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# Taxonomic notes on *Napeogenes* Bates, 1862 from Colombia and Panama, with descriptions of four new subspecies (Lepidoptera: Nymphalidae: Ithomiini)

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Abstract. Four new subspecies belonging to the butterfly genus *Napeogenes* (Nymphalidae: Ithomiini) are described: *Napeogenes stella caucaensis* Constantino & Vitale n. ssp. from Valle del Cauca (Colombia); *Napeogenes stella delgadoi* Vitale & Constantino n. ssp. from Panama; *Napeogenes peridia willmotti* Vitale & Constantino n. ssp. from Valle del Cauca (Colombia) and *Napeogenes tolosa panamensis* Vitale, Constantino & Delgado n. ssp. from Cerro Pirre, Darién (Panama).

Keywords: entomology, taxonomy, Neotropical region, *Napeogenes stella, Napeogenes peridia, Napeogenes tolosa*.

## INTRODUCTION

The purpose of this paper is to contribute to the knowledge of the genus *Napeogenes* Bates, 1862, by providing chorological data and the descriptions of four new subspecies from Colombia and Panama. Although the genus has been reviewed or revised relatively recently by a number of authors (Fox & Real 1971; D'Almeida 1978, Mielke & Brown 1979, Lamas 2004), the systematics of the genus is still undergoing change and a number of new taxa remain to be described (e.g., Willmott & Vitale 2008, Elias *et al*. 2009). We also provide field observations by the second author in Colombia and Francisco Delgado in Panama.

## METHODS

Specimens were examined from major public and private collections and the collection acronyms used throughout the text are listed below. The identity of all existing taxonomic names was confirmed through examination of type specimens and original descriptions, so that such names could be reliably assigned to populations.

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| BMNH | The Natural History Museum, London, UK; |
| FDLC | Francisco Delgado collection, Zoology Department, Universidad de Panamá, Veraguas, Panama; |
| FVLI | Fabio Vitale collection, Lecce, Italy; |
| FLMNH | McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, Gainesville, USA; |
| GRC | Gabriel Rodríguez collection, Envigado, Medellín, Colombia; |
| JSC | Julián Salazar collection, Manizales, Colombia; |
| JSZ | Juan S. Zuluaga CIB collection, Medellín, Colombia; |
| CFC | Constantino family collection, Cali, Colombia; |
| MHNUC | Museo de Historia Natural, Universidad de Caldas, Manizales, Colombia; |
| SMM | Sandra Muriel collection, Medellín, Colombia; |
| ZSM | Zoologische Staatssammlung München, Munich, Germany; |
| ZMHU | Museum für Naturkunde der Humboldt Universität, Berlin, Germany. |

The following abbreviations are used in the text:

(D)FW – dorsal, forewing;
(V)HW – ventral, hindwing.

## TAXONOMY

### *Napeogenes stella* (Hewitson, 1855)

*Napeogenes stella* was described by Hewitson from "New Granada" (most likely Colombia, Cundinamarca). Examination of a syntype preserved in BMNH type collection allowed us to establish that the taxon comes from the Magdalena River Valley, from where we also examined modern specimens of this subspecies. Other recent localities include: Río Porce, Amalfi (Colombia, Antioquia), Sierra Nevada de Santa Marta, Parque Tayrona (Colombia, Magdalena). Another subspecies is also known from Colombia: *Napeogenes stella opacella* Kaye, 1918, which was described from "Quebrada de la Sarga, Río Tamaná" in the Chocó region, and within the Chocó endemism centre (*sensu* Brown, 1977). The subspecies has recently been recorded at: El 12, Río Baudo (Colombia, Chocó); Río Anchicayá (Colombia, Valle del Cauca) (CFC); Tumaco (Colombia, Nariño) (GR). Furthermore, *N. stella opacella* occurs south into northwestern Ecuador (Carchi, Esmeraldas, Imbabura)(Vitale, Willmott & Hall,

unpublished data). Additional subspecies outside Colombia include: *Napeogenes stella browni* Racheli & Racheli, 1998 (TL: Venezuela, Táchira, San Juan de Colón, La Fría), and *Napeogenes stella aster* Godman, 1899 (TL: Ecuador, Pichincha).

