEPP) (ROTHSCHILD bequest 1939-1); 2 ♂♂, Yungas, Bolivia, *P. drucei* ♂, Bolivia, R.E. TURNER coll., Brit Mus. 1917-136; in coll. Brit. Mus. Nat. Hist. London.

Fw length ranging from 36 to 49 mm. Mean value 44.3 mm on 23 ♂♂ specimens. Upperside FWs: The males show a certain degree of variability in the extension of the green patch which in two specimens does not run until vein 3 and in four specimens does not touch basally vein 1a. Two specimens have a white-yellow dot in S2. The three red spots on the upperside HWs seem variable in their size and in some cases they are more separated. Two specimens with a few red scales in S1a.

Underside FWs: two specimens with a white dot in S2. Underside HWs: In seven specimens the last red dot is absent, three specimens show an additional dot in S6 and most of the specimens have the spot in S1b larger than that in S1a.

Paratypes ♀♀: 4 ♀♀, Peru, Cuzco (ROTHSCHILD bequest B.M. 1939-1): 1 ♀, Peru Cuzco, IV 1901 (leg. GARLEPP) (ROTHSCHILD bequest B.M. 1939-1); 1 ♀, E. Peru, Marcapata, 4500 ft. (ROTHSCHILD bequest B.M. 1939-1); 1 ♀, Peru Cuzco, Callanga, 1500 m, 1898 (leg. GARLEPP) (ROTHSCHILD bequest B.M. 1939-1), in coll. British Museum (Nat. Hist.), London. 1 ♀, Peru, Cuzco, Quincemil, 8.XI.1975 (leg. SCHUNKE), in coll. RACHELI in coll. Museo Zoologico, Universita di Roma.

FW length ranging from 44 to 53 mm. Mean value 47.7 mm on 8 ♀♀ specimens. Palpi black, patagia red, patches along the thorax and on the first, second, third and fourth abdominal segment. Ostium bursae and ostium oviducti ringed with red hair.

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Upperside FWs: All specimens completely brown except one with a white dot in S3 and another one with two spots in S2 and S3, this latter the largest. Fringes white. Upperside HWS: Seven pink spots from S1a to S6. The first two are always united between them. The next three are elongated; the last two are circular. One specimen the last one is a dot in another one is absent. Fringes white.

Underside FWs: All specimens completely brown except two with white spots; one specimens whith a dot in S3, the other one with 3 white spots in S2, S3, S4. Underside HWs: seven pinks spots from S1a to S6. The first two are united, the next three are larger, and the last two circular. In a specimen are visible only few pink scales in S6.

Derivatio nominis: the name *yaminahua* is dedicated to the tribe Yaminahua of the upper Manu where the junior author spent several months for anthropological and biological research.

Discussion

Even though this subspecies is found far from Ecuador 1600 km as the *Parides* flies, nonetheless it is related in male and female patterns to *P. erlaces guillerminae* PISCHEDDA & RACHELI 1986 of the Napo refuge. The affinities between Napo and Inambari via Ucayali has been suggested by BROWN (1979, 1982).

The range of *yaminahua* seems to extend from the Inambari refuge southwards to Yungas and to the north beyond the river Manu. This taxon has not yet been found in the Tambopata Reserve (LAMAS, 1985) which is not surprising, as the altitude of, the Reserve is 300 m and *P. erlaces* is usually bound to much higher habitats (600-1600 m). LAMAS (1983) considers Tambopata as a linking area between the Inambari and Yungas refugia. Tambopata might not have been suitable for *P. erlaces* during the cold phases, the species being already adapted to higher altitudes in the rain forest and therefore not able to descend to drier zones (4000 m vs. 1000 mm, BROWN 1979).

The extension of the range of *yaminahua* to Yungas de la Paz may have occurred along the foot of the Cordillera de Carabaya and Cordillare Real through the Mapiri and Beni areas. The climatic situation during the dry season 18000 B.P., might have influenced the apparent uniformity of external characters of the populations of *P. erlaces* from the Napo to Yungas. During the late ice age these refugia supported greater rainfall than other areas and nowadays correspond to the distribution of rich dense forest (HUECK & SIEBERT, 1972). It might be suggested that these populations behave as polytopic subspecies (sensu MAYR, 1969) on the basis of the green band of the ♂♂ and the pattern of the ♀♀.

