

Five new Peruvian subspecies of *Morpho* (Lepidoptera: Nymphalidae, Morphinae)

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SUMMARY

BLANDIN P, LAMAS G. 2006. Five new Peruvian subspecies of *Morpho* (Lepidoptera: Nymphalidae, Morphinae). *Rev. peru. Entomol.* 45.- Five new subspecies of *Morpho* are described herein from Peru: *Morpho cisseis cabrera* Blandin & Lamas **ssp. nov.**, from the upper Río Madre de Dios (Department Madre de Dios), *M. c. jeannoti* Blandin & Lamas **ssp. nov.**, from the Río Aguaytía basin (Department Ucayali), *M. amphitryon duchenei* Blandin & Lamas **ssp. nov.**, from the "upper Río Nieva" forests (border between the Departments Amazonas and San Martín), *M. sulkowskyi calderoni* Blandin & Lamas **ssp. nov.**, and *M. s. nieva* Lamas & Blandin **ssp. nov.**, two very distinctive subspecies from different mountain chains in Departments Amazonas and San Martín.

Key words: Andes, Lepidoptera, Morphinae, Peru.

RESUMEN

BLANDIN P, LAMAS G. 2006. Cinco subespecies nuevas de *Morpho* de Perú (Lepidoptera: Nymphalidae, Morphinae). *Rev. peru. Entomol.* 45.- Describimos aquí cinco subespecies nuevas de *Morpho* de Perú: *Morpho cisseis cabrera* Blandin & Lamas **ssp. nov.**, del alto Río Madre de Dios (departamento Madre de Dios), *M. c. jeannoti* Blandin & Lamas **ssp. nov.**, de la cuenca del Río Aguaytía (departamento Ucayali), *M. amphitryon duchenei* Blandin & Lamas **ssp. nov.**, de los bosques del "alto Río Nieva" (borde entre los departamentos Amazonas y San Martín), *M. sulkowskyi calderoni* Blandin & Lamas **ssp. nov.**, y *M. s. nieva* Lamas & Blandin **ssp. nov.**, dos subespecies muy notorias de diferentes cadenas montañosas en los departamentos Amazonas y San Martín.

Palabras clave: Andes, Lepidoptera, Morphinae, Perú.

Introduction

According to LAMAS (2004), 17 species of the nymphaline genus *Morpho* Fabricius, 1807 are found in Peru, twelve of which were reviewed previously by BLANDIN (1988, 1993). However, knowledge of the geographical distribution of those species in the country is still quite limited. Nevertheless, during recent years new data have been obtained from some insufficiently known areas. As a result, we have found several new taxa at the subspecific level, which we describe herein, namely (i) two subspecies of *Morpho cisseis* C. Felder & R. Felder, 1860, a lowland Amazonian species which shows considerable diversification in several valleys at the base of the eastern slopes of the Andes; (ii) one subspecies of *Morpho amphitryon* Staudinger, 1887, a scarce species living in Andean montane forests at altitudes ranging from some 700 to slightly over 2000 m, and whose northernmost population has been

discovered in the mountain chain forming the border between the Amazonas and San Martín departments; and (iii) two subspecies of the cloud forest specialist *Morpho sulkowskyi* Kollar, 1850, discovered in two different mountain chains in Departments Amazonas and San Martín. Color illustrations of all these new taxa will appear in the forthcoming book by BLANDIN (2007).

Specimens examined are deposited in the following collections:

MNHN	Muséum National d'Histoire Naturelle, Paris, France.
MUSM	Museo Nacional de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Perú.
PCGJ	Private collection of Georges Jeannot, Paris, France.

Morpho cisseis cabrera Blandin & Lamas **ssp. nov.**

The subspecies *Morpho cisseis cisseis* C. Felder & R. Felder, 1860, from Brazil, Amazonian basin south of the Amazon river, and *M. c. cisseistricta* Le Moult & Réal, 1962, from Bolivia,

