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Revisional notes on the "*cinerea*" group of *Catasticta* Butler, 1870 (Lepidoptera: Pieridae)

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Abstract. Diagnostic characters for the *cinerea* group of *Catasticta* and an annotated synonymic list of all taxa in the group (three species, plus seven subspecies) are given. *Catasticta coerulescens* (Eitschberger et Racheli, 1998) is elevated to species rank, and *Catasticta coerulescens intimpa* Bollino et Boyer ssp. n. (Perú, Apurimac) is described as new.

Key words: entomology, taxonomy, distribution, Bolivia, *Catasticta*, Colombia, Ecuador, Neotropical Pierinae, nomenclature, Peru, types, Venezuela.

INTRODUCTION

The purpose of this paper is to continue the senior author's research into the genus *Catasticta*, presenting a phenetic diagnosis of a small group of fairly rare species. Members of the group appear to be closely related, sharing similar wing patterns, habits and habitats; they are also related to the members of the "*amastris*" and "*uricoecheae*" groups. As pointed out by Lamas & Bollino (2004), these groups would be part of the subgenus *Leodontoia* Eitschberger & Racheli, 1998. We prefer to treat them as members of the genus *Catasticta sensu lato* until there is a phylogenetic revision of the whole genus.

Lamas (2004) considered all members of the group to be conspecific, with different subspecies distributed all along the Andean Chain from the Sierra Nevada de Santa Marta (Colombia) southward to the Bolivian Yungas. Bollino & Costa (2007) recently elevated *C. rochereaui* Le Cerf, 1924 to specific status. Being dissatisfied with the taxonomic arrangement of the remaining species-group names, we started to examine all of the specimens we hold in our own collections and those preserved in many other private and public collections. Henceforth we will adopt "*cinerea*" as the name for this group.

The "*cinerea*" species group

The species of this group share the following combination of morphological characters:

1. The hindwing subcostal vein is long, ending distad of an imaginary line traversing the disc at the base of veins M_1 and CuA_2 (see fig. A in Lamas & Bollino (l.c.), and also fig. 3 in Eitschberger & Racheli, 1998).
2. The interneural yellow submarginal stripes on the HWV are drumstick-shaped, the basal portion no thicker than the distal one (compare fig. B in Lamas & Bollino l.c.).
3. The extreme base of the HWV costal cell, behind the humeral vein, is totally white or pale yellow, never totally dark.
4. Except for a few red or orange scales at the extreme base of the HWV, males have no red coloration on the dorsal or ventral surfaces of the wings, whilst females have FWD, HWD and FWV red or orangeish-red discal bands.

MATERIAL AND ABBREVIATIONS

Our research was based on examination of more than 500 specimens of the group preserved in the senior author's collection, about 130 preserved in the junior author's collection, and more than 200 specimens preserved in various public and private collections.

Acronyms for institutions and private collections holding specimens examined in this paper largely follow Evenhuis (2008):

AMNH: American Museum of Natural History, New York, USA;
BMNH: The Natural History Museum, London, England;
CMNH: Carnegie Museum of Natural History, Pittsburgh, USA;
ETHZ: Eidgenössische Technische Hochschule, Zürich, Switzerland;
MBLI: collection of Maurizio Bollino, Lecce, Italy;
MUSM: Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru;
MZUJ: Zoological Museum, Jagellonian University, Krakow, Poland;
PBPF: collection of Pierre Boyer, Le Puy Ste. Réparade, France;
SMNS: Staatliches Museum für Naturkunde, Stuttgart, Germany;
ZMHB: Zoologisches Museum der Humboldt Universität, Berlin, Germany.

Abbreviations used in the text include the following:

FW: forewing;
FWD: dorsal surface of forewing;

FWV: ventral surface of forewing;
HT: holotype;
HW: hindwing;
HWD: dorsal surface of hindwing;
HWV: ventral surface of hindwing;
PT: paratype.

Catasticta cinerea Butler, 1897

C. cinerea was described by Butler (1897) on the basis of a single male without collecting data. Its type locality was unknown until Reissinger (1972) gave it as Ecuador. Racheli (1996) and Eitschberger & Racheli (l.c.) correctly restricted the type locality to South Peru. After examination of the holotype, we can concur with this decision, as the holotype matches specimens originating from Peru southward to Bolivia.

