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ELECTRONIC APPENDIX A

Taxonomic description of *Redonda bordoni*, new species (Lepidoptera: Nymphalidae, Satyrinae)

Abbreviations

A & B: Adams & Bernard

BMNH: The Natural History Museum, London, UK.

JFLC: Collection Le Crom, Bogotá, Colombia.

MALUZ: Museo de Artrópodos, La Universidad del Zulia, Maracaibo, Venezuela.

MHN: Museo de Ciencias Naturales, Universidad Nacional de Colombia.

MIZA: Museo del Instituto de Zoología Agrícola, Universidad Central de Venezuela, Maracay, Venezuela.

MZUJ: Zoological Museum of the Jagiellonian University, Krakow, Poland.

P & V: Pyrcz & Viloría

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Redonda bordoni Viloría & Pyrcz, new species

(Figs. 1a, 5, 6)

Male. Forewing length: 26-32 mm; n = 123; mean = 29.56. Eyes hairy, reddish brown, circled with black and white scales. Palpi twice as long as head, light brown, flanked with white, with brown, dark brown and yellow hairs; first segment quarter length of first. Antennae up to two fifths length of costa, 32 segments; shaft orange brown, darker towards club; club 2.5-3 times longer than wide, concave (spoon-shaped). Body densely hairy, dorsally dark coffee brown, ventrally light brown, almost white on abdomen; hairs glossy light brown. Forewing triangular, tornus obtuse. Hindwing oval. Upperside ground colour shiny brown, darker towards basal half and marginal region; wing bases dark coffee brown; crossveins at distal extremity of discal

cells covered by greyish white; series of five to six submarginal elongate white spots on both wings.

Underside ground colour as above; forewing pattern as on upperside; hindwing veins greyish white, as well as longitudinal lines in discal and Cu₂ cells, the former bifurcated near base; postdiscal series of five to six fusiform white ocellar marks; third Schwanwitsch's externa, first and second Schwanwitsch's media coffee brown (Schwanwitsch 1924); all discontinuous and dislocated to form a system of longitudinal lines parallel or oblique to veins and white marks, in basal half of wing and postdiscal-submarginal region, respectively.

Genitalia illustrated in Figure 6a.

Female. Forewing length: 20-29 mm; n = 4; mean = 20.87. Wings considerably shorter and narrower than in male; apex pronounced at hindwing vein M₂. Upperside ground colour silvery white; wing bases very dark coffee brown; forewing densely dusted with dark brown in apical and discal region, and within discal cell. Underside colour pattern as in male, dark coffee brown much more dense in basal half of hindwing; white lines and veins more distinct; fusiform white ocellar marks heavily elongate; costal margin dark coffee brown. Genitalia illustrated in Figure 6b.

Type material. Holotype male, taken between Laguna El Cenegón and Laguna Grande, Páramo El Batallón, Estado Táchira, Venezuela, 3200-3400 m, 28-ii-1994, A. Vilorio, M. García & J. Camacho colls. (Fig. 1a, above); Allotype female, same data as holotype (Fig. 1a, below) (MALUZ). Paratypes: 27 males (3 in MHN, 3 in JFLC), 1 female, same data as holotype; 19 males (2 in MZUJ, 2 in BMNH), VENEZUELA: Estado Táchira, Páramo El Batallón, entre la Antena CANTV y la Laguna El Cenegón, 3100-3250 m; 27-ii-1994, A. Vilorio, M. García & J. Camacho colls.; 4 males, Estado Táchira, Municipio Jáuregui, Callejón del Cenegón, 16-xii-1994; M. García coll.; 6 males, 1 female, Estado Táchira, Parque Nacional Juan Peñaloza, Páramo El Rosal, 3000 m, 12/14-i-1995; J. Camacho & M. García colls.; 10 males, Estado Táchira, Páramo El Batallón, Entre El Cenegón y Laguna Grande, 3300-3400 m, 05-iii-1996, J. Camacho, M. García, T. Pyrcz, J. Wojtusiak colls. (MALUZ); 1 male, Estado Táchira, Páramo de La Negra, 30-ix-1951, P. Fenjues coll.; 1 male, same locality, 3200 m., 14-i-1982, C. Bordón coll. (MIZA); 51 males, 1 female, Estado Táchira, Páramo El Batallón, Vía El Pulpito, 3500-3800 m, 02/04-iii-1996, T. Pyrcz, J. Wojtusiak, J. Camacho, M. García colls.; 5 males, Estado Táchira, Páramo El Batallón, Vía El Cenegón, 04-iii-1996, T. Pyrcz, J. Wojtusiak, J. Camacho, M. García colls. (MZUJ).