Recently, two undescribed, quite localized and scarce populations of *N. stella* have been discovered in premontane dry forests along the Cauca River Valley in Colombia, and in premontane humid forest in Panama, which we describe here.

### *Napeogenes stella caucaensis* Constantino & Vitale n. ssp.

Plate 2 Figs. 11-12, Map 2

*Napeogenes stella* n. ssp. 1 K. S. Brown (Lamas 2004).

Description and diagnosis

Male length of FW ♂ 26 mm.

DFW, complete series of 8 whitish transparent submarginal spots. Basal part of cubital veins reddish brown (orange in *N. stella stella*). Costal margin black. An oval black spot inside discal cell, not touching the veins.

DHW, complete series of 7 whitish transparent submarginal spots Two black spots at base of $Cu_1$-$M_3$ and $M_3$-$M_2$, smaller than in any other subspecies. Basal portions of 1A, 2A, $Cu_2$ and $Cu_1$ opaque reddish brown, the transparent areas between these veins opaque orange.

VHW, reddish brown streak at costal margin, extending half-length from humerus.

Dorsally, thorax and patagia reddish brown. Antenna with basal half black, distally orange, including clubs. Ventrally thorax and abdomen yellow.

The new subspecies differs from other Colombian subspecies by the increased transparency of both wings, a character especially evident in males. *Napeogenes stella stella* and *N. stella opacella* have the basal part of the wing opaque orange. The same character also discriminates the new subspecies from the Venezuelan *N. stella browni*, which also has increased yellow in the DFW marginal spots. The Ecuadorian *N. stella aster,* which is the subspecies with the most transparent pattern, has the DFW and DHW veins much darker than in the new subspecies.

