

# Description of a new subspecies of *Catasticta fulva* Joicey & Rosenberg, 1915, with notes on several other species in the genus (Lepidoptera: Pieridae)

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**Abstract** - *Catasticta fulva anaranjada* n. ssp. is described from Peru. In addition, the females belonging to *Catasticta fulva* Joicey & Rosenberg, 1915, *Catasticta philone ecuadora* Brown, 1939 and *Catasticta tamsa yanganza* Eitschberger & Racheli, 1998 are figured for the first time, and bilateral and mosaic gynandromorphs of *Catasticta teutamis epimene* (Hewitson, 1870) are illustrated. Finally, the status of *Catasticta zamorana* Eitschberger & Racheli 1998 **stat. rev.** and the distribution of *Catasticta frontina muehlei* Eitschberger & Racheli 1998 are revised.

**Resumen** - Una nueva subespecie de *Catasticta fulva* Joicey & Rosenberg, 1915 es descrita y nombrada de Perú, las hembras de *Catasticta fulva* Joicey & Rosenberg, 1915, *Catasticta philone ecuadora* Brown, 1939 y *Catasticta tamsa yanganza* Eitschberger & Racheli, 1998 son presentadas por primera vez, ginandromorfos bilateral y mosaico de *Catasticta teutamis epimene* (Hewitson, 1870) son ilustrados. Finalmente, el estatus de *Catasticta zamorana* Eitschberger & Racheli 1998 y la corología de *Catasticta frontina muehlei* Eitschberger & Racheli 1998 fueron revisados.

**Key words:** *Catasticta*, Peru, Ecuador, South America, gynandromorphy, females, taxonomy.

## INTRODUCTION

The genus *Catasticta* Butler, 1870 (Pieridae) is one of the largest Andean butterfly radiations, with almost 100 species currently described and several more awaiting description. The genus is restricted to Central and South America where it inhabits forests from 500-3900 m. The inaccessibility of some of their Andean habitats and the similar appearance of many species has resulted in certain species being both difficult to collect and often overlooked, and thus being very poorly represented in most collections. These features have contributed to the need for closer taxonomic study and a number of new taxa are awaiting formal description, one of which is described here. In addition, we take the opportunity to illustrate several new phenotypes and discuss the taxonomy and distribution of a couple of poorly known species from Ecuador. This article forms part of a review of the genus *Catasticta* in preparation by the authors.

The following abbreviations are used in the text: FW: Forewing, HW: Hindwing. Acronyms for institutions and private collections holding specimens examined in this paper follow Evenhuis (2015): **MBLI**: collection of Maurizio Bollino, Lecce, Italy; **MUSM**: Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru; **PBPF**: collection of Pierre Boyer, Le Puy Ste. Réparate, France; **SPCE**: collection of Sebastián Padrón, Cuenca, Ecuador; **MSGU**: collection of Mark J. Simon, Gainesville, USA; **MGCL**: McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, Gainesville, Florida, USA.

## *Catasticta fulva anaranjada* Bollino & Padrón new subspecies

(Fig. 1 h-i, 2)

**Diagnosis:** In comparison with *C. fulva anaranjada* n. ssp., *C. fulva fulva* Joicey & Rosenberg, 1915 has dorsal and ventral FW and HW spots that are hazel-brown colored and suffused with brown scales, while *C. fulva kentae* F. Brown & Goodson, 1940 has dorsal and ventral FW and HW spots that are yellowish light brown. Both *C. fulva fulva* and *C. fulva kentae* have dorsal and ventral FW cells that are brown, with only the external fifth portion of the wing marked with light scales. Both *C. fulva fulva* and *C. fulva kentae* have dorsal and ventral FW discal spots in spaces 1a-1b-2-3 that are well separated from the base of the wing and the cellular vein.

**Description:** MALE: FW length of holotype: 21.6 mm. FW with slightly rounded apex and outer margin indented at M<sub>2</sub>-M<sub>3</sub>; HW with smooth outer margin and rounded anal lobe. General pattern as in *C. fulva fulva* and *C. fulva kentae*. **Dorsal surface:** Ground color of both wings deep brown (PANTONE® 478 C). FW with a complete series of orange (PANTONE® 716 C) discal, submarginal and marginal spots; marginal spots elongated and strongly suffused with brown scales; discal spots in space 1b-2-3 extended inward to touch cellular vein, those in space 1a-1b extended inwardly nearly to base of wing. Cell with inner half orange from base to apex. HW with complete series of orange discal, submarginal and marginal spots, submarginal spots with outer half strongly suffused with brown scales, marginal ones totally suffused with brown scales; submarginal spots chevron-shaped; marginal spots triangular. **Ventral surface:** FW with a complete series of discal, submarginal and marginal spots; marginal spots elongated, those in space 3-4-5-6-8-9 yellow, those in space 1b-2 orange. Discal spots orange, those in space 1b-2-3 extended inward to touch cellular vein, and those in space 1a-1b extended inwardly nearly to



base of wing. Cell with inner half orange from base to apex. HW with general pattern as in *C. fulva fulva* and *C. fulva kentae*.

