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A new Subspecies of Papilio zagreus DOUBLEDAY, 1847 from Venezuela

(Lep. Papilionidae)*

by

TOMMASO RACHELI & MARINA PISCHEDDA

Abstract: The populations of *Papilio zagreus* occurring in western Venezuela are related to a new subspecies named *motilones*. The distribution of the taxonomic units of *P. zagreus*-complex is analized taking account of paleoclimatic events.

Introduction

In 1981 the senior author during a collecting trip in Venezuela had the opportunity to examine several private collections as well as that located in the Instituto de Zoologia Agricola, Maracay and to collect in Apure and Sierra de Perija. During 1985 the junior author collected in the Apure area and succeeded in obtaining one male of *P. zagreus*. The differences found in the populations of Tachira and Zulia, remove them from the nominal subspecies.

Papilio zagreus was described in 1847 from a single female collected by DYSON and figured in DOUBLEDAY (1848). In the original description the provenience is indicated only as „Venezuela" and all subsequent literature sources report no exact locality. VANE-WRIGHT (pers. comm.) however, informs us that DYSONs material is likely to come from the Province of San Esteban, coastal area of N. Venezuela. Specimens from this area are very scarce in collections, nonetheless the few specimens examined are different from the populations of Apure and the females fitted well with the holotype. It is therefore necessary to restrict the type locality of the nominal subspecies to San Esteban, until a systematic revision of *Papilio zagreus*-complex has been carried out (RACHELI & PISCHEDDA in prep.).

On account of the possible polyphyly of Papilionini and the still unsatisfactory taxonomy of the taxon, *zagreus* is retained in the genus *Papilio* (s.l.), following MUNROE (1961).

Description

Papilio zagreus **m o t i l o n e s** subspec. n.** (figs. 1-2)

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** According to the International Code of Zoological Nomenclature (RIDE et. al., 1985) the case of naming a superspecies or semispecies is not considered. Only the art. 6 (b), recommendation, contemplates the use of the term superspecies for names already appointed to species or subspecies. Therefore the new name is designated at subspecific level.

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Type: Holotype ♂/Venezuela, Tachira, (S. Cristobal), Rio Frio m 500, 11.VIII.85, M. PISCHEDDA leg. (Holotype ♂ *Papilio zagreus motilones* RACHELI & PISCHEDDA 1987).

External features. Head: Scape white; antennae: basal third black, distal two third yellow. Fronto-clypeus black with median yellow line. Palpi and patagia white, tegulae yellow. Two white dots on the prothorax. A dorsal yellow median line on the black thoracic tergites. The sternites are yellow and black striped. Abdomen dorsally and ventrally black, laterally orange. Coxae yellow externally.

Upperside Fws: Fw length 58 mm. Three large yellow apical spots in S6-S8, around patch in S5, and a series of five small yellow marginal dots. The discal and post discal band is formed by seven spots of variable size, that in S6 the largest and subtriangular, in S7 elongated, in S8 very small. The spots in S1b-S4 are elongated except that in S1b which is rounded. Those in S2-S3 are interrupted by a black band which invades also the spot in S4. This black band forms two small spots near the median vein and are of a light orange colour. Some orange scales in S1b. In the cell there are two bands, one yellow at its apex, the other much longer along the inner part of the median vein and it is of the some light orange colour of the two spots in S2-S3. Some yellow scales are present on the costal margin opposite of the cell-bar as well as along the radial vein.

Underside Fws: Similar to upperside, ground colour brownish-black. The apical yellow spots partly obliterated by brownish scales. Six small marginal dots. Discal and post discal yellow band more prominent than upperside. The black post-discal band dividing the spots is less evident. A series of six small yellow marginal spots.

Upperside HWs: Along the anal margin a dense black pilosity, yellow along the median vein becoming black distally. Outer margin lightly scallopped with traces of white internervular scales. A series of black spots from S1b to S7, this latter extends from the base outwardly. An irregular black patch in the cell distally. Spaces S6-S8 yellow, the other light orange. The veins are yellow up to the marginal black band which protrudes inside the orange postdiscal pattern, therefore forming, especially in S3-S5, a scallop-edging. A series of seven yellow rounded dots in the black band.

Underside HWs: Ground colour dull orange with a submarginal and marginal band containing a series of 14 light blue dots and 8 yellow spots, respectively in the two areas.