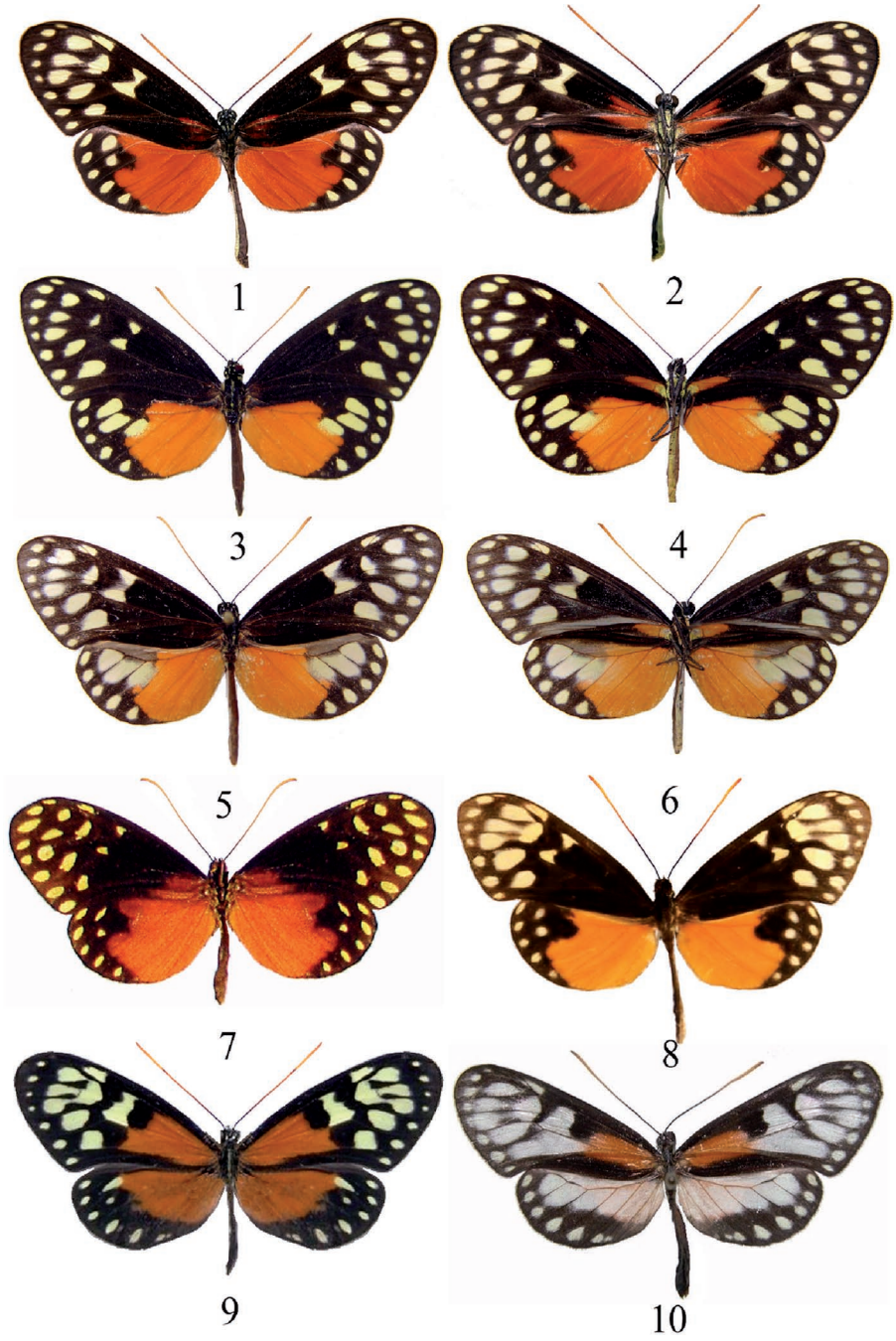
Type material

***Holotype***: ♂ COLOMBIA, Valle del Cauca, Río La Vieja, VI-1987, S. Constantino *leg.* (CFC), will be deposited in MHNUC.