FEMALE: unknown.

**Types** (all locality data are reported verbatim): **HOLOTYPE** ♂: PERU: Peru – Ayacucho / Tutumbaro / ~ 12°43'S 73°56'W / m. 1700 – IV.2006 / Lg. José Böttger, currently in MBLI, to be deposited in the MUSM.

**PARATYPES** (14 ♂♂): PERU: 10 ♂♂ Peru – Ayacucho / Tutumbaro / ~ 12°43'S 73°56'W / m. 1700 – IV.2006 / Lg. José Böttger, all in MBLI; 2 ♂♂ San Francisco vers Abra Tapuna, 2200m (Ayacucho) Pérou, 4-2006; 1 ♂ Tutumbaro / Abra Tapuna vers San Francisco / 1700m (Ayacucho) Pérou 4-2006; 1 ♂ Tutumbaro / Abra Tapuna vers San Francisco / 1700m (Ayacucho) Pérou 4-2006, all in PBPF.

**Etymology:** The Spanish adjective “anaranjada” means “orange-colored”, referring to the color of the bands and spots of this new subspecies.

**Distribution:** To the best of our knowledge, the new subspecies is restricted to the small valley around Tutumbaro village, along a small tributary of the Apurímac River, and where *Catasticta fulva anaranjada* seems to be seasonally not so rare. Its apparently restricted distribution might also be due to the lack of extensive sampling in the area. In fact, other subspecies of the same taxon are much more widespread and usually abundant in the right season.

**Habits:** This species is a montane cloud forest butterfly, with males gathering with individuals of other species at streams and water seeps. Although Pierre Boyer (pers. comm.) has been in the area twice, he has never seen it, therefore suggesting that it is a seasonal species or one that otherwise fluctuates temporally in abundance.

#### *Catasticta fulva* Joicey & Rosenberg, 1915, female (Fig. 1c-e)

The female of *Catasticta fulva* has not previously been illustrated in any publication. The first author received some females of the nominotypical subspecies, which we illustrate herein. As shown in the plate (Figs. 1c-h) the species has polymorphic females. In a series of six females, two are white, two are yellowish light brown, and two are yellowish.

*Catasticta* species with bimodal (*sensu* Vane-Wright, 1975) populations and polymorphic females have been reported in the past, including, *C. troezenae*, *C. gelba*, *C. seitzii* (Bollino &

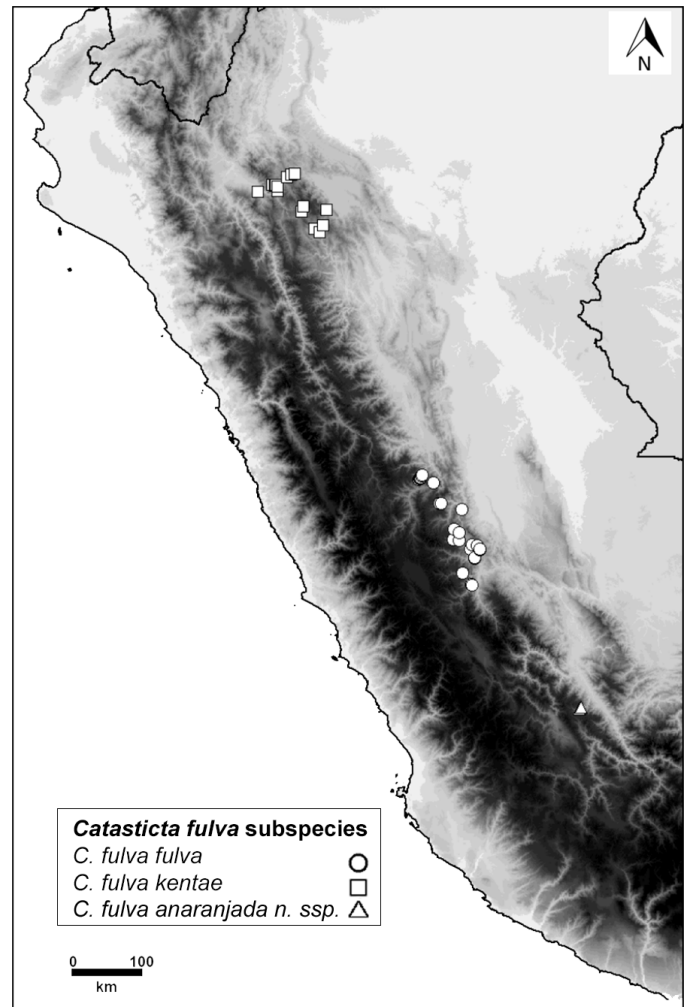


Fig. 2. Map showing the distribution of subspecies of *Catasticta fulva*.

