

NEW GEOGRAPHICAL RECORDS FOR THE CRITICALLY ENDANGERED BUTTERFLY  
*PARIDES PANTHONUS CASTILHOI* (PAPILIONIDAE: TROIDINI)

**Additional key words:** Threatened species, Brazil, Ilha Grande National Park, Neotropical, Conservation

In the last revision of the Brazilian threatened butterfly species, ten out of the 58 listed species belong to the family Papilionidae, of which five are Troidini (ICMBio/MMA 2018). Thus far known from a single locality, *Parides panthonus castilhoi* D'Almeida, 1967 is possibly the most critically endangered Brazilian Papilionidae (Tyler et al. 1994, Brown & Freitas 2008, Freitas et al. 2018). This butterfly was described as *Battus (Parides) castilhoi* R. F. D'Almeida, 1967 from a pair collected by Lauro Travassos Filho in the left margin of the Paraná River in the municipality of Castilho, São Paulo State, in Southeastern Brazil, in November 1964 (D'Almeida 1967). Later, in December 1991, in a visit to the same site (Fig. 1), K. S. Brown Jr. collected a single worn female feeding on flowers of *Palicourea* (Rubiaceae). In the laboratory, this female laid 15 eggs, and larvae were successfully reared on *Aristolochia arcuata* Mast. (Aristolochiaceae); the life cycle is illustrated in Tyler et al. (1994: 171). In addition, a specimen of *P. p. castilhoi* (Fig. 2a) was recently found in

the collection of the “Escola Superior de Agricultura Luiz de Queiroz” (ESALQ-USP, Piracicaba, São Paulo State, Brazil), collected at “Ribeirão Palmito” in, [16.II.1966] a site in the right margin of the Paraná River (Três Lagoas Municipality, Mato Grosso do Sul State, Central Brazil) and near the type locality (Fig. 2b).

In a recent expedition, a single female of *P. p. castilhoi* was collected inside the limits of the Ilha Grande National Park (Guaíra, Paraná State, Brazil; 24°0'S, 54°10'W), almost 450 km downstream from the original collecting locality in the Paraná River (Fig. 2a). This female was deposited in the Museu de Zoologia of the Universidade Estadual de Campinas – ZUEC (Campinas, São Paulo, Brazil), to which the five labels read (separated by transverse bars): Brazil, Paraná, Guaíra, P[arque]N[acional] de Ilha Grande, Ilha 2, 06.II.2019, M. Peczek leg. / AHBR151 / LBR1105 / DNA voucher BPU47 / ZUEC LEP 11042. The DNA 'barcode' (5' extremity of the mtDNA COI) of the specimen from Ilha Grande was sequenced using