Whilst the ventral pattern is stable throughout the range of the species (it is nearly impossible to separate a Venezuelan specimen from a Bolivian one), the species shows some degree of intra- and inter-populational variability in the dorsal pattern. However, we can identify only two basic patterns:

1) a "northern Andean pattern" corresponding to ssp. *suprema* Fassl, 1915, to which we refer all populations from Venezuela, Colombia and Ecuador

2) a "southern Andean pattern" corresponding to the nominotypical subspecies, to which we refer all Peruvian and Bolivian populations.

Venezuelan, Colombian and Ecuadorian populations are all characterised by males with well-developed grey discal and submarginal bands on all wings. The HWD discal band is especially diagnostic, occupying the wing from the base to an imaginary oblique line traversing the wing at the origin of vein M_2. Characters given by Eitschberger & Racheli (l.c.) to substantiate their description of ssp. *substituta* ("*submarginal lunules ... sagittate, and rather vanished, more yellowish and elongated especially those near the anal angle*") are present in varying degrees in all populations examined.

Females are quite variable, almost every population containing individual specimens matching the description of either ssp. *suprema* or ssp. *substituta*. Females are characterised by a FWD discal red band formed of roughly quadrangular spots.

Peruvian and Bolivian populations are characterised by males with reduced grey bands. The HWD discal band is very weakly expressed, being represented in most specimens only by a streak and a spot in the discal cell, and a few grey scales in other spaces. Females are characterised by a FWD discal red band formed of roughly rectangular spots.

Even if we recognize that size is not a diagnostic character in itself, we consider it interesting that both males and females belonging to ssp. *suprema* are smaller (FW length 24.9-27.2 mm., average 26.2 mm. from 36 specimens) than specimens belonging to ssp. *cinerea* (FW length 25-31.2 mm., average 28.9 mm. from 50 specimens).

Habits

C. cinerea is a low mountain to montane cloud forest butterfly. Like other species belonging to the same and related groups (i.e. "*amastris*" and "*uricoecheae*" groups), it is frequently found hill-topping around small isolated peaks or trees. Numerous males can be observed flying around the same tree, over which they often do battle with an ascending swirling flight. This behaviour is mainly observed in the higher part of its altitudinal range, where the canopy is lower, allowing for easier observation, whilst below 2500m it sometimes puddles along rivers or roads, or even damp vertical cliffs. Females are seen from time to time flying around the trees that the males use. Their flight is a little slower and heavier.

Catasticta coerulescens (Eitschberger & Racheli, 1998) stat. rev.

(fig. 1-4)

C. coerulescens was described as a subspecies of *C. cinerea* based on 3 males collected at Marcapata by Ockenden. At the time of description, Eitschberger & Racheli (l.c.) were not aware that the species was much more widespread and both sympatric and synchronic with *C. c. cinerea*. Specimens of both species have been sampled in the same biotope (Abra Acjanaco, Cuzco, and Abra Tapuna, Ayacucho). *C. coerulescens* has a more restricted altitudinal range, usually occurring at more than 2,900 m. a.s.l., with the highest concentration of specimens at 3,300-3,400 m. a.s.l., whilst *C. cinerea* flies from about 2,000-2,100 m. a.s.l. up to no more than 3,000 m. a.s.l., where it is extremely rare. Due to the different pattern, parapatry and the occasional sympatry at 2,900-3,000 m., we raise *C. coerulescens* to specific status.

There are obvious differences in the dorsal pattern of males, e.g. in *C. coerulescens* the dorsal discal and marginal bands of both wings are much greyer and more extended than in *C. cinerea*. The main diagnostic character is found on the FWV: in *C. coerulescens* the discal cell is almost totally occupied by pale scales, whilst in *C. cinerea* there is only an apical spot and, at most, some pale scales along the median axis of the cell.

Females are characterised by: the FWD and FWV discal cells with a red distal spot, with red scales also present in the middle third of the space (in *C. cinerea* the FWD and FWV discal cells have a red discal spot but the remaining portion is completely brown); HWD has a thick yellow streak in cell 2A (in *C. cinerea* this cell is dark brown with, at most, a few yellow scales).