Costa, 2007), *C. philodora* (Bollino, Greeney & Vitale, 2002), *C. ctemene* (Bollino, Greeney & Vitale, 2002; Bollino, Boyer & Vitale, 2003), and *C. striata* (Lamas & Bollino, 2004).

To allow comparison of all subspecies belonging to *C. fulva*, we also illustrate both surfaces of *C. fulva fulva* (Figs. 1 a-b) and *C. fulva kentae* (Figs. 1 f-g) males.

**Fig. 1 (facing page).** a: *Catasticta fulva fulva* ♂ dorsal, Peru – Pasco/ San Alberto/ Oxapampa Distr./ ~ 10°36'S 75°20'W/ m. 2000 – IX.2003, in MBLI; b: *Catasticta fulva fulva* ♂, ventral, same data as a; c: *Catasticta fulva fulva* ♀, dorsal, Peru – Pasco/ Cord. Yanachaga/ El Pajonal/ ~ 10°38'S 75°18'W/ m. 2800 – I.2006, in MBLI; d: *Catasticta fulva fulva* ♀, dorsal, Peru – Pasco/ Cord. Yanachaga/ El Pajonal/ ~ 10°38'S 75°18'W/ m. 2800 – I.2006, in MBLI; e: *Catasticta fulva fulva* ♀, dorsal, Peru – Pasco/ Cord. Yanachaga/ El Pajonal/ ~ 10°38'S 75°18'W/ m. 2800 – XI.2004, in MBLI; f: *Catasticta fulva kentae* ♂, dorsal, Peru – Amazonas / Above Pedro Ruiz Gallo / ~ 5°53'S 78°13'W / m. 1800 – 8-15. XII.2001, in MBLI; g: *Catasticta fulva kentae* ♂, ventral, same data as f; h: *Catasticta fulva anaranjada* n.ssp., HT ♂, dorsal; i: idem, ventral; j: *Catasticta philone ecuadora* ♂, dorsal, Ecuador / Prov. Tungurahua / Chinchin 7.88 mt. 1800, in MBLI; k: idem, ventral; l: *Catasticta frontina muehleii* ♂, dorsal, Ecuador – Zamora C. / Romerillos / m 1600 – XI.2000, in MBLI; m: *Catasticta frontina muehleii* ♂, ventral, same data as l; n: *Catasticta philone ecuadora* ♀, dorsal, Ecuador – Tungurahua / Rio Verde / ~ 1°22'S 78°20'W / m. 1800 – IX.2003, in MBLI; o: *Catasticta philone ecuadora* ♀, ventral, same data as n; p: *Catasticta tamsa yanganza* ♀, dorsal, Ecuador - Zamora / Yangana – Valladolid road / 2650m, VI.2012, in SPCE; q: idem, ventral; r: *Catasticta zamorana* ♂, dorsal, Ecuador – Loja Province / road Loja-Zamora / mt. 2000 – 15-30.V.1998, in MBLI; s: *Catasticta zamorana* ♂, ventral, same data as r; t: *Catasticta teutamis epimene* gynandromorph, dorsal, Ecuador- Tungurahua/ Baños, in MSGU; u: *Catasticta teutamis epimene* gynandromorph, dorsal, Ecuador- Tungurahua/ Baños, in MGCL.

***Catantactia zamorana* Eitschberger & Racheli, 1998 stat. rev.  
(Fig. 1 r-s)**

*Catantactia frontina zamorana* Eitschberger & Racheli, 1998 was described as subspecies with type locality "Equateur, env. de Loja". Eitschberger & Racheli (1998b) figured a paratype only in the original description, while D'Abbrera (1981: 137) figured the holotype under *C. frontina* F. Brown & Gabriel, 1939. Careful examination of both specimens, and of additional material from southern Ecuador, confirmed our doubts regarding the conspecificity of the HT and PT. In fact, while the paratype is typical *C. frontina*, the holotype belongs to a different species, *Catantactia zamorana* Eitschberger & Racheli, 1998, **stat. rev.** The most important distinguishing characters between *C. frontina* and *C. zamorana* are:

*Wing shape*

1). Outer margin of FWs at  $M_2$ - $M_3$ : *C. frontina* only slightly indented, while *C. zamorana* more strongly indented.