Material examined

Paratypes: 27 ♂♂, 4 ♀♀ with the following data:

1 ♂, Rio Negro, 4.IX.; 1 ♂, 24.IX.; coll. J.B. CASANOVA (San Cristobal); 1 ♂, La Cuchilla (San Cristobal) coll. G. BORGES; 3 ♂♂, Rio Frio 26.VI.81; 1 ♂, San Joaquin de Navay 16.VI.1981, coll. MATTEI, Maracay; 1 ♂, Barancas, San Joaquin de Navay 15.VI.1972; 1 ♂ (Zulia) El Tucuco (400 m) 25.V.1967, coll. GADOU, Caracas; 1 ♂, Venezuela, Tachira, La Morita 300 m, 9.IV.1972, A. D'ASOLI, A. MONTAGUE, J. SALCEDO leg.; 1 ♂, Venezuela, Tachira, Rio Frio m 600, 2.-

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10.IX.1981, F.F. YEPEZ, J. CLAVIJO, A. CHACON leg.; 1 ♂, Venezuela, Tachira m 600, 11.-13.XII.1980 J.A. CLAVIJO, A. CHACON, H.J. AYALA leg.; 1 ♂, Rio Frio m 600, 24.IV.82, ex p. Zool Agric.; 1 ♀, Venezuela, E. Tucuco m 420, 21.-27.V.1971, C.J. ROSALES, J. SALCEDO, A. RAMIREZ leg.; 1 ♀, (Tachira), Rubio, 24.X.1954. All specimens in coll. Instituto de Zoologia Agricola, Maracay. 1 ♂, Villavicencio, XII. O. Columbia (*zagreus* ♂ var.) (59-26 J.J. JOICEY Bequest). in coll. British Museum (Nat.Hist.) London. 1 ♂ Rio Negro, 11.X.1981,BORGES leg.; 1 ♀, Venezuela, Tachira, Rio Negro, m 500, 11.X.1981; 1 ♂, Tachira, La Cuchilla, Vega de Aza, 1.III.1981; 1 ♂, Venezuela, Tachira, San Joaquin de Navay, m 300, 29.VIII.1980; 1 ♂, Edo. Tachira, Rio Frio m 500, 26.VI.1981, O. MATTEI leg.; 1 ♂, Tachira, (S Cristobal), Rio Frio m 500, 20.VI. (19)80 BAIOCCHI leg. All specimens in coll. RACHELI in coll. Museo di Zoologia, Universita di Roma. 1 ♀, Rio Frio, 5.IX.1981; 2 ♂♂, Paramillo (San Cristobal); 1 ♂, Rio Frio; 1 ♂, Rio Frio, XII.; 1 ♂, San Juan de Colon, 1.IX.1981; 1 ♂, Paramillo, 3.IX.1979; 2 ♂♂, Rio Frio, 18.VII. All specimens in coll. MANRIQUE, San Cristobal.

Variability of the males. FW lengths 58.6 mm mean on 27 ♂♂.
In few specimens there is a reduction of the number of the marginal series of dots of the upperside FWs. The apical spots are also reduced in size in three specimens. The cell-bar may be larger than that of the holotype but usually is of the same width. In four specimens there is a riductions of the black discal band, so that the yellow discal and post-discal bands appears to be fused together, but the space 1b is always filled with black and the relative yellow spot appears isolated.

The upperside of the NWs in the specimen from El Tucuco shows a great reduction in the amount of black in the discal and post-discal spots. Also the cell is devoid of black scales giving therefore a resemblance to *P. ascolius*. From this, it is separable at once by the series of post-discal spots of the FWs which are arrow-shaped, whilst in *P. ascolius* rounded. Two specimens from Rio Frio have a much larger black marginal area extending almost to the cell.

Variability of the females (Fig. 3-4). FW length 65 mm mean on 4 specimens.

They are characterized by the shape of the FWs which are more elongate than the males and by the abdomen which is brownish without any stripe above and orange-red underneath. The pattern similar to that of the male but the spot in S1b of the FW is orange instead of yellow as well as the three spots near the median vein. A specimen from Rio Frio is much darker so that the yellow colour si reduced and the black spots of the HWs more prominent.

Derivatio nominis
The new name is dedicated to the tribe Motilones inhabiting the Serrania de los Motilones, Sierra de Perija, Zulia, Venezuela.

Discussion
ROTHSCHILD & JORDAN (1906) suggested that there were no significant charac-

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ters in the several populations of *P. zagreus* occurring from Venezuela southwards to Bolivia, so as to separate them subspecifically.

At present four species are recognized in the *P. zagreus*-group, namely *P. ascolius* FELDER & FELDER, 1865, *P. neyi* NIEPELT, 1909, *P. zagreus* DOUBLEDAY, 1847 and *P. bachus* FELDER & FELDER, 1865 (HANCOCK, 1983).

Dealing with allopatric taxa it is always difficult to resolve the dilemma of the species limit, let alone that, of the subspecies. It is stimulating however to look at the pattern of the distribution of *P. zagreus* and allied taxa in the light of the recent tendencies of the mechanisms of evolution in neotropical butterfly communities.