Other populations of *P. erlaces* which occur in east and south Bolivia, are treated for the time being as the nominal subspecies. In these areas it is often sympatric with *P. vertumnus* (CRAMER, 1779) and *P. anchises* (LINNAEUS, 1758), all these three species being characterized by the FWs/HWs of females with white/red patterns (ZISCHKA, 1950).

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The occurrence of intermediate specimens of *P. erlaces* females from the Napo to the Yungas with anything from few white scales to somewhat regular white patches on the FWs, suggests the incomplete isolation of the various populations throughout their range. It is postulated that this is due to secondary contact between adjacent refugia, not giving rise however, possibly for mimetic reasons, to real hybridization zones as commonly happens in *Heliconius* and Ithomiids.

An important point to underline is the change in the characters of the genitalia of the *erithalion-erlaces* complexes, particularly their increasing diversity proceeding from the north to the south.

The shape of the harpe, which is subtriangular and with a few teeth in the populations from central America to Colombia, becomes rounded and heavily toothed from Ecuador to Bolivia. Ecuador effectively marks the boundary of the relevant ranges of *P. erithalion* and *P. erlaces* which apparently have no contact zones.

The presence of two different sets of characters, overall pattern and male genitalia, in the same population of *P. erlaces* in the Yungas de La Paz, maybe due to recent and long-time factors, both involving ecological and phylogenetic determinants. Selective pressures have acted on the external characters, also for mimetic reasons, whilst on the other hand, populations from the south, isolated in refugia and come to secondary contact with the northern populations, retained their genitalic characters which were not subjected to recent selective pressures (fig. 3).

The almost uniform pattern shown by the populations of *P. erlaces* from the Napo to the Yungas may lead to another hypothesis supported by the overlapping ranges of other taxa as that of *Aratinga* (Psittacidae) (FORSHAW & COOPER, 1978) as well as that of other birds (HAFFER, 1978). The creation of several refugia based on several species of Ithomiids and Heliconids (BROWN, 1979, 1982) may not be maintained for other taxa from the evidence that the ecological homogenity involving similar climate, type of soil and vegetation, may have acted in different manner on different animals. The inter-relationships between the Napo and Yungas refugia as well as all the in-between areas are very strong and often indistinguishable. It seems that these areas had remained stable for a long time bein an almost continuous forest. Hypothesis already considered by SIMPSON & HAFFER (1978), even though Napo and Inambari behave as „core areas" for some species of birds HAFFER 1978). Interestingly enough, the ranges of *guillerminae* and *yaminahua* are congruent with the Yungas centre (MÜLLER, 1972) based on the analysis of neotropical vertebrates.

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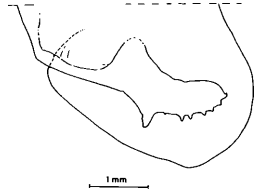
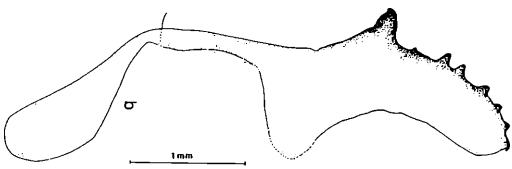


Fig. 1



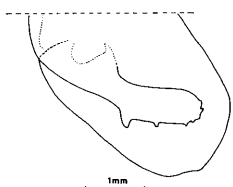


Fig. 2

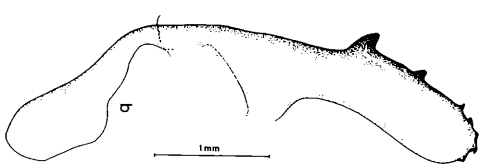


Fig. 3

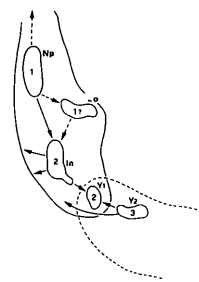


Fig. 1: male genitalia of *P. erlaces yaminahua* subspec. n.
a: right valva and harpe b: left harpe in detail

Fig. 2: male genitalia of *P. erlaces guillerminae* PISCHEDDA & RACHELI
a: right valva and harpe b: left harpe in detail

Fig. 3: unbroken line: similar external features of *P. erlaces*
dashed line: similar male genitalia of *P. erlaces*
Np; Napo; Lo. Loreto; In.Inambari; Y1. North Yungas; Y2. South Yungas
Ranges of *P. erlaces* subspecies: 1. *P. erlaces guillerminae*; 2. *P. erlaces yaminahua*; 3. *P. erlaces erlaces*.
Arrows: presumed dispersal of *P. erlaces* populations.

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