C. coerulescens is one of the largest species of the genus. Some males can attain a wingspan of 54 mm., and the female can attain a wingspan of 61 mm.

Material examined

1 male, Peru – Cuzco / Acjanaco-Pillcopata km. 10 / ~ 13°09'S 71°31'W / m. 3000-3100 – 24.II.2005 / Lg. Pierre Boyer / DNA sample N° 112; 1 male, Peru – Cuzco / Abra Acjanaco / ~ 13°09'S 71°53'W / m. 3300-3400 – 22.V.2003 / Lg. José Boettger; Peru – Cuzco/ Carrizal (Huayupata)/ ~ 13°05'S 72°23'W/ m. 3200-3250 –III.2006/ Lg. José Boettger; 2 males, Peru – Cuzco / Abra Acjanaco / ~ 13°09'S 71°33'W /

1-4. *Catasticta coerulescens coerulescens*: 1 – male, dorsal: Peru – Cuzco / Abra Acjanaco / ~ 13°09'S 71°53'W / m. 3300-3400 – 22.V.2003 / Lg. José Boettger, in MBLI; 2 – idem, ventral; 3 –female, dorsal: Abra Acjanaco vers Pillcopata km10 / 3000/3100m (Cuzco) / 24/2/2005 / Pierre Boyer leg. , in PBPF; 4 – idem, ventral; 5, 6. *Catasticta coerulescens intimpa* n.ssp., HT dorsal; 6 – idem, ventral

m. 2900-3000 – IV.2005 / Lg. José Boettger; 1 male, Peru – Cuzco / Inkatambo / ~ 13°03'S 72°25'W / m. 2150-2200 – III.2005 / Lg. José Boettger; 1 female, Peru / Dep. Cuzco / Acjanaco / 26.05.2003, 3400 m. / leg. T. Pyrcz, all in MBLI; 1 male, Abra Tapuna vers San Francisco / km 5, 3500 m (Ayacucho) / 21/5/2005 / Pierre Boyer leg.; 2 males, Abra Malaga vers Quillabamba km27 / 2900m, (Cuzco) / 26/2/2005; 1 female, Acjanaco vers Boca Manu / 3400m, (Cuzco) / 23/5/2003 / Tomasz Pyrcz leg. ; 4 males, 1 female, via Acjanaco-Boca Manu km. 2 / (Cuzco), 3300-3470 m. / 22/5/2003 / leg. P. Boyer; 1 male 1 female, Abra Acjanaco vers Pillcopata km10 / 3000/3100m (Cuzco) / 24/2/2005 / Pierre Boyer leg. ; 1 male, Acjanaco vers Boca Manu km2 à 4 / 3300/3400m, (Cuzco) / 4/2005 / Jose Bottger leg., all in PBPF; 3 males, Peru / Dep. Cuzco / Acjanaco / 22.05.2003, 3350 m. / leg. T. Pyrcz, all in MZUJ

Habits

The species is clearly a montane cloud forest butterfly, flying in the ecotone between forest and páramo. Although the junior author has observed *C. coerulescens* puddling on two occasions on the road from Abra Malaga to Quillabamba (Cuzco), the species is usually found hilltopping in the areas where most specimens have been encountered, near Abra Acjanaco (Cuzco), and at Abra Tapuna (Ayacucho).

C. coerulescens is also found in the area of S.N. Ampay (Abancay, Apurimac) in an isolated and very distinct population, which we describe as:

***Catasticta coerulescens intimpa* n. ssp.**

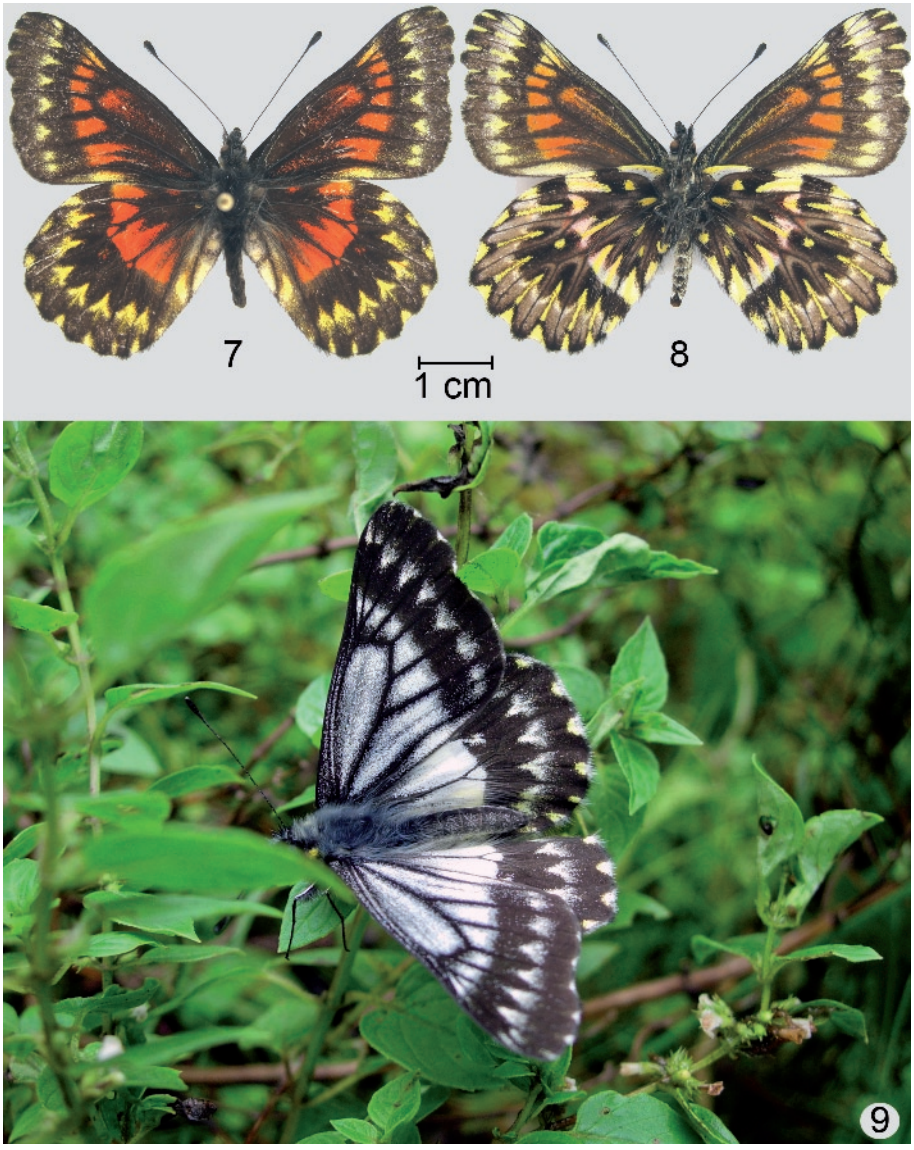
(figs. 5-9)

Types

Holotype (figs. 4-5): male, Peru – Apurimac, S.N. Ampay (Abancay), Laguna Angasccocha, ~ 13°35'S 72°53'W, m. 3100-3200 – III.2005, Lg. José Böttger, currently in MBLI, will be deposited in MUSM.

Paratypes: (272 males; 1 female): 45 males, Peru – Apurimac, S.N. Ampay (Abancay), Laguna Angasccocha, ~ 13°35'S 72°53'W, m. 3000 – III.2004, Lg. José Böttger; 6 males, Peru – Apurimac, S.N. Ampay (Abancay), Laguna Angasccocha, ~ 13°35'S 72°53'W, m. 3000-3100 – 18.II.2005, Lg. José Böttger; 1 male, Peru – Apurimac, S.N. Ampay (Abancay), Laguna Angasccocha, ~ 13°35'S 72°53'W, m. 3000-3100 – 18.II.2005, Lg. Pierre Boyer/ DNA SAMPLE N° 107; 1 male, same data, except for DNA SAMPLE N° 108; 27 males, Peru – Apurimac, S.N. Ampay (Abancay), Ccorhuani, ~ 13° 36' S 72°52' W, m. 3100-3200 – III.2005, Lg. José Böttger; 128 males, Peru – Apurimac, S.N. Ampay (Abancay), Laguna Angasccocha, ~ 13°35'S 72°53'W, m. 3100-3200 – III.2005, Lg. José Böttger, all in MBLI; 10 males, Peru – Apurimac, S.N. Ampay (Abancay), Laguna Angasccocha, ~ 13°35'S 72°53'W, m. 3100-3200 – III.2005, Lg. José Böttger, presently in MBLI, will be deposited in MUSM; 1 male, Peru – Apurimac, S.N. Ampay (Abancay), Laguna Angasccocha, ~ 13°35'S 72°53'W, m. 3100-3200 – III.2005, Lg. José Böttger, in coll. Rozycki (Chicago, USA); 1 male, Peru – Apurimac, S.N. Ampay (Abancay), Laguna Angasccocha, ~ 13°35'S 72°53'W, m. 3100-3200 – III.2005, Lg. José Böttger, in coll. Dusi (Verona, Italy);

