

NOTES ON THE GENUS *ARGYROGRAMMANA*, WITH DESCRIPTIONS OF FIVE NEW SPECIES (LEPIDOPTERA: RIODINIDAE)

JASON P. W. HALL AND KEITH R. WILLMOTT

Dept. of Entomology and Nematology, University of Florida, Gainesville, Florida 32611, USA

ABSTRACT.— Type specimens of the extremely rare and/or poorly known species in the *Argyrogrammana amalfreda* (Staudinger, [1887]) complex (group "Bariniformes" of Stichel, 1911, 1930) are illustrated, with notes on taxonomy and distribution. In addition, five new species are described from eastern Ecuador.

KEY WORDS: Amazon, *Argyrogrammana aparamilla* n. sp., *Argyrogrammana bonita* n. sp., *Argyrogrammana caelestina* n. sp., *Argyrogrammana celata* n. sp., *Argyrogrammana natalita* n. sp., behavior, Bolivia, Brazil, Central America, cloudforest, Colombia, Costa Rica, Ecuador, French Guiana, Guyana, hilltopping, Neotropical, Peru, perching behavior, South America, taxonomy, Trinidad.

The genus *Argyrogrammana* Strand, 1932, contains some of the most exquisite and rare species of riodinids to be found in the Neotropics, and, for the lepidopterist, encountering these butterflies in the field is always a memorable experience. Several species are still only known from the type specimen. The genus includes approximately 24 described species distributed throughout tropical Central and South America, the majority of which are confined to lowland rainforest in the Amazon Basin.

Taxonomic studies in this strongly sexually dimorphic genus have been hampered greatly by a lack of knowledge of which females are associated with which males, and by a poor understanding of the extent of intraspecific variation in males due to their great rarity in collections. The recent work of Brévignon and Gallard (1995) must be considered as the most important work by far on the taxonomy and behavior of *Argyrogrammana*, illustrating many hitherto unknown females and new species, and documenting species diversity at a single site (French Guiana). This provides a superb example of how much there is still to discover about the distribution and ecology of rare riodinid species, and how important field work is even today in cataloging riodinid diversity.

The purpose of this paper is to assist researchers in the identification of the rare and poorly known species in this genus which are mostly phenotypically characterised by an orange and blue pattern on the recto surface. These species were grouped by Stichel (1911, 1930) into his "Bariniformes" (*A. amalfreda* (Staudinger, [1877]) complex). Although these do not necessarily form a monophyletic group, it is convenient here to treat them together. Reviews of the two remaining groups are in preparation; these are Stichel's "Stilbeformes" (*A. stilbe* (Godart, [1824]) complex), characterised by an orange/yellow recto surface mottled with black spots, and the "Trochiliiformes" (*A. trochilia* (Westwood, [1851]) complex), characterised by banded females and often blue banded males.

Our studies of *Argyrogrammana* have been prompted by the discovery of several new species in the "*amalfreda* complex" during the course of our field work in Ecuador. Here we present notes on the known distribution and taxonomy of the hitherto known species, with illustrations of type specimens, followed by descriptions of five new species from eastern Ecuador.

ARGYROGRAMMANA Strand, 1932

Argyrogramma Stichel, 1910, preoccupied (Hübner, [1823])

Argyrogrammana praestigiosa (Stichel, 1929) (Fig. 1a,b)

Male, type, no locality data (Zoologische Museum Humboldt Universität, Berlin, Germany, ZMHU).

Distribution: French Guiana.

The male verso surface, and the female of *A. praestigiosa* (see Brévignon and Gallard, 1995) both indicate that this species is closely related to the more widespread *A. glaucopsis* (Bates, [1868]), figured by D'Abrera (1994: 1052), and by Lewis (1987: 70, misidentified as female *A. saphirina* (Staudinger, [1887])). Therefore, *A. praestigiosa* seems to be better grouped with *A. glaucopsis* in the "*trochilia* complex."

