

## A new miniature killifish of the genus *Laimosemion*, subgenus *Owiye*, from the Negro river drainage, Brazilian Amazon (Cyprinodontiformes: Rivulidae)

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*Laimosemion jauaperi*, new species, from the Jauaperi river drainage, central Brazilian Amazon, is described. It was found in a shallow, black-water pool adjacent to a stream within dense forest. *Laimosemion jauaperi* differs from all other rivulines by possessing four pelvic-fin rays in the female (vs. 5–9), four branchiostegal rays (vs. 5–6) and the presence of a distinctive anterior white zone on the anal fin (vs. absence). *Laimosemion jauaperi* is hypothesized to be closely related to *Laimosemion uatuman* from the Uatumã river drainage by both, uniquely among rivulines, sharing the presence of caudal fin dark coloured with a contrasting distal white band in males.

### Introduction

A great biological diversity has been reported for the Amazon, the largest rain forest in the world, but only in recent years the occurrence of certain organisms living in special habitats has been first reported. This is the case of the small killifishes of the subgenus *Owiye*, presently placed in the genus *Laimosemion*, which are uniquely found in shallow pools within the dense forest (Costa, 2006, 2011). Whereas Amazon killifishes of the genus *Anablepsoides* are frequent in ichthyological collections because they occur in streams and lakes at the same place as other freshwater teleosts, species of *Owiye*, even when sympatric to species of *Anablepsoides*, are rarely found because they inhabit isolated shallow pools not sampled by most fish collectors (e.g., Costa, 2004a–c). Among the six species endemic to the Amazonas

river basin, only *L. rectocaudatus*, from the western Amazonas river basin in Peru, was not described in the last 10 years (Fels & de Rham, 1981). The other species described for the Amazonas river basin are: *L. kirovskyi* and *L. uatuman* from the central Brazilian Amazon (Costa, 2004a–b), and *L. amanapira*, *L. romeri*, and *L. uakti* from the upper Negro river drainage in Brazil (Costa, 2003, 2004c). A new species from the Negro river drainage is herein described.

### Material and methods

Material is deposited in UFRJ, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro. Morphological characters used in the description below were obtained from specimens fixed in formalin just after collection, for a period

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of about ten days, and then transferred to 70 % ethanol. Descriptions of colour patterns were based on photographs of both known specimens taken in small aquaria just after collection. Measurements and counts follow Costa (1995). Measurements are presented as percentages of standard length (SL), except for those related to head morphology, which are expressed as percentages of head length. Fin-ray counts include all elements. Number of vertebrae and gill-rakers were recorded only from the cleared and stained specimen; the compound caudal centrum was counted as a single element. The osteological preparation was made according to Taylor and Van Dyke (1985). Terminology for cephalic neuromast series Costa (2001). The abbreviation c&s means specimens cleared and stained for bone and cartilage.

*Laimosemion jauaperi*, new species  
(Figs. 1–2)

**Holotype.** UFRJ 9277, 18.9 mm SL, male; Brazil: Estado de Roraima: Município de Rorainópolis: stream about 35 km W of Jundiá, road BR-431, Jauaperi river drainage, itself a part of the lower section of the Negro river drainage, Amazonas river basin, 0°13'45"S 60°59'30"W, P. H. N. Bragança, F. P. Ottoni & E. Henschel, 15 September 2012.

**Paratype.** UFRJ 9278, 15.2 mm SL, female (c&s); collected with holotype.

**Diagnosis.** *Laimosemion jauaperi* is distinguished from all other congeners and all species of other genera of the subfamily Rivulinae by having 4 pelvic-fin rays in the female and 5 in male (vs. 5–7 in both sexes of other congeners, 6–9 in other rivulines), four branchiostegal rays (vs. 5–6), and anterior portion of anal fin, involving the space occupied by the first two fin rays, white in both sexes. It also differs from all other species of the genus, except *L. uatuman*, by having the caudal fin dark coloured in males (dark crimson red in *L. jauaperi*, dark grey in *L. uatuman*) with a contrasting distal white band (vs. caudal fin never dark coloured, distal white band absent). *Laimosemion jauaperi* is further distinguished from *L. uatuman* by having caudal fin dark crimson red in both sexes (vs. dark grey in males, hyaline in females) and five pelvic-fin rays in male and four in female (vs. six in both sexes).