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are monomorphic, showing on the wings above a bright blue coloration, sometimes with a violet tinge. In Peru, *M. cisseis* is represented by two polymorphic subspecies, exhibiting a whole range of intermediate coloration stages, from specimens having a pure blue discal area, to individuals with the distal part of the blue discal area tinted ochre with more or less reddish-copper reflections. These are *M. c. phanodemus* Hewitson, 1869, known from the following Peruvian localities: Iquitos, Tarapoto, Juanjui, Río Ucayali, and Río Inambari; and *M. c. gahua* Blandin, 1988, from the area of Tingo María, in the upper Río Huallaga (Blandin 1988). During the last few years we have been able to study several specimens collected in the area of Salvación (Río Alto Madre de Dios) (5 ♂ in MUSM, 12 ♂ in MNHN, and 9 ♂ in PCGJ); we have not examined any female, but we have seen photographs of two individuals. These specimens represent a polymorphic population of *Morpho cisseis*, which shows strong affinities with *phanodemus*; nevertheless, there are differences which justify the description of a new subspecies.

Diagnosis. *Male.*- FW length 94 mm (holotype); wingspan 135-160 mm in the paratypes, the majority being between 145-150 mm. Forewing above with colored area along vein M_3 at distal end of discal cell exceeding 10 mm in width, as developed as in *phanodemus*, its distal edge often forming strong teeth, as in *phanodemus*. This area can be completely blue (with a whitish bright zone at the base of the wing) or golden ochre in its distal part; the complete range of intermediates exists; when the ochre is just encroaching into the blue, it takes on a beautiful wine-colored tinge. The colored area penetrates into the end of the forewing discal cell, forming a well defined mark there, as is usually the case in *phanodemus*. Hindwing above with colored basal area always blue, lightened, sometimes very clearly, in the most proximal zone, by a whitish area; the ochre tint sometimes appears along the costa, but remains very limited. The essential difference with *phanodemus* concerns the shading behind the forewing discal cell: behind it, at the level of cells Cu_1 - Cu_2 and Cu_2 -2A, the brown black ground color forms a clearly more extensive shadow than in *phanodemus*; the boundary between this shadow and the colored area is usually quite clear (in *phanodemus* this shading is reduced – sometimes strongly – by a covering of colored metallic scales, so that its border with the colored area becomes blurred). Overall, the colors are brighter than in *phanodemus*; the blue, in particular, is generally clearer (it often has a slight greenish yellow tinge in *phanodemus*); because the brown black shadow behind the forewing discal cell has a clearer

edge, the overall appearance of *cabrera* is both more contrasted and shinier.

Type-material (all from Peru): **Holotype** ♂, Madre de Dios, Salvación, Río Yunguyo, 500-700 m (M. Cabrera), June 1994, in the MUSM. Paratypes: 4 ♂, same data as holotype, in the MUSM; 1 ♂, same data as holotype, in the MNHN (number PBM 2096); 11 ♂, same data as holotype but without date, in the MNHN (numbers PBM 2097-2107); 2 ♂, same data as holotype but without date, in the PCGJ.

Etymology: Dedicated to Mario Cabrera, school teacher at Salvación; thanks to him, the knowledge of the *Morpho* species from the upper valley of the Río Alto Madre de Dios increased substantially in the last two decades. A noun in apposition.

***Morpho cisseis jeannoti* Blandin & Lamas**
ssp. nov.

During the last few years, specimens of *M. cisseis* from the Río Previsto, a tributary of the Río Aguaytía (department Ucayali), have been obtained (1 ♂ in MUSM; 8 ♂, 2 ♀ in MNHN; 23 ♂, 6 ♀ in PCGJ). Moreover, there are 3 ♂ in MUSM, one from the same general area (Boquerón del Padre Abad), one from the Cordillera del Sira, between the Río Pachitea and the Río Ucayali, and one from the Parque Nacional Yanachaga-Chemillén, Paujil, upstream in the Río Pachitea valley. These specimens show strong polymorphism, with: 1) individuals with the forewing colored area wholly blue, extending slightly beyond the postero-distal tip of the discal cell, as in *M. c. gahua*; 2) individuals also with a narrow colored area, in which an ochre tint takes more or less the place of the blue, as in *M. c. gahua*; 3) individuals with a wider forewing colored area (intermediate between typical specimens of *gahua* and *phanodemus*), widely covered with ochre; and 4) specimens with the colored areas almost wholly ochre, including the hindwing; moreover, the ochre can be tinged with bright orange or, on the contrary, it can take a greyish tint. We regard these specimens as representing a new subspecies.