A. barine (Staudinger, [1887]) (Fig. 2a,b ♂; 2c,d ♀)

Male, type, Río San Juan, W. Colombia (ZMHU).

Female, type, Río San Juan, W. Colombia (ZMHU).

Distribution: Costa Rica to W. Ecuador.

This species is not represented in the Natural History Museum, London, England (BMNH), and the specimen figured as this species by D'Abrera (1994) is probably a form of *A. glaucopsis*.

A. physis (Stichel, 1911)

ssp. *physis* (Stichel, 1911) (Fig. 3a,b; 19)

Male, type, Río San Juan, W. Colombia (ZMHU).

Distribution: W. Ecuador to French Guiana.

ssp. *phyton* (Stichel, 1911) (Fig. 3c,d)



Fig. 1-6. Type specimens: 1. *Argyrogrammana praestigiosa*, type male: a) recto; b) verso. 2. *A. barine*, type male: a) recto; b) verso. Type female: c) recto; d) verso. 3. *A. physis physis*, type male: a) recto; b) verso. *A. physis phyton*, type male: c) recto; d) verso. 4. *A. amalfreda*, type male: a) recto; b) verso. 5. *A. nurtia*, type male: a) recto; b) verso. Type female: c) recto; d) verso. 6. *A. alstonii*, type male: a) recto; b) verso.

Male, type, São Paulo de Olivença, Brazil (ZMHU).

Distribution: E. Colombia to Peru, Brazil.

There are three specimens of this species in the BMNH, one of which is figured by D'Abrera (1994: 1051). This specimen, from Cananche, Cundinamarca, N. Colombia, appears to be phenotypically intermediate between the two subspecies. A specimen from Bahia, E. Brazil, has reduced orange and an elongated subapical blue patch on the recto surface. This may represent a valid subspecies, but more material is needed before it can be described. The female of *A. physis physis* is figured by Brévignon and Gallard (1995) but the female of *A. physis phyton* remains unknown.

***A. amalfreda* (Staudinger, [1887])** (Fig. 4a,b; 20)

Male, type, Pebas, Peru (ZMHU).

Distribution: Only known to us from the type specimen.

The male specimen figured by Brévignon and Gallard (1995) as this species, differs from the type of *A. amalfreda* in the verso pattern and forewing recto subapical blue patch, and is probably not conspecific. Similarly, the female specimen figured by them is also unlikely to represent *A. amalfreda*. The poor condition of the male specimen makes a definite identification difficult, but it appears to be similar to *A. celata* n. sp.

***A. nurtia* (Stichel, 1911)**

ssp. *nurtia* (Stichel, 1911) (Fig. 5a,b, 21 ♂; 5c,d ♀)

Male, type, Pachitea, Peru (ZMHU).

Female, type, Río Songo [1200m], Bolivia (ZMHU).

Distribution: Peru.

ssp. *ludibunda* Brévignon & Gallard, 1995 (not figured)

Male, holotype, Maripasoula, French Guiana.

Female, allotype, Matoury, French Guiana. Both in coll. L. & C. Brévignon, (LCB).

Distribution: French Guiana.

The recently described subspecies *A. n. ludibunda* differs from the nominate by having reduced orange on the recto surface and a slightly more elongate forewing recto subapical patch (figured by D'Abrera, 1994: 1051). The female type ascribed to *A. nurtia nurtia* does not belong to this species (see note under *Argyrogrammana natalita* n. sp.). Brévignon and Gallard (1995) figure the true female of *A. nurtia ludibunda*, while the female of the nominate subspecies is unknown to us.

***A. alstonii* (Smart, 1979)** (Fig. 6a,b)

Male, type, St. Annes, Trinidad (BMNH).

Distribution: French Guiana, Trinidad.

This rare species was recently recorded from French Guiana by Brévignon and Gallard (1995), and the female appears to be unknown. Guianan males are darker orange and have more reduced blue markings on the recto surface than the type, thus resembling *A. nurtia ludibunda*.