Etymology. We name this new species after Carlos Bordón, a Venezuelan entomologist who collected the first individual we saw of this unusual butterfly.

Reference

Schwanwitsch, B. 1924 On the ground-plan of wing-pattern in nymphalids and certain other families of the rhopaloceros Lepidoptera. *Proc. Zool. Soc. London* **1924**, 509-528, 4 pls.



Figure 5. *Redonda bordoni* female displaying the silvery dorsal surfaces of its wings.

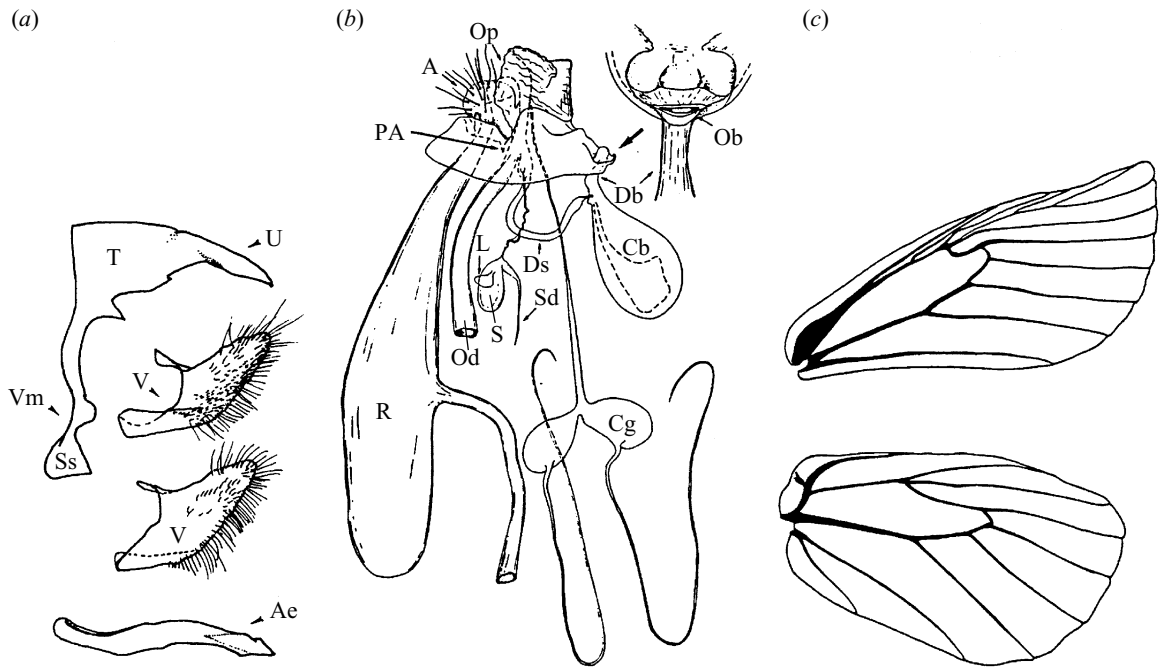


Figure 6. Morphological features of *Redonda bordoni*. (a) Male genitalia (aedeagus and valvae removed from their natural positions: Ae, aedeagus; Ss, saccus; T, tegumen; U, uncus; V, valva; Vm, vinculum). (b) Female genitalia (A, anus; Cb, corpus bursae; Cg, collateral gland; Db, ductus bursae; Ds, ductus seminalis; L, lagena; Ob, ostium bursae; Od, oviduct; Op, ovipore; PA, post-apophysis; R, rectum; S, spermatheca; Sd, spermathecal duct). (c) Venation of female wings.