2 males, Ampay, Abancay / 3000m (Apurimac) / 03/2004, Jose Bottger leg. ; 2 males, Ampay, Abancay / 3000m, (Apurimac) / 11/2004 / Pierre Boyer leg. ; 5 males, Laguna Angasqocha / Santuario Ampay / 3200m (Apurimac) / 18/2/2005 / Pierre Boyer leg. ; 1 female, Quebrada Yanaccacca / E.Abancay, Ampay / 3200m, (Apurimac) / 19/2/2005,



7-9. *Catasticta coerulescens intimpa* n.ssp.: 7 – PT female, dorsal: Quebrada Yanaccacca / E.Abancay, Ampay / 3200m, (Apurimac) / 19/2/2005, Pierre Boyer leg., in PBPF; 8 – idem, ventral; 9 –male, photo by P. Boyer

Pierre Boyer leg.; 14 males, Ampay, Abancay, 3000m (Apurimac), 03/2005, Jose Bottger leg.; 10 males, Laguna Angasqocha, Santuario Ampay, 3200m (Apurimac), 18/2/2005, Pierre Boyer leg., all in PBPF; 1 male, Peru – Apurimac, S.N. Ampay (Abancay), Laguna Angasccocha, ~ 13°35'S 72°53'W, m. 3000 – III.2004, Lg. Juan Grados, in MUSM; 13 males, Peru, Depto. Apurimac / Sant. Nac. Ampay / Laguna Ankascocha / 3300-3350 m, 19.II.2005 / leg. Pyrcz & Garlacz ; 5 males, Peru, Depto. Apurimac / Sant. Nac. Ampay / Laguna Ancasccocha / 3250-3300 m 21.II.2005 / leg. Garlacz & Pyrcz, all in MZUJ.

Description

FW length: 31.5 mm.

Dorsal surface: The ground colour of both wings is brown. FW with ground colour of discal cell strongly suffused by grey scales; discal band grey, with cells CU_1, CU_2, 1A, 2A centred by large white dots, and cells R_2, M_1, M_2, M_3 centred by thick white streaks; submarginal band formed of white chevrons; marginal internervular spots small and white. HW with creamy white discal band filling the spaces but not reaching the base of the wing, each space being outlined by brown-scaled veins; submarginal band formed of pale grey chevrons; marginal internervular dots pale yellow.

Ventral surface: as in *C. c. coerulescens*, but HW discal band formed of larger spots, those in cells CU_2, 1A, 2A being pentagonal (triangular in *C. c. coerulescens*).

Female (fig. 6) (FW length: 30 mm.) characterized by both wings having a nearly black ground-colour, FWD discal cell with a deep orange distal spot and red scales suffusing the median portion; discal band formed of orange spots, except that in cell 1A which is yellow and that in cell R_2 which is pale orange; submarginal band formed of yellow chevrons. HWD with a red discal band, the spot in cell SC+R1 being yellow in its marginal portion, and those in cells CU_1, CU_2 yellow; submarginal band formed of large yellow chevrons. FWV as in *C. c. coerulescens*, but with a yellow discal spot in 1A.