The conditions of the environment in South America or in other tropical countries as Africa (MAYR & O'HARA, 1986) and Australia (KEAST, 1961) have been influenced by the climatic pleistocenic and post pleistocenic fluctuations (BROWN, 1976; HAFFER, 1969, 1982; MÜLLER, 1972, 1973; PRANCE, 1973; VUILLEUMIER, 1971).

The distribution of *P. zagreus* is largely vicariant with that of *P. ascolius*, the former being spread from Venezuela to Bolivia, the latter from Costarica to west Ecuador along the central and western side of the Andes. The present-day distribution may be explained by past events (fig. 5). The sea transgression especially must have been significant in extinguishing the populations in the Amazonas leaving a restricted isolate, *P. bedoci* Le CERF 1925, along the Oyapock and, on the western side *P. zagreus* which to-day reaches Teffe' (BATES, 1861; MICHAEL, 1914). *P. zagreus*, and to a certain extent *P. bachus*, during the interglacial periods underwent adaptive radiation with many populations with a low rate of introgression. The eastern Andes populations of *P. zagreus* are scarcely differentiated intergrading one another from east Colombia to Bolivia, whilst the western ones are locally more stable in external features. The new subspecies from west Venezuela extends its range towards Villavicencio in east Colombia, where occasionally specimens similar to those found in Tachira occur. The relative uniformity of the pattern may be due to the less severe climatic conditions occurring in the lowlands east of the Andes, in the Sierra de Perija, the Coastal Cordillera and the Catatumbo area which suffered only one or two glaciations and acted as refugia (VUILLEUMIER, 1971; STEYERMARK, 1982).

The syntopy of *P. zagreus* and *P. bachus* in various places, for example in Rio Guatigua, Colombia or at Chanchamayo, Peru, can be inferred as recent secondary contacts because *P. zagreus* is usually found lower (200-1000 m) than *P. bachus* (600-1300 m). This latter may have been trapped in altitude during the cold phases and only recently, being already well differentiated, has it come to lower altitudes, where it has maintained its specific status. *P. zagreus* and *P. ascolius*, being more plastic, have evolved in several refugia, following two directions along the eastern and western slopes of the Andes. Pre-montane populations seem to have been relatively more stable compared to lowland populations. On the other hand,

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even admitting that the former populations have retained more plesiomorphic characters, it is likely that they underwent morphological differentiation because of the low gene-flow during the critical phases. In the Napo and Lorete refuges, however, both *P. zagreus* and *P. bachus* have evolved two strikingly a link between the two species but their distributions are poorly known and specimens are very scarce, perhaps unique.

The present ranges of the populations of the new subspecies, as well as the distribution of *P. zagreus* in Venezuela, are supported by the evidence of the relationships presented by lowland forest elements (STEYERMARK, 1982). Floristic affinities with the Amazon are found in Catatumbo, Apure and eastern Colombia which correspond with the actual distribution of *P. zagreus motilones*. The climatic changes may have shifted both lowland plants and insects to higher altitudes and at present they are regaining their original habitat.

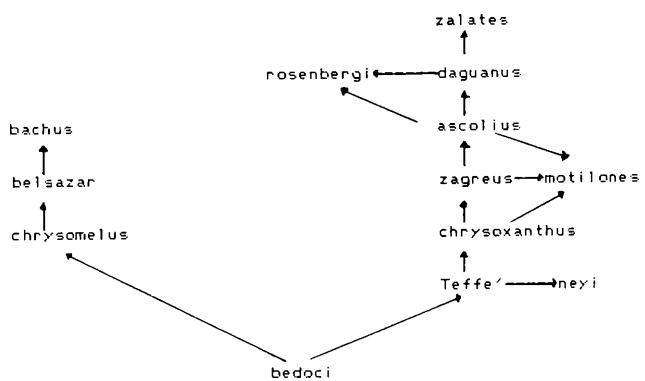
Preimaginal stages of *P. zagreus* and *P. bachus* are virtually unknown, even though it is reported from local ecuadorean collectors, that the larvae of *P. zagreus* are gregarious, living in batches. This feature is quite unusual among Papilionini and reminiscent of behaviour shown by some groups of oriental mimetic *Papilio* such as *slateri, clytia, laglaizei* (IGARASHI, 1984). The gregariousness of the larvae could have also been a reason for the extinction of the ancestral *zagreus* from the Hylaea for the embayment occurring during the late pleistocene interglacial when the sea level raised about 50 m (SIMPSON & HAFFER, 1978). The Amazonas was flooded up to the Solimoes and the specimen of *P. zagreus* collected by BATES at Teffe' could mark this limit.

Present knowledge of *P. zagreus*-complex, based on the distribution and external features, may be summarized as follows (Tab. 1):

one superspecies including the semispecies *zagreus-chrysoxanthus-neyi-motilones-ascolius-daguanus-rosenbergi-zalates*;

one polytypic species *P. bachus* with the subspecies *belsazar-chrysomelus* (+ *lathy*);

one monotypic species *Papilio bedoci*.