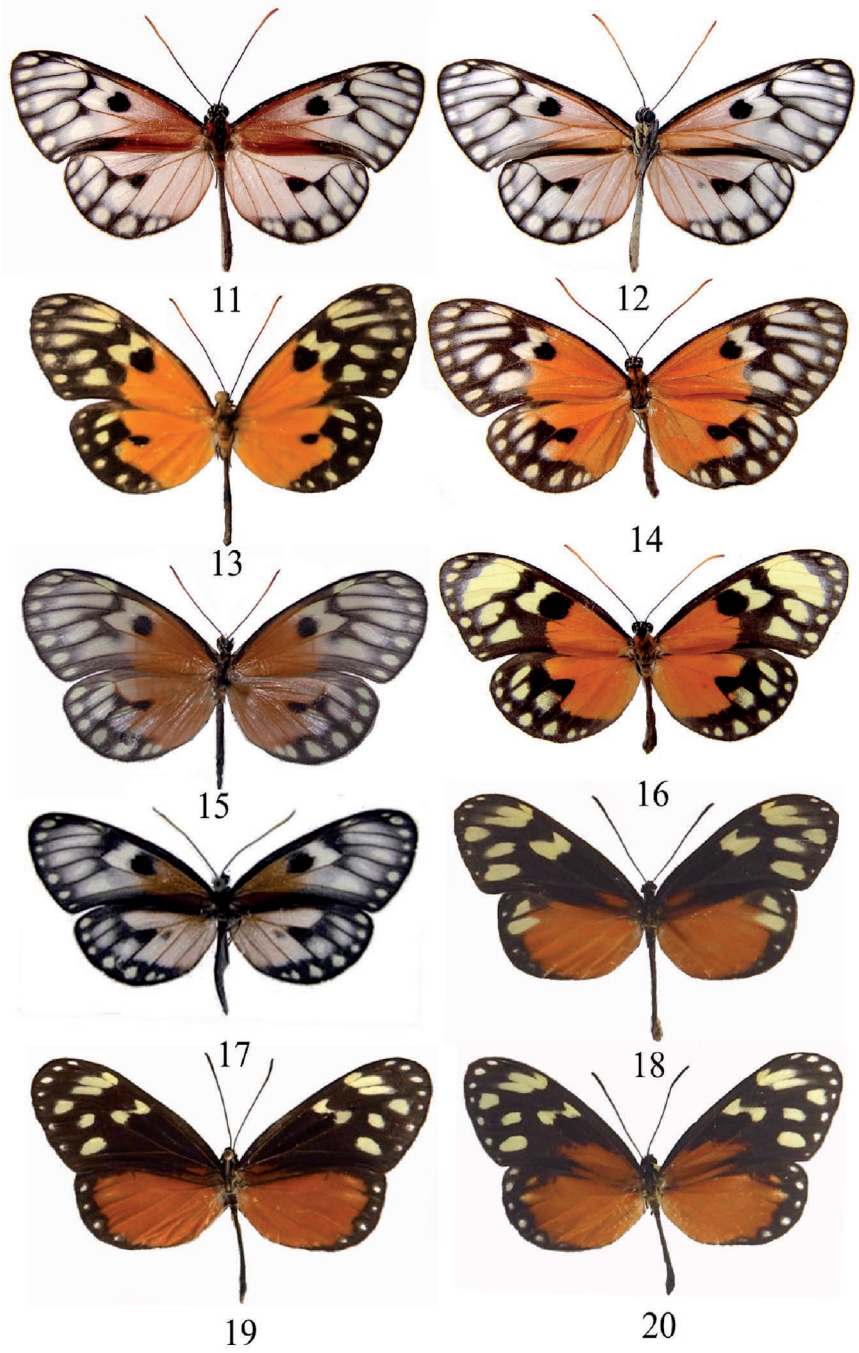
***Paratypes***: 4 ♂, same data as holotype (CFC); 1 ♂, COLOMBIA, Antioquia, Río Claro, 800 m, X- 1994, G. Rodríguez *leg.* (GRC); 4♂ and 8♀, COLOMBIA, Antioquia, Peñalisa, Río Cauca, m. 800, 3-III-2004, G. Rodríguez *leg.* (FVLI); 1♂, COLOMBIA, Antioquia, Río Claro, 800 m, J. Salazar *leg.* (JSC).

Etymology

The name derives from that of the Cauca River, where the dry forest habitat of this new taxon occurs.




1-2: *Napeogenes peridia willmotti* n. ssp. HT Valle del Cauca, Colombia. 3-4: *N. p. peridia*, female, Río Porce, Colombia. 5-6: *N. p. peridia* male, Río Porce, Colombia. 7: *N. p. hemisticta*, Panama. 8: *N. p. hemimelaena* Panama. 9: *N. p. hoppi*, Río Micay, Colombia 10: *N. p. decora* Ecuador




11-12: *Napeogenes stella caucaensis* n. ssp. HT Río La Vieja, Valle del Cauca, Colombia. 13: *N. s. delgadoi* n. ssp. HT Panama. 14: *N. s. stella* Río Magdalena, Colombia. 15: *N. s. browni*, Táchira, Venezuela. 16: *N. s. opacella* Chocó, Colombia. 17: *N. s.a aster* Ecuador. 18: *N. tolosa panamensis* n. ssp. HT Panama. 19-20: *N. t. amara* male and female, Panama

Variability

Specimens of the new subspecies nearly lack any sexual dimorphism. Females have the orange colour less translucent than males.

Another population, from Panama, is also phenotypically distinctive, and is described as a second new subspecies:

### *Napeogenes stella delgadoi* Vitale & Constantino n. ssp.

Plate 2 Fig. 13 and Map 2

*Napeogenes stella* n. ssp. 1 Lamas (Lamas 2004)l.