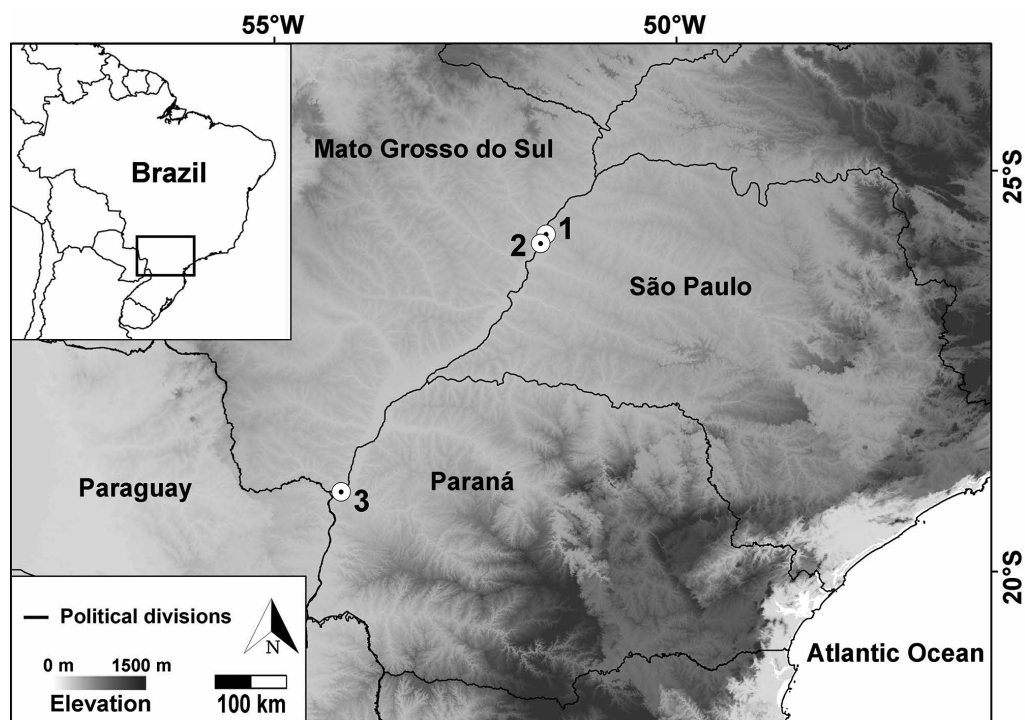


FIG. 1. Map with the three known localities of *P. panthonus castilhoi* based on all known specimens. Codes: 1, Castilho, São Paulo state; 2, Ribeirão Palmito, Três Lagoas, Mato Grosso do Sul state; 3, Ilha Grande National Park, Guaíra, Paraná, state.



FIG. 2. Two female specimens that represent new distribution records for *P. panthonus castilhoi*. **a**, specimen from Ilha Grande National Park, Guaíra, Paraná; **b**, specimen from Ribeirão Palmito, Mato Grosso do Sul. Note the more developed forewing white markings in the specimen from Mato Grosso do Sul. Scale bar = 1 cm.

standard techniques with the primers k698(F) + nancy(R) (Silva-Brandão et al. 2005), and is available on GenBank (MG600588). A neighbor-joining analysis accomplished in the program Mega v7 (Kumar et al. 2016) and using the Kimura-2-parameters model and 1000 bootstrap replicates over a previous matrix compiled to Troidini butterflies (Silva-Brandão et al. 2008), shows that the specimen clusters with other *Parides panthonus*, appearing as sister to *P. p. lysimachus* (Fig. 3). The Ilha Grande National Park includes 76,138.19 hectares of semideciduous mesophytic Atlantic Forest distributed over a large archipelago of more than 180 islands of well-preserved riverine habitats in the Paraná River, harboring several threatened species of plants and animals (ICMBio 2008). This new record is of special importance for the following reasons: (1) it expands the distribution of the species about 400 km along the Paraná River; (2) it points to the existence of a population inside a national park with large areas of suitable habitat, increasing the opportunities for conservation of the subspecies; (3) it

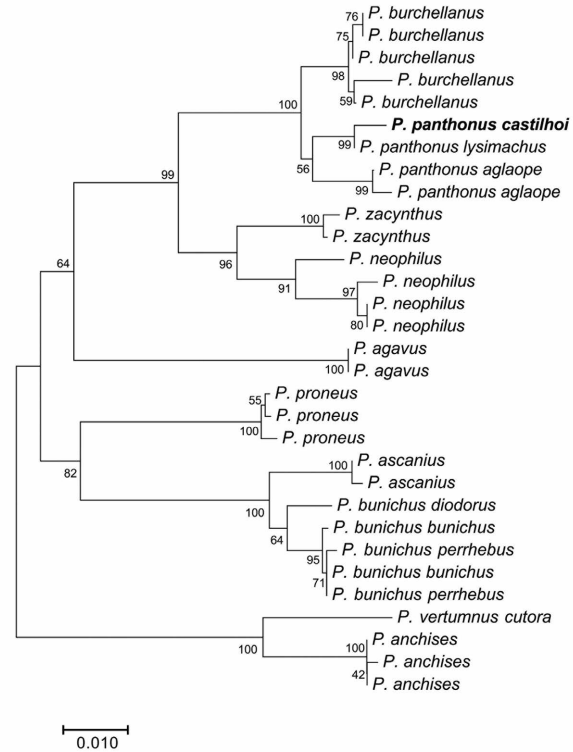


FIG. 3. A neighbor-joining tree showing the position of *P. panthonus castilhoi* (in bold). The numbers next to nodes are bootstrap values (all data and accession numbers are available in Silva-Brandão et al. 2008).

suggests that additional populations of the species might be found along the Paraná River between Castilho and Ilha Grande National Park.