***A. pulchra* (Talbot, 1929)** (Fig. 7a,b ♂; 7c,d ♀)

Male, type, Sta. Fé de Bogotá, Colombia (BMNH).

Female, type, Sta. Fé de Bogotá, Colombia (BMNH).

Only known to us from the two types. It is noteworthy that in a genus where it is difficult to match males with females, the pattern of the verso surface and apical blue spot of these two specimens correlate remarkably well.

***A. sticheli* (Talbot, 1929)** (Fig. 8a,b ♂; 8c,d ♀)

Male, type, St. Laurent, Río Maroni, French Guiana (BMNH).

Female, type, French Guiana (BMNH).

Distribution: French Guiana.

This species is very similar in the pattern of the verso surface and the blue maculae of the forewing recto to *A. pulchra*, and the two species are clearly related. The female type of *A. sticheli* is not conspecific with the male type and its corresponding male appears to be unknown. Brévignon and Gallard (1995) illustrate the true female of *A. sticheli*, which resembles the female of *A. pulchra* but has a larger blue subapical spot and darker recto coloration.

***A. caesarion* Rebillard, 1958** (not figured)

Male, type, Gavea, Brazil (Musée Nationale d'Histoire Naturelle, Paris, France, MNHN).

Distribution: S. E. Brazil.

This species is figured by D'Abrera (1994: 1051, second column, third row) as *Argyrogrammana?* sp., and by Rebillard (1958), and is impossible to confuse with any other species in the genus. The recto surface is entirely red/orange with faint black speckling.

***A. venilia* (Bates, [1868])** (not figured)

Female, type, Pará, Brazil (BMNH).

Distribution: E. Ecuador, Brazil, Guianas.

The correct male of this species has only recently been recognised by Brévignon and Gallard (1995), and had been considered as a separate species, *A. boyi* (Röber, 1926) (type male from Tefé, Brazil (BMNH)). Although Stichel (1911, 1930) included "*A. boyi*" in his group "Trochiliiformes", and "*A. venilia*" in his "Stilbeiformes", *A. venilia* has a male verso, and female, characteristic of his group "Bariniiformes."

***A. denisi* Gallard, 1995** (not figured)

Male holotype, female allotype, both Galion, Roura, French Guiana. Both to be deposited in the MNHN.

Distribution: French Guiana.

The male of this species is very similar to *A. nurtia ludibunda* and *A. alstonii*, but is smaller, and the verso surface lacks any blue markings, more closely resembling that of *A. physis*.

***A. sebastiani* Brévignon, 1995** (not figured)

Male, holotype, Galion, Roura, French Guiana (LCB).

Female, allotype, locality as for holotype (in coll. J.-Y. Gallard, JYG). Distribution: French Guiana.

The male of this species resembles *A. physis phyton* on the recto surface, but has a more curved blue subapical patch, while the verso surface is similar to that of *A. pulchra*, but lacks any blue coloration.

***A. chicomendesi* Gallard, 1995** (not figured)

Male, holotype, Galion, Roura, French Guiana (to be deposited in the MNHN).

Female, allotype, locality as for holotype (JYG).

Distribution: French Guiana.

This species closely resembles *A. bonita* n. sp., and is discussed in the diagnosis for that species.

***Argyrogrammana natalita* Hall & Willmott, new sp.**

(Fig. 9a,b; 14)

Description.— MALE: forewing length 14mm. *Recto*: forewing ground color black; very thin silver-blue submarginal line; outer margin fringe black, white in 1A, Cu₁, M₂ and M₁; ovoid shining blue subapical patch



Fig. 7-13. Type specimens: 7. *A. pulchra*, type male: a) recto; b) verso. Type female: c) recto; d) verso. 9. *A. natalita* n. sp., holotype male: a) recto; b) verso. 10. *A. caelestina* n. sp., holotype male: a) recto; b) verso. 11. *A. aparamilla* n. sp., holotype male: a) recto; b) verso. 12. *A. celata* n. sp., holotype male: a) recto; b) verso. 13. *A. bonita* n. sp., holotype male: a) recto; b) verso.