Diagnosis. *Male.*- FW length 95 mm (holotype), wingspan 140-158 mm. Forewing above with colored area at distal end of discal cell along vein M_3 varying from less than 5 to about 10 mm in width, being less developed than in *phanodemus* but often more so than in *gahua*. This area can be completely blue (with a whitish bright zone at the wing base), or wholly ochre (with a reduced greenish yellow brighter

zone at the wing base); the ochre can be bright with an orange tinge, or quite dull, sometimes greyish. Particularly in the ochre specimens, the colored area may penetrate the distal end of the discal cell, sometimes over a relatively extensive area but without forming a well-defined mark, as is usually the case in *phanodemus*; behind the discal cell, at the base of cells Cu_1 - Cu_2 and Cu_2 -2A, the brown-black ground color forms a more extended shadow than in *phanodemus* and its border with the colored area is often a little clearer. Hindwing submarginal marks small, often blurred and sometimes effaced.

Female.- Wingspan 150-160 mm. As in the male, there is a clear polymorphism on the dorsal surface, from individuals with the colored areas completely blue, analogous to the female of *gahua*, to individuals with the colored area widely overrun with ochre (we have not seen yet any female corresponding to the completely ochre male). As in the other subspecies, the marginal and submarginal marks are well defined, the pupillary marks being sometimes visible.

Type-material (all from Peru): **Holotype** ♂, Ucayali, Aguaytía, Río Previsto, December 2003, in the MUSM. Paratypes: 3 ♂, same data as holotype, in the MNHN (numbers PBM 2009, 2011, 2014); 1 ♀, same data as holotype, but March 2003, in the MNHN (number PBM 2010); 2 ♂, 1 ♀, same data as holotype, but June 2005, in the MNHN (numbers PBM 2172-2174); 10 ♂, 4 ♀, same data as holotype, but December 2004, in the PCGJ; 1 ♂, Ucayali, Boquerón del Padre Abad, 27 December 1963 (P. Hocking), in the MUSM; 1 ♂, Huánuco, Cordillera del Sira, ca. 09°25'S, 74°45'W, 800 m, September 1987-August 1988 (Exp. Univ. Viena), in the MUSM; 1 ♂, Pasco, Parque Nacional Yanachaga[-Chemillén], Paujil, 500 m, 3 June 1994 (P. Hocking), in the MUSM.

Etymology: Dedicated to Georges Jeannot, who has, over a period of more than 30 years, assembled an excellent collection of *Morpho*; he was the first to discover the distinctness of the phenotype of the *M. cisseis* from Río Previsto. A noun in the genitive case.

***Morphoamphitryonduchenei* Blandin & Lamas, ssp. nov.**

Morpho amphitryon Staudinger, 1887 exists in Bolivia (*M. a. susarion* Fruhstorfer, 1913), where it remains poorly known, and in Peru. In Southern and Central Peru, the only populations which have been frequently sampled, in the upper Río Perené valley (Chanchamayo, Junín department), belong to the nominate subspecies. DUCHÊNE (1985) described *M. a. cinereus* as a new subspecies from the upper Río Huallaga valley

(Huánuco department), more than 200 km N of Chanchamayo. Recently, specimens were discovered in the region of the "Alto Río Nieva", at the mountains forming the border between the departments of Amazonas and San Martín, more than 400 km N of Tingo María. These specimens are obviously different from *cinereus* and represent a new subspecies.

Diagnosis. *Male*.- FW length, 84-87 mm, wingspan 143-150 mm. Forewing and hindwing above with base tinted with blue-grey, slightly tinged with green, not very extensive (in *cinereus*, the base of the wings is more often tinged with violet); outwards, the ground color shifts to quite dark brown, tinted with ochre, becoming almost black shortly before the submarginal marks. Forewing with small, whitish costal mark, costal area reduced to a few ochre scales in cell M_1 - M_2 ; pupillary marks creamy yellow, those in cells M_1 - M_2 , M_2 - M_3 and M_3 - Cu_1 small, that in cell Cu_1 - Cu_2 very reduced; submarginal marks as in *cinereus*, quite small (in comparison with *amphitryon*), creamy yellow; antemarginal marks orange yellow as in *cinereus* but smaller and much less elongated; marginal ochre marks almost effaced. Hindwing above with submarginal marks as in *cinereus*; antemarginal ones clearly smaller; marginal ochre marks very reduced or completely effaced (they are clear – but usually very fine – in *cinereus*). Hindwing below with ocelli in cells M_3 - Cu_1 , Cu_1 - Cu_2 and Cu_2 -2A smaller than in *cinereus*, particularly in M_3 - Cu_1 ; subdiscal band forms a quite clear angle in cell M_2 - M_3 .

