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Geographic distribution, habitat, colour pattern variability and synonymy of the Amazon killifish *Melanorivulus schuncki* (Cyprinodontiformes: Rivulidae)

Pedro H. N. Bragança*, Pedro F. Amorim* and Wilson J. E. M. Costa*

Melanorivulus schuncki is first recorded for a vast geographic area of the eastern Brazilian Amazon between Rego Grande River, Amapá state, and the lower Amazonas River basin, Pará state. It was found in shallow parts of clear and black water streams, as well as in broad flooded areas, both in the edge of the forest and in open savannah. Some variability in colour patterns of unpaired fins in males is first recorded. *Rivulus albae* is formally recognized as a junior synonym of *Melanorivulus schuncki*.

Melanorivulus schuncki é registrada pela primeira vez para uma vasta área geográfica do leste da Amazônia brasileira entre o Rio Rego Grande, Estado do Amapá, e a bacia do baixo Rio Amazonas, Estado do Pará. Ela foi encontrada em partes rasas de riachos de água clara e negra, assim como em amplas áreas alagadas, tanto na borda de floresta como em savana aberta. Uma pequena variabilidade em padrões de colorido de nadadeiras ímpares em machos é registrada pela primeira vez. *Rivulus albae* é formalmente reconhecida como um sinônimo júnior de *Melanorivulus schuncki*.

Introduction

During a faunal survey of the Amapá state, northern Brazil, in February 2010, the biologists Andre De Luca and Fábio Schunck found a new species of *Melanorivulus*, then considered as a subgenus of *Rivulus*. That species, subsequently named as *Rivulus schuncki* by Costa & De Luca (2011), was collected in a stream near the village of Vila Nova, Anauerapucu River drainage, Amazonas River basin. This was the first record for *Melanorivulus*, now considered as a valid genus (Costa, 2011), north of the Amazonas River. Subsequently, two

of us (PHNB and PFA) found several populations of *M. schuncki* along a vast geographic area both north and south of the Amazonas River, including the Amazonas River basin itself and small isolated coastal basins north of the Amazonas River. More recently, the same taxon was described as a new species, *Rivulus albae* by Valdesalici et al. (2011). The objectives of the present study are: to extend the geographic distribution of *M. schuncki* on the basis of new collections, to record some variability in habitat and colour patterns, and to formally recognize *R. albae* as a junior synonym of *M. schuncki*.

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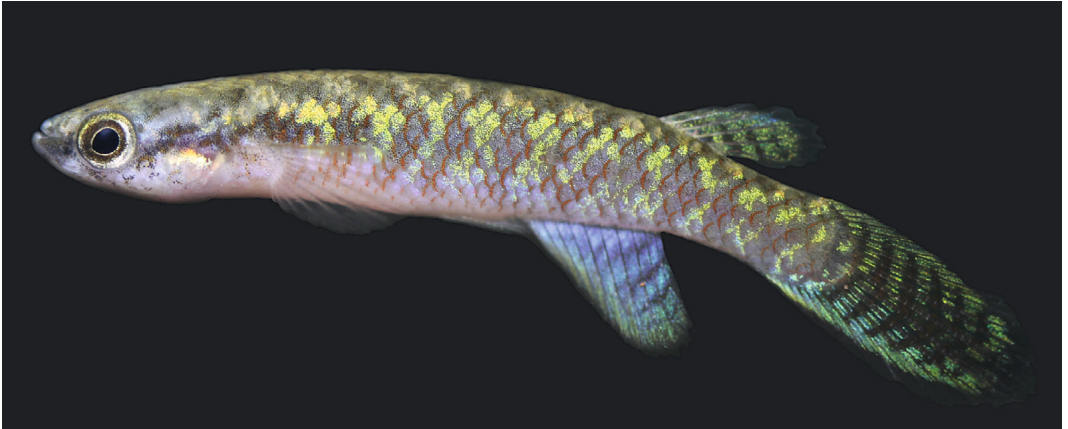


Fig. 1. *Melanorivulus schuncki*, UFRJ 8059, male; Brazil: Estado do Amapá: Calçoene (a few hours after collection).