Description and diagnosis

Male length of FW ♂ 25 mm.

This new subspecies differs from the nominate one because the submarginal spots, which are whitish in the latter, are yellow in the new subspecies; it differs from the Venezuelan *N. stella browni*, which also has yellow submarginal spots, by the increased wing opacity, in both black and orange areas, a trait which also distinguishes it from *N. stella caucaensis* and *N. stella aster*. The new subspecies further differs from the southern *N. stella opacella* because that subspecies has three large yellow postdiscal spots, and by having a distinctive FW yellow subapical band; rarely, specimens from Ecuador have this FW subapical band broken into spots similar to the new subspecies.

Type material

***Holotype***: ♂, PANAMA, Colón, Piña, 200 m, 1-XII- 1994, F. Delgado *leg.* (FDLC).

***Paratypes***: 1 ♂, PANAMA, Colón, Cerro Salud, 800 m, V-1994, F. Delgado *leg.* (FDLC); 1 ♂, PANAMA, Colón, Gamboa, 100 m, V-1994, F. Delgado *leg.* (FDLC); 1 ♂, PANAMA, Darién, Puerto Indio, sector pacífico, 100 m, I-1994, F. Delgado *leg.* (FDLC); 1 ♀, PANAMA, Darién, Río Tuquesa, 100 m, II-1994, F. Delgado *leg.* (FDLC); 1 ♂, PANAMA, Darién, Jaqué, 10 m, IV-1994, F. Delgado *leg.* (FDLC); 1 ♂, PANAMA, Darién, Cerro Pirre, 350 m, VIII-1994, F. Delgado *leg.* (FDLC); 1 ♂, PANAMA, San Blas, Armila, 100 m, I-1994, F. Delgado *leg.* (FDLC).

Etymology

The new subspecies is named after our friend, Francisco Delgado, Universidad de Panamá, Veraguas, who collected the type specimens and whose collection supplied important information on the distribution of this subspecies.

### *Napeogenes peridia* (Hewitson, 1854)

*Napeogenes peridia* was described by Hewitson from "New Granada" (most likely Colombia, Cundinamarca). After examination of syntype preserved in the BMNH type collection, we can confirm that the range of the subspecies falls within the boundaries

of the Magdalena centre of endemism (*sensu* Brown, 1977), and specimens of this taxon were also recently observed at Río Porce (Colombia, Antioquia); *Napeogenes peridia hoppi* Hering, 1925 was described from Río Micay (Colombia, Cauca), and based on a single specimen. This subspecies is quite rare all along its range, occurring also in extreme northwestern Ecuador: El Durango, San Lorenzo (Esmeraldas), Lita (Imbabura). There are three additional subspecies described: *N. peridia hemisticta* Schaus, 1913 from Costa Rica, *N. peridia hemimelaena* Godman & Salvin, 1877 from Panama and *N. peridia decora* Godman, 1899 from western Ecuador (Pichincha, Los Ríos, Manabí, Chimborazo, Cotopaxi, Bolívar, Guayas, El Oro).

### *Napeogenes peridia willmotti* Vitale & Constantino n. ssp.

Plate 1 Figs. 1,2 and Map 1

Description and diagnosis

Male length of FW ♂ 29 mm.

DFW: complete series of 8 yellow submarginal spots, form and dimension similar to nominate subspecies. Series of 5 oblong postmedian spots, isolated from one another and from postdiscal yellow spot. Postmedian spot in $M_2$-$M_1$ elongated towards postdiscal spot. Inside discal cell there is an hourglass-shaped yellow spot. Wing background colour opaque black, except for an orange dash along cubitus. There is a double yellow radial spot 3 mm long under costal margin.

DHW: series of 6 yellow submarginal spots. Two yellow postmedian spots in $M_3$-$M_2$ and $M_2$-$M_1$, and a third faint spot in $Cu_1$-$M_3$. Spot in $M_3$-$M_2$ basally touching discal orange area; spot in $M_2$-$M_1$ connected to a black postdiscal spot.