Female.- FW length, 88 mm, wingspan 155 mm, smaller than in *cinereus* (wingspan 160-163 mm). Wings above slightly lighter than in male. Overall, the decoration differs very little from that of the male, thus giving pronounced differences with the female of *cinereus*: forewing costal area very reduced, pupillary marks smaller and lighter, submarginal marks also smaller. On the fore- and hindwings the antemarginal marks are also clearly smaller than in *cinereus*, the marginal marks less effaced than in the male. No marked differences below with the female of *cinereus*, ventral surface silvery. Hindwing ocellus in cell M_3 - Cu_1 missing, those of Cu_1 - Cu_2 and Cu_2 -2A small; subdiscal band forms a quite clear angle in cell M_2 - M_3 .

Type-material (all from Peru): **Holotype** ♂, Alto Río Nieva, at the boundary between Amazonas and San Martín departments, in the MUSM. Paratypes: 1 ♂, Alto Río Nieva, 1400 m, at the boundary between Amazonas and San Martín departments (B. Calderón), in the MNHN (number PBM 1917); 1 ♂, 1 ♀, at the boundary between Amazonas and San Martín departments, in the MNHN (numbers PBM 2160-2161).

Etymology: Dedicated to Gérard Duchêne, specialist of the genus *Morpho* and more specifically of *M. amphitryon*. A noun in the genitive case.

***M. sulkowskyi calderoni* Blandin & Lamas, ssp. nov.**

BLANDIN (1993) pointed out the possible existence of a new subspecies of *Morpho sulkowskyi* from the "Rodríguez de Mendoza" area (Amazonas department; his indication on p. 66 of "region of Moyabamba, Amazonas department" [sic] is erroneous). Since then, knowledge of the populations in Amazonas department has progressed substantially. Benigno Calderón's field work confirms the presence of this new subspecies in several localities.

Diagnosis. *Male.*- FW length 52 mm (holotype), wingspan 82-92 mm. Wing shape different to that of the nominate subspecies, the hindwing clearly elongated distally at end of veins R and M_1 . Hindwing outer edge often very regular, though with a slight projection at the end of vein Cu_1 . Forewing apex above usually with a heavier amount of black than in *M. s. sulkowskyi*; the mother-of-pearl color almost reaches the outer edge, as the black margin, starting from the end of vein M_2 , narrows strongly towards tornus. A black mark of variable thickness along the hindwing costal edge, towards the apex. Wings below with overall color tinged with an often quite intense yellow ochre. From among a sample of 100 specimens, the ocellus in forewing cell Cu_1 - Cu_2 present in 100 % of the individuals (though sometimes small); the ocellus in hindwing cell M_1 - M_2 present in 95 % of the individuals, but sometimes reduced to a mere trace.

Female.- Wingspan 75-90 mm. Hindwing more elongated at the end of veins R and M_1 than in *M. s. sulkowskyi* or *M. s. selenaris* Le Moult & Réal, 1962, but less accentuated than in the male. Forewing outer edge with clear projections, as in *selenaris*. Wings above with deeply contrasted appearance because of the strong development in both extent and intensity of the brown black decorations; on the forewing, as the mother-of-pearl reflections are weak or almost non-existent, the contrast between these decorations and the ivory background is very pronounced. On the underside, the contrast between the brown decorations (often very dark), the ivory background, and the silvery areas is also very strong. Ocellus in forewing cell Cu_1 - Cu_2 present in 100 % of the individuals ($n = 15$); ocellus in hindwing cell M_1 - M_2 present in two-thirds of the individuals but sometimes reduced to a trace.