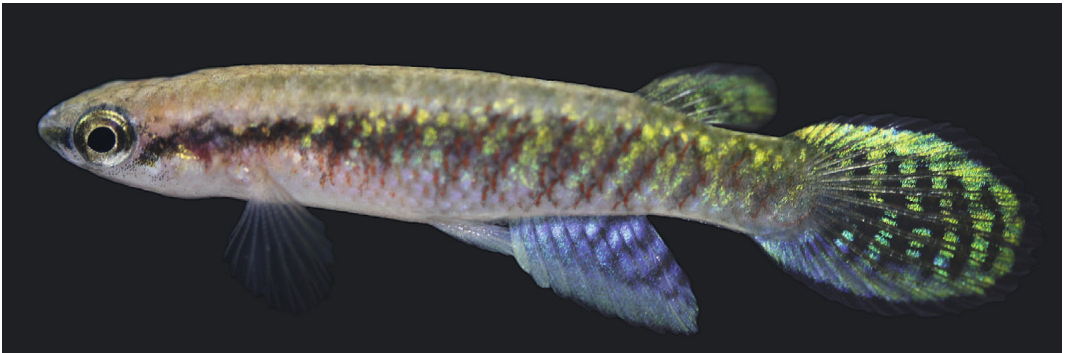


Fig. 2. *Melanorivulus schuncki*, UFRJ 7988, male; Brazil: Estado do Pará: Salvaterra, Marajó Island (a few hours after collection).

Material and methods

Specimens were fixed in formalin just after collection, for a period of 10 days, and then transferred to ethanol 70 % and deposited in the ichthyological collection of the Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro (UFRJ). Colour patterns were analysed based on photos of live males and females from each sampled population, taken just after collection.

Melanorivulus schuncki (Costa & De Luca, 2011) (Figs. 1–2)

Rivulus schuncki Costa & De Luca, 2011: 290 (type locality: stream near Vila Nova, road AP 030, Anauerapucu River drainage, Amazonas River basin, 0°8'23" N 51°32'14" W, Estado do Amapá, Brazil; holotype: UFRJ 6766, male, 24.4 mm SL).

Rivulus albae Valdesalici, García & Nielsen, 2011: 106 (type locality: Pozo Bacabae, 1°44.270' N 50°50.904' W, Lago Comprido floodplains, Estado do Amapá, Brazil; holotype: MZUSP 108783, male, 15.4 mm SL).

Material examined. All localities in Brazil: Estado do Amapá: UFRJ 6766, holotype; UFRJ 6767, 4 paratypes; UFRJ 6768, 6 paratypes; stream near Vila Nova, road