Antenna orange, except for a small part at base black. Ventrally abdomen and thorax yellow.

The holotype of the new subspecies differs from the other described subspecies as follows:

1) *Napeogenes peridia peridia*

DHW: in *N. peridia peridia* males, there is a series of 3 large yellow areas that are semi- transparent in $Cu_1$-$M_3$, $M_3$-$M_2$ and $M_2$-$M_1$ adjacent to a small postdiscal black spot. In the new subspecies these yellow spots are reduced.

2) *Napeogenes peridia hoppi*

DFW: this subspecies is easily separated from the new subspecies because of the large reddish area covering the basal half of the discal area, which is black in the new subspecies.

3) *Napeogenes peridia hemimelaena* and *Napeogenes peridia hemisticta*

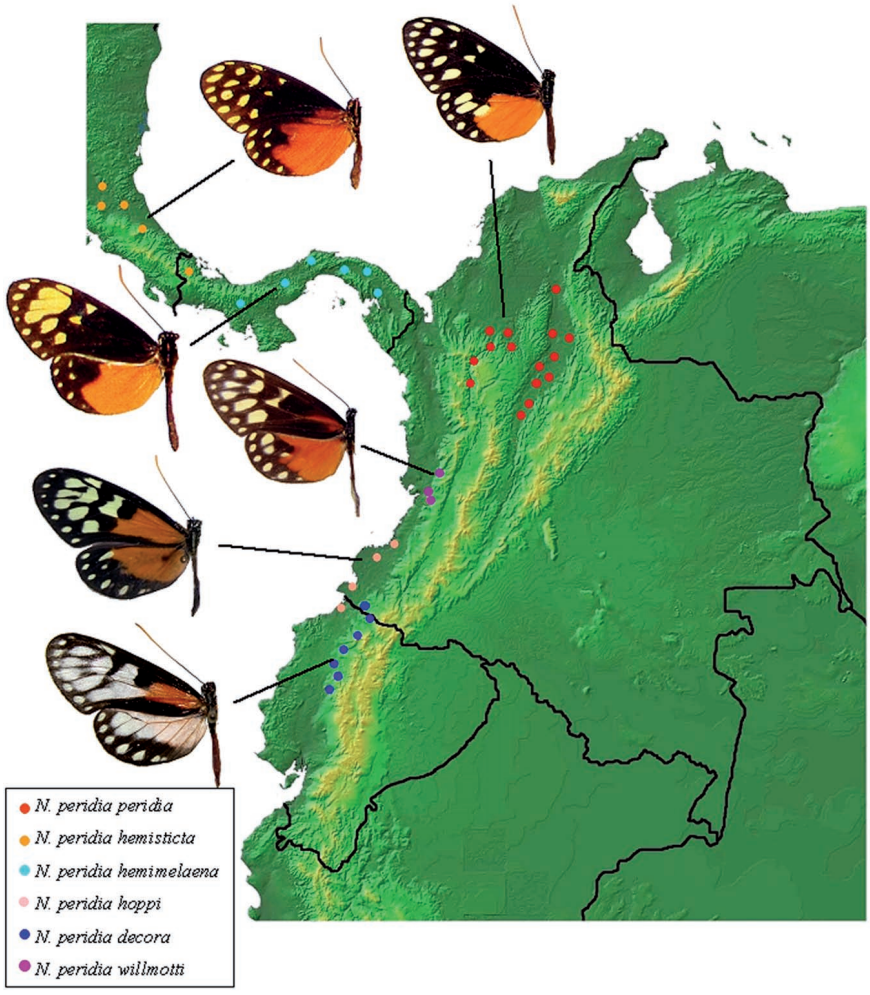
The new subspecies can be separated from these two subspecies by the size and the form of the yellow discal spot, which in these two subspecies is separated into two small yellow triangular spots connected to the discal veins, while the same spot in the new subspecies is a single spot, hourglass-shaped. On DHW, the two yellow post median spots in $M_3$-$M_2$ and $M_2$-$M_1$ are very small in comparison with the same spots in the new subspecies.