Type-material (all from Peru): **Holotype** ♂, Amazonas, San José de Molinopampa, 2300 m, 10 April 2005 (B. Calderón), in the MUSM. Paratypes: 2 ♂, Amazonas, Mendoza, Cedro Piruro, 2100m, 28 March, 10 April 2005 (B. Calderón), in the MUSM; 8 ♂, 6 ♀, Amazonas, San José de Molinopampa, 2300m, 06°17'S, 77°33'W, 6, 10, 20, 23 April, 13, 15, 17, 19, 20, 22, 23, 25 May 2005, in the MUSM; 4 ♂, 2 ♀, Amazonas, Mendoza, Piruro, 2350-2400 m, 2003 (B. Calderón), in the MNHN (numbers PBM 1898-1902, 1906-1907); 1 ♂, Amazonas, Mendoza, Cedro Piruro, 2150 m, 2003 (B. Calderón), in the MNHN (number PBM 1903); 2 ♂, Amazonas, Mendoza, La Orilla, 2100-2200m, 2003 (B. Calderón), in the MNHN (numbers PBM 1904-1905); 3 ♂, Amazonas, San José de Molinopampa, 2300m, 9, 10 April 2005 (B. Calderón), in the MNHN (numbers PBGL 045-047); 4 ♂, Amazonas, Mendoza, Cedro Piruro, 2100m, 20, 21, 22 March 2005 (B. Calderón), in the MNHN (numbers PBGL 070-073); 2 ♀, Amazonas, San José de Molinopampa, 2300m, 24 April, 16 May 2005 (B. Calderón), in the MNHN (numbers PBGL 074-075); 1 ♂, Amazonas, cerca Huambo, October 1981 (B. Calderón), in the MUSM; 4 ♂, 1 ♀, Amazonas, Quebrada Mianque, La Orilla, 2300-2400 m, 06°25'S, 77°24'W, April 2001, December 2004 (B. Calderón), in the MUSM.

Etymology: Dedicated to its discoverer, Benigno Calderón, whose exploratory work, over some thirty years, has led to considerable progress in the knowledge of the Lepidoptera of the Amazonas department. A noun in the genitive case.

***Morpho sulkowskyi nieva* Lamas & Blandin, ssp. nov.**

Near the border between the departments of Amazonas and San Martín, one of us (GL) collected a few years ago males of *M. sulkowskyi* showing strong differences with *M. s. sulkowskyi* and *M. s. calderoni*. Other specimens, including one female, have been collected in 2003 and 2006 in the same area by Benigno Calderón.

Diagnosis. *Male.*- FW length, 49 mm (holotype), wingspan 75-85 mm. Smaller, on average, than *sulkowskyi* and *calderoni*. Wing shape as in the nominate subspecies; in particular, the hindwing is little elongated at the end of veins R and M_1 (in contrast with *calderoni*). Hindwing outer edge with almost no undulations (no projections at the vein ends).

Wings above distinguished from *sulkowskyi* and *calderoni* particularly by the heavier amount of black on the forewing outer margin: the marginal decoration forms a regular, 3-4 mm

wide, dark band, from vein M_1 as far as the middle of cell Cu_1-Cu_2 . This band is more or less clearly divided down the middle by a light line; the metallic reflections that cover it widely are a dark purple blue. Towards the hindwing apex there is no black mark as in *calderoni*. Wings below without marked differences with *sulkowskyi*; however, ocellus in forewing cell Cu_1-Cu_2 , more often missing (<50 % of the individuals show it, in contrast with *calderoni*); ocellus in hindwing cell M_1-M_2 , missing in >50 % of the individuals (another difference with *calderoni*). The overall ground color is paler than in *calderoni*.

Female.- FW length 50 mm, wingspan 88 mm. Wings rounded, as in the nominate subspecies; hindwing outer edge slightly undulate. Wings above with no marked differences with *sulkowskyi*; metallic reflections perhaps less intense, but more specimens need to be examined to ascertain whether this is a constant difference (on the contrary, the differences with *calderoni* are obvious).