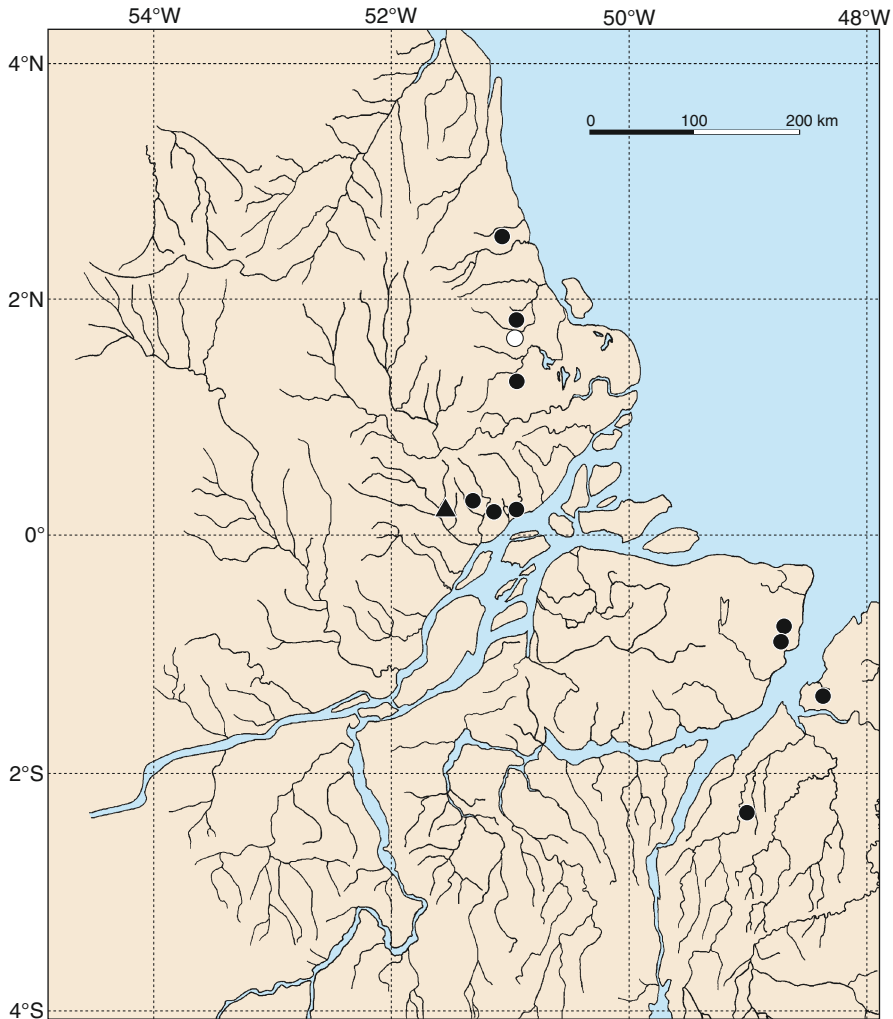


Fig. 3. Geographic distribution of *Melanorivulus schunckii*: ▲ type locality; ○ type locality of *R. albae*; ● other localities.

AP 030, Anauerapucu River drainage, Amazonas River basin, 0°08'23"N 51°32'14"W; A. C. De Luca & F. Schunck, 7 Feb 2010. – UFRJ 8020, 3; stream and swamp 3 km of Matapi River, AP-030 road to Laranjal do Jari, Macapá municipality, Amazonas River basin, 0°13'39"N 51°11'26"W; P. Bragança & P. Amorim, 9 Jan 2011. – UFRJ 8022, 25; buriti palm swamp 8 km from Matapi River, AP-30 road to Laranjal do Jari, Macapá municipality, Amazonas River basin 0°13'05"N 51°12'58"W; P. Bragança & P. Amorim, 9 Jan 2011. – UFRJ 8016, 33; Curiaú Lake, AP-70 road to Vila de Santo Antônio da Pedreira, Macapá municipality, Amazonas River basin, 0°08'54"N 51°02'26"W; P. Bragança & P. Amorim, 10 Jan 2011. – UFRJ 8059, 2; igarapé tributary of Rego Grande River near Cunani archeologic site, Calçoene

municipality, Rego Grande River basin, 2°37'12"N 51°00'09"W; P. Bragança & P. Amorim, 12 Jan 2011. – UFRJ 8030, 10; floodplain close to the road BR-156 to Oiapoque, 4 km before Tartarugal, Tartarugalzinho municipality, Tartarugal River basin, 1°21'45"N 50°55'34"W; P. Bragança & P. Amorim, 16 Jan 2011. – UFRJ 8014, 19; Igarapé do Henrique, Pracuúba municipality, Amapá Grande River basin, 1°45'55"N 50°52'38"W; P. Bragança & P. Amorim, 16 Jan 2011.