4) *Napeogenes peridia decora*

This subspecies is easily separated from the new one by the transparency of the wings.

Type material

***Holotype***: ♂ COLOMBIA, Valle del Cauca, Cali, Oberes Dagua Geb., c.a. m. 1.000, 24-VIII-1960, Denhez *leg.* (FVLI), will be deposited in ZSM.

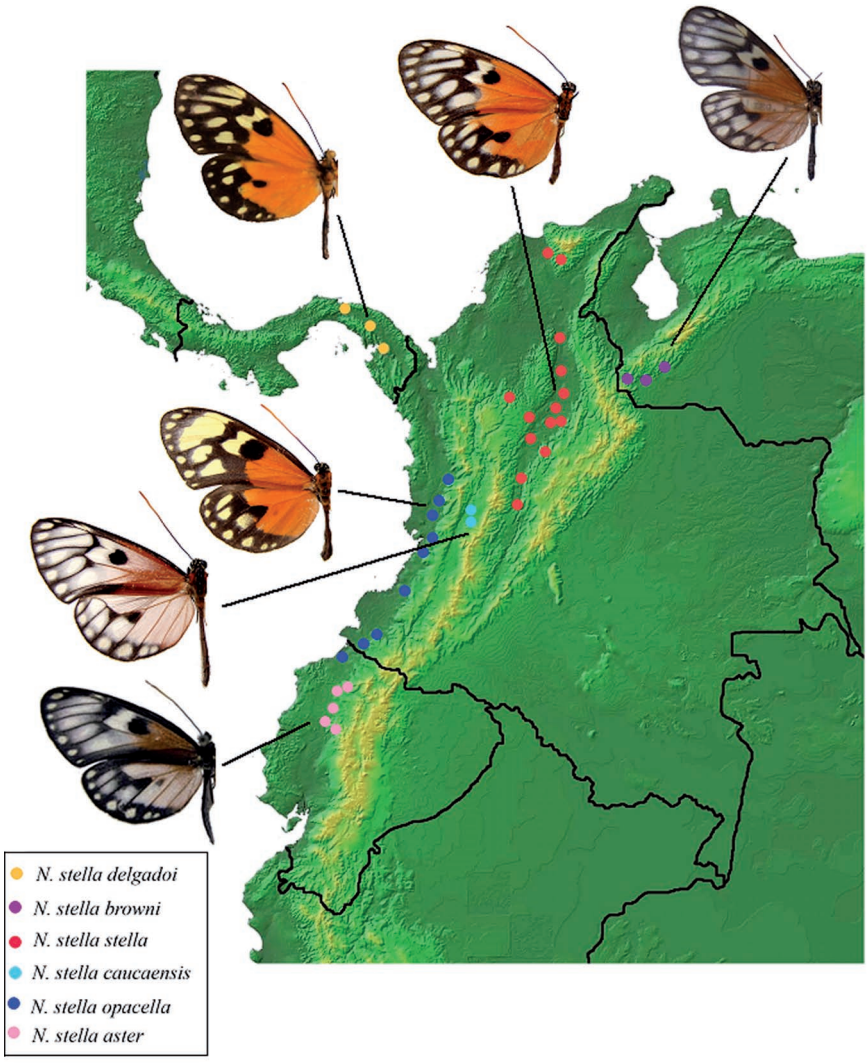



Map 1. *Napeogenes peridia* collection localities

***Paratypes***: 1 ♂, COLOMBIA, Valle del Cauca, Río Garrapatas, 800 m, 1-IX--1999, L. Constantino *leg.* (CFC); 1 ♂, COLOMBIA, Risaralda, Santa Cecilia, 600 m, 5-IV-1994, J. Salazar *leg.* (MHNUC).