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Legends to the figures:

Fig. 1 *Papilio zagreus motilones* subspec. n. Holotype ♂, upperside
Fig. 2 idem, underside
Fig. 3 Paratype ♀, upperside
Fig. 4 idem, underside

Fig. 5 *Parides erlaces yaminahua*, Holotype ♂, upperside
Fig. 6 idem, underside
Fig. 7 Paratype ♀, upperside
Fig. 8 idem, underside

Fig. 9 *Papilio klagesi* ♂, upperside
Fig. 10 idem, underside

Fig. 11 *Parides anchises marinae* subspec. n. Holotype ♂, upperside
Fig. 12 idem, underside
Fig. 13 Paratype ♀, upperside
Fig. 14 idem, underside

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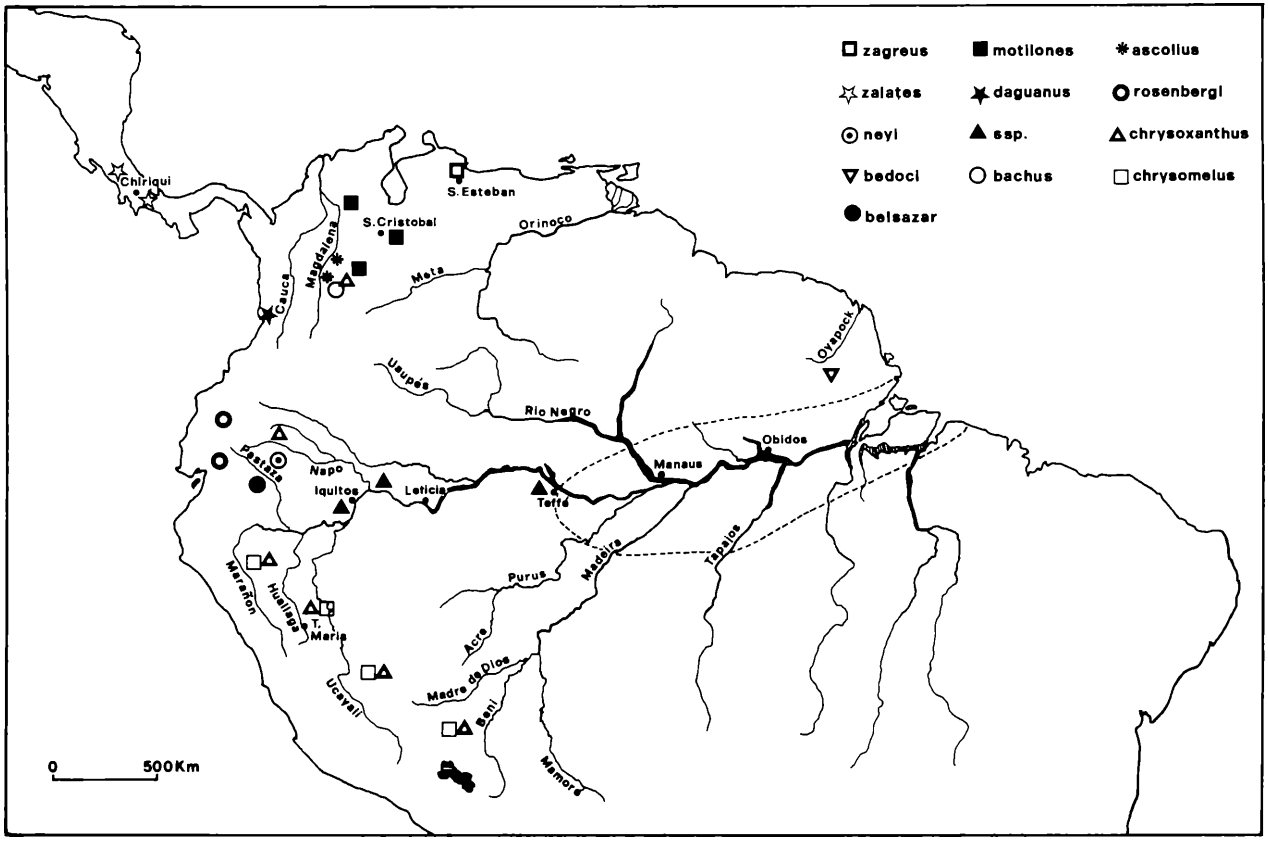

Fig. 5: Present-day distribution of *Papilio zagreus*-complex. Dashed line: supposed extention of the embayment during the Pleistocene.

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Author's Addresses

Dr. TOMMASO RACHELI
Dr. MARINA PISCHEDDA
Dipartimento di Biologia Animale e dell'Uomo
Viale dell'Universita 32
Rome, Italy

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