**Description.** Morphometric data appear in Table 1. Dorsal profile slightly convex from snout to end of dorsal-fin base, nearly straight on caudal peduncle. Ventral profile gently convex from lower jaw to end of anal-fin base, about straight on caudal peduncle. Body slender, subcylindrical anteriorly, slightly deeper than wide, to compressed posteriorly. Greatest body depth at vertical just in front to pelvic-fin base. Jaws short, snout blunt.

Extremity of dorsal and anal fins rounded. Caudal fin oval; rays with short filamentous extensions beyond posterior caudal-fin margin in male. Pectoral fin rounded, posterior margin reaching vertical at about 70 % of length between pectoral-fin and pelvic-fin bases. Pelvic fin small, tip reaching urogenital papilla in male, reaching anus in female. Pelvic-fin bases medially in close proximity. Dorsal-fin origin on vertical just posterior to anal-fin base; second proximal radial of dorsal fin between neural spines of 19<sup>th</sup> and 20<sup>th</sup> vertebrae, first proximal radial of anal fin between pleural ribs of 14<sup>th</sup> and 15<sup>th</sup> vertebrae. Dorsal-fin rays 6–7; anal-fin rays 8–9; caudal-fin rays 24; pectoral-fin rays 12; pelvic-fin rays 5 in male, 4 in female.

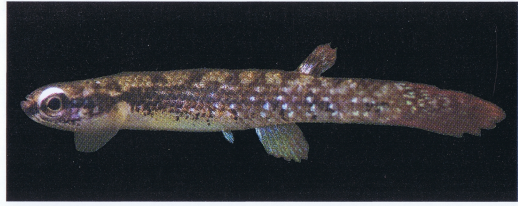
Scales small, cycloid. Body and head entirely scaled, except anterior ventral surface of head. Body squamation extending over anterior 20 % of caudal-fin base; no scales on dorsal and anal-fin bases. Frontal squamation irregularly arranged, with small scale with whole margin free just

**Table 1.** Morphometric data of *Laimosemion jauaperi*.

	holotype male	paratype female
Standard length (mm)	18.9	15.2
<b>Percent of standard length</b>		
Body depth	16.9	16.7
Caudal peduncle depth	12.6	11.5
Predorsal length	78.4	73.6
Prepelvic length	50.7	54.7
Length of dorsal-fin base	7.2	6.0
Length of anal-fin base	14.1	10.1
Caudal-fin length	35.9	37.3
Pectoral-fin length	19.1	18.3
Pelvic-fin length	9.0	5.8
Head length	22.9	24.7
<b>Percent of head length</b>		
Head depth	64	55
Head width	81	78
Eye diameter	38	38



**Fig. 1.** *Laimosemion jauaperi*, UFRJ 9277, holotype, male, 18.9 mm SL: Brazil: Roraima: Rorainópolis.



**Fig. 2.** *Laimosemion jauaperi*, UFRJ 9278, paratype, female, 15.2 mm SL: Brazil: Roraima: Rorainópolis.

posterior to snout. Longitudinal series of scales 32; transverse series of scales 7; scale rows around caudal peduncle 16. No contact organs on flank and fins.

Cephalic neuromasts: supraorbital (2+1)+3, parietal 1, rostral 1, infraorbital 1+13+1, preorbital 2, otic 1, post-otic 1, supratemporal 1, median opercular 1, ventral opercular 1, preopercular 2+3, mandibular 2+1, lateral mandibular 2, parmandibular 1. Two neuromasts on caudal-fin base.

Basihyal subtriangular, greatest width about 35 % of length; basihyal cartilage about 20 % of total length of basihyal. Four branchiostegal rays. Second pharyngobranchial teeth absent. Gill-rakers on first branchial arch 1+7. Vomerine teeth absent. Dermosphenotic absent. Ventral process of posttemporal absent. Total vertebrae 31.