ELECTRONIC APPENDIX B

Sources of information for Figure 2

Forewing length of three species and one subspecies of *Redonda*, 34 undescribed species of *Pedaliodes* Butler and one undescribed species of *Panyapedaliodes* Forster from the high Andes of Peru, were measured during the present study. Additional sources of information are as follows (taxa for which data were obtained are listed in square brackets):

- Adams, M. J. & Bernard, G. I. 1979 Pronophilinae butterflies (Satyridae) of the Serranía de Valledupar, Colombia-Venezuela border. *Syst. Ent.* **4**, 95-118 [*Dangond dangondi* A & B, *Eretris apuleja altamira* A & B, *E. porphyria perija* A & B, *Lasiophila zapatoza manaurera* A & B, *Lymanopoda altaselva* A & B, *L. maletera* A & B, *L. paramera* A & B, *Pedaliodes cesarense* A & B, *P. suspiro* A & B, *P. tyrreoides* A & B, *P. vallenata* A & B, *P. zuleta* A & B, '*Penrosda*' *navarrae* A & B, '*P.*' *quinterae* A & B, *Pronophila orchewitsoni* A & B].
- Adams, M. J. & Bernard, G. I. 1981 Pronophilinae butterflies (Satyridae) of the Cordillera de Mérida, Venezuela. *Zool. J. Linn. Soc.* **71**, 343-372 [*Steromapedaliodes albarregas* (A & B)].
- Craw, R. C. 1978 Revision of genus *Argyrophenga* (Lepidoptera: Satyridae). *N. Z. J. Zool.* **5**, 751-763 [*Argyrophenga antipodum* Doubleday, *A. harrisi* Craw, *A. janitae* Craw].
- Ferrer-Paris, J. R. 2000. *The genus Redonda (Lepidoptera: Satyrinae): a model to study adaptation and distribution in the páramos of Venezuela*. Bayreuth: Universität Bayreuth (Diplom thesis) [*Corades pannonia* Hewitson, *Diaphanos fuscus* Vitoria, *D. huberi* A & B, *Lymanopoda dietzi* A & B, *Pedaliodes plotina rapha* Butler].
- Heimlich, W. 1959 Eine neue Satyridae aus Chile. *Ent. Z.* **69**, 173-179 [*Pamperis poaoeneis* Heimlich].
- Heimlich, W. 1963. Die Gattung *Argyrophorus* Blanchard (Lep. Satyridae). *Mitt. münch. ent. Ges.* **53**, 70-79, pls. 3-6 [*Argyrophorus argenteus* Blanchard, *Etcheverrius chiliensis* (Guérin-Ménéville), *Palmaris monticolens* (Butler), *Punargentus lamna* (Thieme), *Stuardosatyris williamsianus* (Butler)].
- Miller, L. D. 1974 Revision of the Euptychiini (Satyridae) 2. *Cyllopsis* R. Felder. *Bull. Allyn Mus.* **20**, 1-98 [*Cyllopsis argentella* (Butler & Druce), *C. clinas* (Godman & Salvin), *C. diazi* L. D. Miller, *C. dospassosi* L. D. Miller, *C. gemma freemani* (Stallings & Turner), *C. gemma gemma* (Hübner), *C.*