Curiously enough, one of the differential characters observed in *C. coerulescens* females and used to separate them from *C. cinerea* (i.e the yellow streaks present in cells CU_1, CU_2) is the same as that used to differentiate *C. cinerea suprema* from *C. r. rochereaui* (Bollino & Costa l.c.).

Etymology

Intimpa is the quechua name of *Podocarpus glomeratus*, an endangered endemic arboreal component of the biotope where the new subspecies flies.

Habits

Unlike populations of the nominotypical subspecies, most *C. coerulescens intimpa* specimens have been seen puddling along a stream in a very humid area, partially covered with moss, in the vicinity of Laguna Angasccocha. A little sun in the morning is enough to attract them to this place, where they stay for a long time, even if the weather becomes cloudy. Unexpectedly, the female was collected in a more cultivated place, along deforested slopes.

ANNOTATED CHECKLIST

1a. ***Catasticta cinerea cinerea*** BUTLER, 1897. HT male, [S-Peru] "Ecuador", HEWITSON coll., in BMNH [examined].
= *toppini* SHARPE, 1915. HT male, Peru-Bolivia boundary, Captn. H.S. TOPPIN, in BMNH [examined]
= *dusca* BROWN, 1939. HT male, Bolivia, Chaco, La Paz, in ZMHB [examined]
=*ariadne* REISSINGER, 1972 **syn nov.** HT male, Peru, Huanuco, NW Acomayo, Carpish (2600), 12. Nov. 1971, lg. M. ROJAS, in SMNS [examined]
= *maxima* REISSINGER, 1972. Nomen nudum
= *pasiphae* REISSINGER, 1972. Nomen nudum
Distribution: from Northern Peru (Amazonas) southward to Northern Bolivia.

1b. ***Catasticta cinerea suprema*** FASSL, 1915. HT female, Colombia, Central-Cordilliere, Quindiu Pass, in ETHZ [examined]
= *cora* RÖBER, 1909[1] nec LUCAS, 1852
= *substituta* (EITSCHBERGER & RACHELI, 1998) **syn. nov.** HT male, Ecuador, ac. 30169, San Antonio, Tungurahua, coll. H.H. TATE, in AMNH [examined]
Distribution: from Venezuelan side of Serranía de El Tamá, along Central and Oriental Colombian Cordilleras southward to Southern Ecuador.

2a. ***Catasticta coerulescens coerulescens*** (EITSCHBERGER & RACHELI, 1998) **stat**. **rev**. HT male, E. Peru, Marcapata, 10800 ft, (OCKENDEN), in BMNH [examined]
Distribution: from North-Eastern Ayacucho (Abra Tapuna) southward to Marcapata, also present on Cordillera de Vilcabamba, Cuzco (LAMAS, in litt.)

2b. ***Catasticta coerulescens intimpa*** BOLLINO & BOYER **ssp**. **n**. HT male, Peru – Apurimac, S.N. Ampay (Abancay), Laguna Angasccocha, ~ 13°35'S 72°53'W, m. 3100-3200 – III.2005, Lg. José Böttger, currently in MBLI, will be deposited in MUSM.
Distribution: to the best of our knowledge, this subpecies is restricted to Nevado Ampay (Apurimac), where it is locally and seasonally very common.

3a. ***Catasticta rochereaui rochereaui*** LE CERF, 1924. HT female, Colombia, Pamplona [Norde de Santander], in ETHZ [examined]
Distribution: both Colombian and Venezuelan sides of Serranía de El Tamá.

3b. ***Catasticta rochereaui hollandi*** AVINOFF, 1926. HT male, Peña Blanca, "Santander" [Boyacá], Colombia, Feb. 1917, in CMNH [examined]
Distribution: Sierra Nevada del Cocuy (Boyacá, Colombia)

3c. ***Catasticta rochereaui laurentina*** (EITSCHBERGER & RACHELI, 1998). HT male, Colombia, (Sierra Nevada de Santa Marta), San Lorenzo (3000 m.), Minca, leg. C. RODRIGUEZ, in SMNS [examined]
Distribution: as far as we know, restricted to the Sierra Nevada de Santa Marta (Colombia).

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[1]RÖBER (1908-1909) reports *C. cora* from Venezuela and Peru, and illustrates (plate 22-f) a specimen clearly belonging to ssp. *suprema*.

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