DISTRIBUTION

*Napeogenes peridia willmotti* is restricted known only from the Pacific slope of the Colombian Cordillera Occidental, from Santa Cecilia (Risaralda) to Río Dagua (Valle del Cauca), where it is extremely scarce.




Map 2. *Napeogenes stella* collection localities

Etymology

The subspecies is named after our friend Keith Willmott at the McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida.

Variability

The only variability regards the width of reddish colour on the DFW, which is slightly more extensive in the paratypes.

### *Napeogenes tolosa* (Hewitson, 1855)

*Napeogenes tolosa* is a Mesoamerican species extending into northwestern South America, which forms two different phenotypical groups with its subspecies. The northern group includes the nominal subspecies, *N. tolosa tolosa* (Hewitson, 1855) from Mexico to northern Nicaragua, *N. tolosa amara* Godman, 1899 from southern Nicaragua to western Panama, and *N. tolosa mombachoensis* Brabant & Maes, 1997 from a restricted area in Nicaragua. The southern group includes *N. tolosa diaphanosa* Kaye, 1918 from Colombian Chocó and *N. tolosa chrispina* (Hewitson, 1874) from southwest Colombia and northwest Ecuador. All populations of the "northern group" are characterized by an orange colour which is absent in the specimens of the "southern group". We recently examined specimens of an eastern Panama population of *Napeogenes tolosa* clearly belonging to a new subspecies which we describe as:

### *Napeogenes tolosa panamensis* Vitale, Constantino & Delgado n. ssp.

Plate 2 Figs. 19-20

*Napeogenes tolosa* n. ssp. 1 (Lamas 2004).

Description and diagnosis

Male length of FW ♂ 29 mm.

DFW, there are 7 submarginal whitish spots, that in $M_3$-$M_2$ very small. The characteristic postdiscal spots and the discal spot are larger than in any other subspecies. There is a very little reddish coloration in the basal area, including cubital vein and wing base.

DHW, a series of much reduced submarginal whitish spots, most obvious at apex, others faint. Two opaque yellow postdiscal spots, adjacent to black distal margin in $M_3$-$M_2$ and $M_2$-$M_1$, latter smaller. As on DFW, the size of the yellow spots distinguishes the new subspecies from *Napeogenes tolosa amara, N. tolosa tolosa* and *N. tolosa mombachoensis*. The new subspecies is much more distinct from the two southern subspecies, *N. tolosa diaphanosa* and *N. tolosa chrispina*, which are characterized by having transparent wings and lacking the reddish colour in the HW.

Type material

***Holotype***: ♂ PANAMA, Darién, *Cerro Pirre*, Corregimiento de El Real, Distrito de Pinogana, 2-II -1994, 800m., F. Delgado *leg*. (FDLC)

***Paratype***: 1 ♂, same data as Holotype (FDLC); 1♀ PANAMA, same data as Holotype except 12.ii.1994, 400m., F. Delgado *leg.* (FVLI); 1♀ PANAMA, Panamá, *Cerro Azul,* Corregimiento de Tocumen, 15.vi.1993, 1000m, F. Delgado *leg*. (FDLC).

Etymology

The name refers to the country of Panama, where this subspecies is found.

Discussion

This new subspecies occurs in rainforest habitats. Specimens from Darién differ from those from Panamá by having slightly smaller yellow postdiscal spots, and are slightly more translucent, with more intense reddish coloration, and the latter listed by Lamas (2004) as a further undescribed subspecies. However, we believe that the differences are too slight and variable to warrant separation of the two populations.

Acknowledgements

We express our thanks to the museum curators who permitted us to examine Ithomiini collections: Blanca Huertas and Phil Ackery (BMNH), Axel Hausmann (ZSM), Julián Salazar, (MHNUC), Gabriel Rodríguez (Envigado, Colombia), Wolfram Mey (ZMHU); finally, we are much indebted to Keith Willmott for his helpful suggestions and revision of the text.

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