2). Costa of FW: *C. zamorana* has an arched costa, while *C. frontina* has a gently curved vein.

*Dorsal surface*

3). Postdiscal band of HW: the spots are strongly arrow-shaped in *C. zamorana*, while they are triangular in *C. frontina*.

4). Space 1-1a of HW: yellowish with a slight suffusion of brown scales in *C. zamorana*, while it is grey with a suffusion of brown scales in *C. frontina*.

*Ventral surface*

5). Ground color: *C. frontina* has a lighter color than *C. zamorana*.

6). Discal and postdiscal bands of FW: the spots are very light brown in *C. frontina*, while they are much more yellowish in *C. zamorana*.

7). Postdiscal spots of FW: large and arrow-shaped in *C. zamorana*, small and triangular in *C. frontina*

*Distribution*

8). To the best of our knowledge, *C. frontina* is a moderately common species ranging from the Zamora valley northward to Sucumbios Province, while *C. zamorana* is a very scarce species ranging from the Zamora valley to Napo Province. Both species may be locally sympatric, as observed at El Retiro, P.N. Sangay (Morona-Santiago Province, Ecuador) by J.-C. Petit (pers. comm.).

***Catantactia frontina muehlei* Eitschberger & Racheli, 1998  
(Fig. 1 l-m)**

The examination of our series of *C. frontina* from Ecuador has proved that there are no relevant differences between specimens from central and southern Ecuador, and consequently all Ecuadorian populations belong to the same subspecies, i.e. *C. frontina muehlei* Eitschberger & Racheli, 1998.

***Catantactia philone ecuadora* Brown, 1939, female  
(Fig. 1 n-o)**

We figure the hitherto unknown female of *Catantactia philone ecuadora*. The female of this species must be extremely

elusive; in fact, although we have examined many hundreds of males of this very common species, the figured specimen is the only one that we have had the opportunity to study. We also figure a male of this species (Fig. 1 j-k).

***C. tamsa yanganza* Eitschberger & Racheli, 1998, female  
(Fig. 1 p-q)**

The previously unknown female of *Catantactia tamsa yanganza* herewith figured was collected along the Yangana-Valladolid road (Zamora Prov., Ecuador), 2650m, in June 2012. The female was flying low along the road early in the morning (9 am) during a cloudy and rainy day; males were also collected in the same place in previous years by SP. We have also examined an additional female of the same taxon, collected at km 22 Limon-Gualaceo rd. (Morona-Santiago Prov., Ecuador), 2050m, on 30 Sep 1997, and preserved in the MGCL (Willmott, pers. comm.).

***Catantactia teutamis epimene* (Hewitson, 1870), bilateral and mosaic gynandromorphs  
(Fig. 1 t-u)**

Gynandromorphism is a rare chimeric condition characterized by contemporary expression of both male and female sexual characteristics in an individual; in some cases the phenomenon produces specimens with a perfectly axially divided pattern (half male/half female), giving the so-called bilateral gynandromorph; in other cases we observe specimens with a patchy pattern which is known as mosaic gynandromorph, where the characteristics of the two sexes are not defined as clearly as in bilateral gynandromorphs. The causes of this interesting phenomenon are not very clear, but it is known that it occurs at early development stages during embryogenesis, when there are just few cells, and one of the cells does not split its sex chromosomes typically (Narita et al., 2010). Gynandromorphism is well known among Lepidoptera (see, for example, Scriber & Evans, 1988; Emmel & Boender, 1990; Sala & Bollino, 1991; Ivinskis & Saldaitis, 2001), but the phenomenon also occurs in many orders of arthropods (Narita et al., 2010). For the genus *Catantactia*, gynandromorphs have been reported only twice (Bollino, Boyer & Vitale, 2003; Bollino & Vitale, 2003).

Here, we figure two gynandromorphs, one bilateral and a mosaic, both belonging to *Catantactia teutamis epimene* (Hewitson, 1870) from Ecuador. It is worth underlining that three of the four known gynandromorphs of *Catantactia* come from the same locality of Baños (Ecuador, Tungurahua Province). It is likely that this observation is a result of intensive collecting in this region by commercial collectors. Furthermore, all four gynandromorphs belong to species with sexual dimorphism, so we cannot exclude the possibility that gynandromorphs of monomorphic species remain overlooked in collections. This is the case of a putative gynandromorph of *Catantactia sinapina* Butler, 1896 in the first author's collection: as the species is monomorphic, it is nearly impossible to establish if it is a mosaic gynandromorph, or whether the specimen simply suffered some kind of patchy discoloration.

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