- guatemalena* L. D. Miller, *C. hedemanni hedemanni* R. Felder, *C. hedemanni tamaulipensis* L. D. Miller, *C. henshawi henshawi* (Edwards), *C. henshawi hoffmani* L. D. Miller, *C. hilaria* (Godman), *C. jacquelineae* L. D. Miller, *C. nayarit* R. Chermock, *C. nelsoni* (Godman & Salvin), *C. pallens* L. D. Miller, *C. parvimaculata* L. D. Miller, *C. pephredo* (Godman), *C. perplexa* L. D. Miller, *C. pertepida avicula* (Nabokov), *C. pertepida dorothea* (Nabokov), *C. pertepida intermedia* L. D. Miller, *C. pertepida maniola* (Nabokov), *C. pertepida pertepida* (Dyar), *C. philodice* (Godman & Salvin), *C. pseudopephredo* R. Chermock, *C. pyracmon nabokovi* L. D. Miller, *C. pyracmon pyracmon* (Butler), *C. rogersi* (Godman & Salvin), *C. schausi* L. D. Miller, *C. steinhauserorum* L. D. Miller, *C. suivalenoides* L. D. Miller, *C. suivalens escalantei* L. D. Miller, *C. suivalens suivalens* (Dyar), *C. windi* L. D. Miller].
- Miller, L. D. & Miller, J. Y. 1978 "East Indian" butterflies: notes and descriptions 1. Satyridae and Danaidae. *Bull. Allyn Mus.* **49**, 1-23 [*Acrophthalmia artemis windorum* L. D. & J. Y. Miller, *Mycalesis duponcheli allynorum* L. D. & J. Y. Miller, *M. mucia aruana* L. D. & J. Y. Miller, *M. sirius procyon* L. D. & J. Y. Miller, *Ypthima pandocoides* L. D. & J. Y. Miller, *Y. pandocus microocellata* L. D. & J. Y. Miller].
- Pyrcz, T. W. 1995 A new genus, *Tamania*, and a new species, *Tamania jacquelineae*, from the Tama Range, Venezuela Colombia border, and some thoughts on the diagnosis of the tribe Pronophilini (Nymphalidae: Satyrinae). *Lambillionea* **95**, 519-525 [*Tamania jaquelineae* Pyrcz].
- Pyrcz, T. W. & Vilorio, A. L. 1999a Contribution to the knowledge of Ecuadorian Pronophilini, part 1: new pedalioidines (Lepidoptera: Nymphalidae: Satyrinae). *Genus* **10**, 117-150 [*Altopedaliodes kurti* P & V, *A. tena nucea* P & V, *A. zsolti* P & V, *Panyapedaliodes traceyannae* P & V, *Pedaliodes arturi* P & V, *P. balnearia* P & V, *P. dracula* P & V, *P. morenoi pilaloensis* P & V, *P. petri* P & V, *P. peucestas restricta* P & V, *P. rumba* P & V, *P. sonata* P & V, *P. tabaconas* P & V, *Pherepedaliodes nubilia* P & V].
- Pyrcz, T. W. & Vilorio, A. L. 1999b Mariposas de la tribu Pronophilini de la Reserva Forestal Tambito, Cordillera Occidental, Colombia. Primera parte. Convergencia de los patrones de coloración en mariposas andinas: siete nuevas especies del género *Pedaliodes* Butler, 1867 (Lepidoptera:

- Nymphalidae, Satyrinae). *SHILAP, Rev. lepid.* **27**, 173-187 [*Pedaliodes caeca* P & V, *P. hebena* P & V, *P. obstructa* P & V, *P. occulta* P & V].
- Pyrzcz, T. W. & Vioria, A. L. In press Erebiine and pronophiline butterflies of the Serranía del Tamá, Venezuela-Colombia border (Lepidoptera: Nymphalidae: Satyrinae). *Trop. Lepid.* **12** [*Eretris porphyria* ssp. n., *Lymanopoda samius* ssp. n., *Lymanopoda* sp. n., *Oxeoschistus simplex* ssp. n., *Pedaliodes baccara* ssp. n., *P. plotina* ssp. n., *Pedaliodes* sp. n. 1].
- Vioria, A. L. 1995 Description of a new species of *Pedaliodes* (Lepidoptera: Satyridae: Pronophilini) from the Cerro de La Neblina, Venezuela. *Atalanta* **25**, 525-529, pl. XVIIa [*Pedaliodes demarmelsi* Vioria].
- Vioria, A. L. 1998 Un nuevo *Pedaliodes* Butler, 1867 de la Serranía de Tapirapecó, Venezuela (Lepidoptera: Nymphalidae, Satyrinae, Pronophilini). *SHILAP, Rev. lepid.* **26**, 13-18 [*Pedaliodes chaconi* Vioria].
- Vioria, A. L. In press A new Amazonian pronophiline genus, *Foetterleia* gen. nov., and its systematics (Lepidoptera: Nymphalidae: Satyrinae). *Trop. Lepid.* **12** [*Foetterleia scheineri* (Foetterle)].
- Vioria, A. L., Adams, M. J., Pyrcz, T. W. & Romero, F. 2001 Noticia histórica sobre satíridos venezolanos coleccionados por Karl Moritz (1797-1866) y discusión de la identidad taxonómica y la distribución de *Pedaliodes pisonia* (Hewitson, 1862) (Lepidoptera: Nymphalidae, Satyrinae). *SHILAP, Rev. Lepid.* **29**, 31-42 [*Pedaliodes pisonia* (Hewitson)].
- Vioria, A. L., Miller, L. D. & Miller, J. Y. In press A reassessment of *Parapedaliodes* Forster, with descriptions of new taxa (Nymphalidae: Satyrinae). *Bull. Allyn Mus.* **142** [*'Parapedaliodes' juba* ssp. n., [gen. n., sp. n. 1], *'Parapedaliodes' margaretha* spp. n., [gen. n., sp. n. 2, sspp. nn. 1, 2, 3], *'Parapedaliodes' nora* ssp. n., *'Parapedaliodes' nora nora* Adams, [gen. n., sp. n. 3], *'Parapedaliodes' triquetra* (Thieme)].
- Vioria, A. L., Miller, L. D. & Miller, J. Y. In press *Pedaliodes pheretias* (Hewitson) form *griseola* Weymer (Nymphalidae: Satyrinae): its identity and availability, with description of a new species. *J. Lepid. Soc.* **57** [*Pedaliodes* sp. n.].
- Vioria, A. L. & Pyrcz, T. W. 1994 A new genus, *Protopedaliodes* and a new species *Protopedaliodes kukenani* from the Pantepui, Venezuela (Lepidoptera, Nymphalidae, Satyrinae). *Lambillionea* **94**, 345-352 [*Protopedaliodes kukenani* V & P].

- Viloria, A. L. & Pyrcz, T. W. 2000 New pronophiline butterflies from the Venezuelan tepuyes (Nymphalidae: Satyrinae). *J. Lepid. Soc.* **53**, 90-98 [*Pedaliodes terramaris* V & P, *P. yutajeana* V & P, *Protopedaliodes profauna* V & P, *P. ridouti* V & P].
- Viloria, A. L. & Pyrcz, T. W. 2001 Revalidación y revisión de *Steromapedaliodes* Forster, con descripción de dos especies nuevas (Lepidoptera: Nymphalidae, Satyrinae). *Anartia* 15, 1-22 [*Steromapedaliodes sanchezi* V & P, *S. schuberti* V & P].
- Wiklund, C. & Karlsson, B. 1988 Sexual size dimorphism in relation to fecundity in some Swedish satyrid butterflies. *Am. Nat.* **131**, 132-138 [*Aphantopus hyperantus* (Linn.), *Coenonympha arcania* (Linn.), *C. hero* (Linn.), *C. pamphilus* (Linn.), *C. tullia* (Müller), *Erebia ligea* (Linn.), *Hypparchia semele* (Linn.), *Lasiommata maera* (Linn.), *L. megera* (Linn.), *L. petropolitana* (Fabricius), *Lopinga achine* (Scopoli), *Maniola jurtina* (Linn.), *Oeneis jutta* (Hübner), *Pararge aegeria* (Linn.)].