**Colouration.** Male. Flank pale purplish grey, with longitudinal rows of irregularly alternating pink and silver spots, rows limited by horizontal grey lines. Dorsum pale golden with sinuous dark brown outline. Venter light grey. Side of head purplish grey, transverse black bar through chin. Iris light yellow, dorsal portion silver. Dorsal fin yellow, with sub-basal broad dark brown stripe, basal portion white. Anal fin yellow, basal portion light blue, anterior portion including first two rays yellowish white. Caudal fin dark crimson red, posterior margin pinkish white. Pectoral fin yellowish hyaline. Pelvic fin yellowish white.

Female. Similar to male, but differing by having paler colours and ventral portion of flank with black dots, dark brown stripe between posterior margin of orbit and humeral region, tip of dorsal fin and posterior part of anal fin pale pink, anterior margin of anal fin and pelvic fin bluish white, and caudal fin without posterior white band.

**Distribution.** Known only from the type locality, a pool adjacent to stream about 35 km W of Jundiá,

road BR-431, Jauaperi river drainage, Roraima state, Brazil.

**Etymology.** The name *jauaperi* is a reference to the occurrence of the new species in the Jauaperi river drainage. A noun in apposition.

## Discussion

The greatest species diversity of *Owiyeye* is concentrated in the northern South American area known as Guiana Shield (e.g., Costa, 2006), which is an ancient geologic region underlying French Guiana, Suriname, Guyana, northern Brazil, south-eastern Venezuela and eastern Colombia. The Guiana Shield concentrates a rich and highly endemic biodiversity (e.g., Funk & Kelloff, 2009), shaped by the complex palaeogeographical history of northern South America (e.g., Wesselingh et al., 2010). The present limited access and the low population densities are responsible for huge undisturbed areas where biological inventories are still rare (Funk & Kelloff, 2009), thus hiding numerous unknown taxa.

Five species of *Owiyeye* were discovered as a result of recent expeditions to rivers draining the Brazilian part of the Guiana Shield (Costa, 2003, 2004a–c, present study), but knowledge about their relationships is still scarce. *Laimosemion jauaperi* seems to be closely related to *L. uatuman*, another miniature species occurring in the Uatumā river drainage, middle Amazonas river basin (Costa, 2004b); both species share a unique colour pattern consisting of caudal fin dark coloured with a contrasting distal white band in males. *Laimosemion jauaperi* and *L. uatuman* are possibly closely related to *L. kirovskiyi*, a species from the lower Negro river drainage, central Brazilian Amazon (Costa, 2004b), by all the three species sharing a similar colour pattern of flank in males, comprising longitudinal rows of ir-

regularly alternating pink and silver spots. *Laimosemion kirovskyi* has a distinctive light orangish yellow band on the posterior margin of the caudal fin that may be homologous to the caudal white band of *L. jauaperi* and *L. uatuman*. *Laimosemion jauaperi* also differs from *L. kirovskyi* by having 12 pectoral-fin rays (vs. 15), five pelvic-fin rays in male, four in female (vs. six in both sexes), and absence of bars on the caudal fin in males (vs. presence of red bars).

This study indicates two morphological characters not reported previously for rivulines. The first one is a possible sexual dimorphism in the morphology of the pelvic fin, which is well-developed and has five rays in the male, and is minute, with four rays in the female. The second one is the presence of distinctively coloured anterior portion of the anal fin in both sexes, although more conspicuous in the male. Due to the small sample examined (one male and one female), it is not possible to surely assert that the pelvic fin is sexually dimorphic in the species, as well as it is not possible to infer about the functionality of a distinctively coloured anterior portion of the anal fin, in an area just posterior to the supposed dimorphic pelvic fin. However, it is important to note that the number of pelvic-rays is not variable among other species of *Owiyeye*. The sample comprising only two specimens, obtained after intensive efforts during over one hour by three collectors, is a result of the hardly accessible habitat of the new species.

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