Type-material (all from Perú): **Holotype** ♂, Amazonas/San Martín, Puente Nieva, 2350m, 2003 (B. Calderón), in the MUSM. Paratypes: 16 ♂, Amazonas, Abra Pardo Miguel, 2200m, 05°42'S, 77°48'W, 19 November 1996 (G. Lamas, J. Grados, M. Joron, F. Chang), in the MUSM; 3 ♂, 1 ♀, same data as holotype, in the MNHN (numbers PBM 1888-1891); 1 ♂, Amazonas/San Martín, Puente Nieva, October-November 2003 (B. Calderón leg.), in the MNHN (number PBM 1982); 12 ♂, Amazonas/San Martín, Puente Nieva, 2250-2400m, 8, 9, 15 March 2006 (B. Calderón), in the MNHN (numbers PBGL 076-087); 1 ♂, San Martín, Camp[amento] Venceremos, 86 km W Rioja, 1500 m, 21-22 February 1978 (G. Lamas), in the MUSM.

Etymology: Named after the Río Nieva, crossed by the Moyobamba-Florida road at Puente Nieva. A noun in apposition.

Discussion

Morpho cisseis is an Amazonian species living mostly in the lowlands, but which occurs in some Andean valleys and can be observed, in some localities, at 1000 m altitude, for example in the Cerro Escalera, near Tarapoto (San Martín department). In western Amazonia, from southern Venezuela and Colombia to the region of Tarapoto in Peru, the populations of *M. cisseis* belong to subspecies *phanodemus*, which is strongly polymorphic. Another polymorphic but clearly different subspecies, *gahua*, was known from the valley of the upper Río Huallaga (Huánuco department). The discovery of two

new subspecies, *cabrera* from the basin of the upper Río Madre de Dios (Cuzco department), not very strongly differentiated from *phanodemus*, and *jeannoti*, on the contrary quite distinct, from the basin of the upper Río Ucayali (Huánuco and Pasco departments), shows that more or less pronounced differentiation took place in several Andean valleys. It would be very interesting to study the geographical transitions of *gahua*, *jeannoti* and *cabrera* to *phanodemus*.

M. amphitryon is an Andean species occurring in montane forest, between altitudes ranging approximately from 700 to almost 2000 m. The discovery of populations of this species more than 400 km N of the region of Tingo María, which was previously considered as the northern limit of the species, is very interesting. The geographical area of *M. amphitryon* overlaps with that of the phylogenetically close Andean species *M. theseus* Deyrolle, 1860, which reaches the region of Tarapoto (field observations of subspecies *M. t. juturna* Butler, 1870 in the Cerro Escalera, made by one of us [PB] and Gilbert Lachaume in 2006).

According to BLANDIN (1993), *M. sulkowskyi* is spread from Colombia to Bolivia, with a north-south succession of sub-species. LAMAS (2004) considers that there are two different species, *M. sulkowskyi* ranging from Colombia to central Peru, and *M. lympharis* Butler, 1873, ranging from central Peru to Bolivia. This is a matter of discussion. Be that as it may, these *Morpho* are the unique representatives of the genus living in cloud forests, at altitudes between 1500 and 3500 m. Nominate *sulkowskyi* occurs in the three Colombian mountain ranges (KRÜGER 1924). Subspecies *sirene* Niepelt, 1911, very similar to the nominate sub-species (BLANDIN 1993), has been described from Eastern Ecuador. LE MOULT & RÉAL (1962) described from Pozuzo (Pasco department) the Peruvian subspecies *selenaris*; quite different to *sirene*, it has been collected essentially at Carpish, in the upper valley of the Río Huallaga (Huánuco department). Discovery of two very differentiated subspecies in the mountains of Amazonas and western San Martín was unexpected. Subspecies *nieva* has only been found in the area of the type locality, accessible from the Moyobamba-Florida road. This road crosses a mountain chain situated NE of the Río Chiriaco, where the Río Nieva (flowing northwestwards to the Río Marañón), and the Río Mayo (flowing southeastwards to the Río Huallaga), have their sources. We suppose that *nieva* exists in the whole upper Río Mayo and in the cordillera separating the valley of the Río Mayo from the Amazon plains. *M. s. calderoni* is known from locations in the southwestern slopes of the northwest-southeast mountain

axis that is to be found in the extension of the mountain system in which *nieva* flies. The available information does not yet allow for the localisation and characterisation of the transitional zone between the two subspecies.

The discovery of three new, well differentiated subspecies of *Morpho* in the mountains shared by the departments of Amazonas and San Martín emphasizes the high interest of this region from a biogeographical and evolutionary viewpoint.

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