Estado do Pará: UFRJ 7981, 2; bridge on PA-252 road over Ubá River, a tributary of Moju River, Moju municipality, Amazonas River basin, 2°06'09"S 48°46'54"W; P. Bragança & P. Amorim, 19 Jan 2011. – UFRJ 7994, 22; Utinga Lake, Belém, Amazonas River basin; D. Castro, 12 Oct 2010. – UFRJ 7986, 5; Igarapé do



Fig. 4. Types of habitats where *Melanorivulus schuncki* was collected: **a**, Curiaú Lake floodplain; **b**, Ubá River; **c**, igarapé near Salvaterra; **d**, butiti palm swamp near Matapi River.

Maruacá, PA-154 road to Camará port, Marajó island, Salvaterra municipality, Amazonas River basin, 0°52' 56" S 48°35'38" W; P. Bragança & P. Amorim, 23 Jan 2011. – UFRJ 7988, 11; igarapé close to the PA-154 road near km 23, Marajó Island, Salvaterra municipality, Amazonas River basin, 0°46'53" S 48°32'15" W; P. Bragança & P. Amorim, 23 Jan 2011.

Colour pattern variability. The colour pattern recorded for new populations is basically the same as described by Costa & De Luca (2011), except for unpaired fins in males, which may have some variability even at population level (Figs. 1–2). The dorsal fin may have oblique dark grey bars on the posterior portion of the fin. The anal fin usually has oblique reddish gray bars, which may be crossing the whole fin or be restricted to the posterior portion. The caudal fin usually has a distinct dark brown margin, which may be pale in some specimens.

Geographic distribution. Eastern Brazilian Amazon, between Rego Grande River, Amapá state, and the lower Amazonas River basin, both north and south of the main river channel, including the Marajó Island, Pará state (Fig. 3).

Habitat (Figs. 4a–b). *Melanorivulus schuncki* was generally found near stream banks, in shallow places (5–50 cm), in sites where the water had high transparency. It was usually found in lentic streams, but sometimes it was also found near the bank of lotic streams, where the environment conditions resemble those of lentic water habitats. In addition, it was also found in the shallow parts of the Curiaú lake, a peculiar environment formed only during the rainy season, from January to June when Curiaú River overflows from its main channel. In localities north of the Amazonas River, the streams were directly exposed to sunlight as they flow over a savanna vegetation region characterized by the presence of the buriti palm



Mauritia flexuosa, and the water was hyaline or slightly yellow. In localities south of the Amazonas River, *M. schuncki* was always found close to the forest border, in lentic black water streams, notable by the high water transparency. Both northern and southern populations are often sympatric with the poeciliid *Fluviophylax palikur*, the cichlid *Laetacara* sp., juveniles of the erythrinid *Hoplerythrinus uniteniatus* and a great variety of lebiasinid species.

Discussion

Melanorivulus schuncki was first recorded only from its type locality in the Anauerapucu river drainage, north of the Amazon River channel (Costa & De Luca, 2011). Further field studies demonstrated that *M. schuncki* is widespread in the Eastern Amazon of Brazil, including the Marajó Island, occurring both along drainages connected to the Amazonas River and isolated rivers basins north of the Amazonas mouth, in the Amapá state. The northernmost record is a stream tributary to the Rego Grande River (2°37'12" N 51°0'9" W), a small isolated river basin draining the Amapá state of Brazil, and the southernmost record is the Ubá River, a tributary of the Moju River, Amazonas River basin, in Pará state (2°6'9" S 48°46'54" W).

The type locality of *R. albae* is placed within the geographic range of *M. schuncki* (Fig. 3) as well as characters described and illustrations provided for *R. albae* by Valdesalici et al. (2011) are identical to the characters exhibited by *M. schuncki*. Therefore, the name *Rivulus albae*

Valdesalici, García & Nielsen, 2011 is here treated as a junior synonym of *M. schuncki*, since the latter name has chronological priority over the former. The name *R. schuncki* was first available in the printed version of the fourth fascicle of volume 21 of *Ichthyological Exploration of Freshwaters*, which was published in March 2011 (M. Kottelat, pers. comm.), whereas the name *R. albae* first appeared in the first fascicle of volume 61 of *Vertebrate Zoology* published in June 2011.

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Pangio ammophila (photograph by Ralf Britz)
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