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#### LITERATURE CITED

- BROWN, K. S. JR. & A. V. L. FREITAS. 2008. *Parides panthonus castilhoi*, pp. 437-438. In A. B. M. Machado, G. M. M. Drummond & A. P. Paglia (Eds.), Livro vermelho da fauna brasileira ameaçada de extinção. Fundação Biodiversitas, Belo Horizonte, Minas Gerais, MMA, Brasília, Distrito Federal.
- D'ALMEIDA, R. F. 1967. Nova espécie de Papilionidae: *Battus (Parides) castilhoi* sp. n. Rev. Bras. Entomol. 12:89-90.

- FREITAS, A. V. L., O. J. MARINI-FILHO, O. H. H. MIELKE, M. M. CASAGRANDE, K. S. BROWN JR., L. A. KAMINSKI, C. A. ISERHARD, D. B. RIBEIRO, F. M. DIAS, D. R. DOLIBAINA, E. CARNEIRO, M. UEHARA-PRADO, H. P. ROMANOWSKI, E. O. EMERY, G. M. ACCACIO, A. H. B. ROSA, J. M. S. BIZARRO, A. R. M. SILVA, M. P. GUIMARÃES, N. A. P. SILVA, L. BRAGA, & G. ALMEIDA. 2018. *Parides panthonus castilhoi* D'Almeida, 1967, pp. 102–104. In Instituto Chico Mendes de Conservação da Biodiversidade (Org.), Livro Vermelho da Fauna Brasileira Ameaçada de Extinção. Volume VII - Invertebrados, ICMBio, Brasília.
- KUMAR S., G. STECHER, & K. TAMURA. 2016. MEGA7: Molecular Evolutionary Genetics Analysis Version 7.0 for Bigger Datasets. *Mol. Biol. Evol.* 33:1870–1874.
- ICMBIO. 2008. Plano de manejo para o Parque Nacional de Ilha Grande. 752 pp. Available at: [http://www.icmbio.gov.br/porta/images/stories/docs-planos-de-manejo/parna\\_ilha\\_grande\\_pm.pdf](http://www.icmbio.gov.br/porta/images/stories/docs-planos-de-manejo/parna_ilha_grande_pm.pdf) (last access: May 1, 2019).
- ICMBIO/MMA. 2018. Livro vermelho da fauna brasileira ameaçada de extinção: Volume VII - Invertebrados. 727 pp. In Instituto Chico Mendes de Conservação da Biodiversidade. (Org.), Livro Vermelho da Fauna Brasileira Ameaçada de Extinção. ICMBio, Brasília. 4162 pp.
- SILVA-BRANDÃO K. L., A. M. L. AZEREDO-ESPIN, & A. V. L. FREITAS. 2008. New evidence on the systematic and phylogenetic position of *Parides burchellanus* (Lepidoptera: Papilionidae). *Mol. Ecol. Res.* 8:502–511.
- , A. V. L. FREITAS, A. V. Z. BROWER, & V. N. SOLFERINI. 2005. Phylogenetic relationships of the New World Troidini swallowtails (Lepidoptera: Papilionidae) based on COI, COII, and EF-1 alpha genes. *Mol. Phylogenet. Evol.* 36:468–483.
- TYLER, H., K. S. BROWN JR., & K. WILSON. 1994. Swallowtail butterflies of the Americas: a study in biological dynamics, ecological diversity, biosystematics, and conservation. Scientific Publishers, Gainesville, Florida. 376 pp.
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