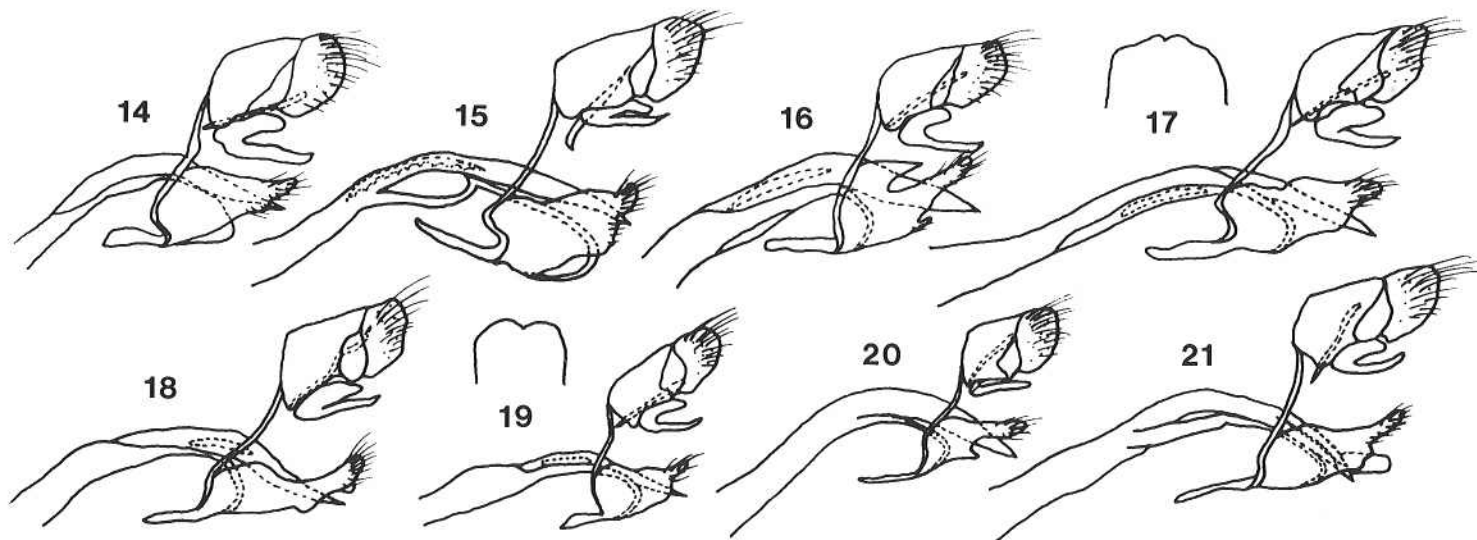


Fig. 14-21. Male genitalia, lateral view: 14. *A. natalita* n. sp.; 15. *A. caelestina* n. sp.; 16. *A. aparamilla* n. sp.; 17. *A. celata* n. sp., with ventral view of uncus; 18. *A. bonita* n. sp.; 19. *A. physis phyton*, Finca San Carlo, Ecuador, with ventral view of uncus; 20. *A. amalfreda*, type specimen, Pebas, Peru; 21. *A. nurtia*, type specimen, Pachitea, Peru. (Note: abdomens of type specimens in the BMNH were not available for dissection).

between Cu_1 and M_1 ; basal half of wing orange from anal margin to costal vein; numerous small black dashes intruding from costa into cell. Hindwing ground color orange with thin black margin, fringe black, white in 1A, Cu_1 and M_2 ; very thin silver-blue submarginal line, bordered distally by a thin orange submarginal line. *Verso*: forewing ground color black, shining blue in the cell; very thin silver-blue submarginal line, bordered proximally by a thin lilac-grey line; disjointed postdiscal band of oblong, lilac-grey spots; black dash at cell end; four black spots within cell. Hindwing ground color shining turquoise; black margin split by very thin silver-blue submarginal line, bordered proximally by a lilac-grey line, and then a disjointed line of black spots; zigzagging postdiscal line of black spots; cell end black, two black spots within cell. Labial palpi striped cream and black, tip black. Eyes brown with a black medial stripe and bare. Antennae black and banded with cream, black clubs. Thorax and abdomen recto orange, verso pale grey. Legs black and banded with cream, except femur black with long white hairs. Genitalia (Fig. 14): valvae roughly triangular and blunt, saccus short and deep.

FEMALE: unknown (but see discussion below).

Types.—*Holotype* ♂: ECUADOR.— Sucumbfos Prov., Río Chingual, km 12 La Bonita - Rosa Florida, 1550m, 18 Mar 95 (J. P. W. Hall). To be deposited in the BMNH.

Etymology.— This species is named for my dear friend Natalia Arango, whose beautiful home country of Colombia was in sight across the Río Chingual during the capture of this specimen (JPWH).

Diagnosis.— This species is closest in the appearance of the verso surface to *A. pulchra*, from which it differs in the configuration of black markings in the forewing cell and the submarginal area of both wings. The recto surface of *A. natalita* n. sp. is at once distinguishable from *A. pulchra* by the solitary blue forewing subapical patch.

Discussion.— A single male specimen was spotted resting beneath a leaf at approximately 1500h a few meters off the small path on vegetation clinging to the hillside which dropped steeply away down to the Río Chingual several hundred meters below. Nothing further can be said about its behavior as it was rapidly captured from a precarious position on the path.

It seems likely that the female type of *A. nurtia nurtia* is in fact the female of *A. natalita* n. sp., due both to the great similarity of the verso surfaces and altitude of their capture

localities. *A. nurtia* is thought to be a lowland species, while the female type is from 1200m in the Yungas province of the Bolivian Andes, a similar altitude to the type locality (1550m) of *A. natalita*. This conclusion suggests that this species may be widespread throughout the Andes in appropriate mid-altitude localities but extremely rare. The apparent rarity of this species can probably be explained by its limited ecological niche in the relatively poorly collected mid-altitude cloudforests (Hall and Willmott, 1995), and the fact that it spends most of its time in the canopy, fortunately accessible in the type locality due to the steepness of the terrain.

Argyrogrammana caelestina Hall & Willmott, new sp.

(Fig. 10a,b; 15)

Description.— MALE: forewing length 15mm. *Recto*: forewing ground color black; outer margin fringe black, white in 1A, Cu_1 , M_2 and M_1 ; thin silver-blue submarginal line; large postdiscal shining turquoise patch extending from near tornus to mid-costa; basal and postbasal area rufous brown. Hindwing ground color black; outer margin fringe black, faint white in 1A, Cu_1 and M_2 ; thin silver-blue submarginal line bordered distally by one, and proximally by two rufous brown lines; basal two thirds of wing rufous brown. *Verso*: forewing ground color dark grey; thin silver-blue submarginal line, bordered distally at apex by faint orange line; proximally bordered by a broken line of blue chevrons; postdiscal area between Cu_2 and costa shining blue, bordered proximally by a black line; cell shining blue, cell end black, five black spots in cell; two discal black dashes in 1A. Hindwing ground color shining blue, margin black, very faint silver-blue submarginal line; two submarginal lines of black chevrons; disjointed postdiscal line of black dashes; cell end black, two lines each of three black spots in discal area. Labial palpi striped cream and black, tip black. Eyes brown with a black medial stripe and bare. Antennae black and banded with cream, black clubs. Thorax and abdomen recto rufous brown, verso pale grey. Legs cream and banded with black, except femur black with long white hairs. Genitalia (Fig. 15): valvae roughly oblong, saccus long, pedicel "kinked" above saccus and supporting the aedeagus, a unique structure among the species studied here.

FEMALE: unknown.

Types.— *Holotype* ♂: ECUADOR.— Napo Prov., km. 49 Tena - Loreto rd., 1350m, 14 Mar 95 (J. P. W. Hall). To be deposited in the BMNH.

