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The Electric Glass Knifefishes of the *Eigenmannia trilineata* species-group (Gymnotiformes: Sternopygidae): monophyly and description of seven new species

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Eigenmannia trilineata López and Castello, 1966 (Sternopygidae) was described from the Río de La Plata basin and subsequently cited from most South American river basins. Questions about the limits of this species raise the possibility of the occurrence of undescribed species misidentified as *E. trilineata*. Herein we propose the *Eigenmannia trilineata* species group for species that share the presence of the superior medial stripe on the flank. This group comprises: ***Eigenmannia antonioi* sp. nov.**, from the Rio Anapu, Rio Amazonas basin; ***Eigenmannia desantanai* sp. nov.**, from the Rio Cuiabá, Rio Paraguay basin; ***Eigenmannia guairaca* sp. nov.**, from the Riacho Água do Ó, upper Rio Paraná basin; ***Eigenmannia matintapereira* sp. nov.**, from the Rio Uneiuxi and Rio Urubaxi, Rio Negro basin; *Eigenmannia microstoma* (Reinhardt, 1852), from the Rio São Francisco basin; ***Eigenmannia muirapinima* sp. nov.**, from small tributaries of the Rio Amazonas; ***Eigenmannia pavulagem* sp. nov.**, from the tributaries of Rio Capim, Rio Guamá basin; *E. trilineata*, from the lower Rio Paraná basin and Río de La Plata basin; *Eigenmannia vicentespelaea* Triques, 1996, from São Vicente I and II caves, Rio Tocantins basin; and ***Eigenmannia waiwai* sp. nov.**, from the Rio Trombetas basin. These species can be distinguished from each other by unique sets of meristics, morphometrics, osteological and colour pattern features.

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ADDITIONAL KEYWORDS: *Eigenmannia* – species group – taxonomy.

INTRODUCTION

Species of the electric glass knifefish genus *Eigenmannia* (Sternopygidae) are small to medium sized omnivores (up to 300 mm of TL), with insectivorous trends (Soares, 1979; Alves-Gomes, 1997; Giora, Fialho & Dufech, 2005). They are widely distributed across the Neotropical region, from the Pacific slope and Río Magdalena basins and from the Orinoco and the Amazon to the Río de La Plata basin (Albert & Crampton, 2005). Due to their attractive translucent appearance, some species of the genus (*Eigenmannia* cf. *virescens*) are common in the aquarium trade (Albert, 2003), and have been used as a model in ecological (Kirschbaum, 1979; Giora *et al.*, 2005; Giora & Fialho, 2009) and neuroethological studies (Hopkins, 1972, 1974; Kramer, 1983, 1985, 1999; Hagedorn & Heiligenberg, 1985); however, their complex taxonomic history is yet to be thoroughly studied.

The striped species of *Eigenmannia*, herein called the *Eigenmannia trilineata* species group, include *Eigenmannia microstoma* (Reinhardt, 1852), *Eigenmannia trilineata* López and Castello, 1966,

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Eigenmannia vicentespelaea Triques, 1996, and seven new species, described herein. The first of the species now assigned to this group was described by Reinhardt (1852) as *Sternopygus microstomus* based on material collected in Lagoa Santa, Brazil. Subsequently, Eigenmann (1894) restricted *Sternopygus* to species with a free orbital rim and proposed a new genus, *Cryptops*, for the species without a free orbital rim. Jordan & Evermann (1896) noted that *Cryptops* was preoccupied in Annelida, in Myriapoda by Leach (1817), and Coleoptera by Schoenherr (1823) and Solier (1851). They thus proposed *Eigenmannia* for this genus. The first overview that included all current species of *Eigenmannia* was completed by Ellis (1913), in which it was assumed that some previous species, including *E. microstoma*, were varieties of *E. virescens*. López & Castello (1966) described the second species included in this group, *E. trilineata*, based on material collected in Nuñez, Río de La Plata, Argentina; however, Mago-Leccia (1978) judged the latter species to be a variety of *E. virescens*, but subsequently in the overview of Gymnotiformes, Mago-Leccia (1994) revalidated *E. microstoma* and *E. trilineata* without any comment. Two years later, *E. vicentespelaea* was described from the São Vicente cave in Goiás, Brazil, by Triques (1996).

Eigenmannia trilineata and *E. virescens* have been applied to samples from different drainages in South America (e.g. Triques, 1996, 1998; Ferreira *et al*., 2007; Lucinda *et al*., 2007; Montag *et al*., 2008); however, cytogenetic studies provide evidence of a great variety of cytotypes in the species of *Eigenmannia* (Almeida-Toledo *et al*., 2002; Silva *et al*., 2009; Fernandes *et al*., 2010; Moysés *et al*., 2010). Thus, this raises doubts about the names applied to different populations of *E. trilineata* and indicates potential undescribed diversity.

Recent taxonomic efforts on species and species complexes in the Gymnotiformes revealed pronounced unknown diversity (Vari, de Santana & Wosiacki, 2012; de Santana & Vari, 2013). As an initial effort to clarify the taxonomy of *Eigenmannia*, we analysed specimens fitting the traditional concept of *E. trilineata* and investigated whether they represent a single widespread species or if unexplored diversity exists under that name. The aims of this study are to: (1) investigate putative synapomorphies for the *E. trilineata* species group; (2) analyse and delimit the morphologically recognizable species within the species group; (3) describe seven new species in the *E. trilineata* species group.

MATERIAL AND METHODS

Measurements were taken point-to-point to the nearest 0.1 mm with digital calipers under a stereomicroscope, preferably on the left side. Measurements and abbreviations cited in this manuscript are: total length (TL), the distance from the tip of the snout to the distal margin of the caudal filament; length to end of anal fin (LEA), from the tip of the snout to the insertion of the last anal-fin ray; head length (HL), from the tip of the snout to the posterior margin of the branchial opening; preanal distance, from the tip of the snout to the insertion of the first anal-fin ray; prepectoral distance, from the tip of the snout to the insertion of the first pectoral-fin ray; snout to anus, from the tip of the snout to the anterior margin of the anus; body depth at pectoral fin, the vertical distance between the dorsal and ventral margins of the body at the vertical, passing through tip of longest pectoral-fin ray; body depth at anal fin, the vertical distance from dorsal margin of the body to insertion of the first anal-fin ray; body width, measured across at the vertical, passing through the medial portion of the pectoral fin; anal-fin length, from the first to the last anal-fin ray; pectoral-fin length, from the base of the first pectoral-fin ray to the distal extremity of the longest pectoral-fin ray; caudal filament length, from the last anal-fin ray to the distal extremity of the caudal filament; caudal filament depth, the vertical distance from dorsal and ventral margin of the caudal filament immediately posterior to the insertion of the last anal-fin ray; caudal filament width, measured across the caudal filament immediately posterior to the insertion of the last anal-fin ray; snout length, from the tip of the snout to the anterior margin of orbit; internasal distance, measured from posterior margin of the anterior nostril to anterior margin of the posterior naris; snout to posterior naris distance, the distance from the tip of the snout to the anterior margin of the posterior naris; posterior naris to orbit distance, the distance from the posterior margin of the posterior naris to the anterior margin of the orbit; internarial width, the distance between the inner margins of the anterior nare; orbital diameter, horizontal distance between opposing margins; postorbital distance, from the posterior margin of orbit to posterior margin of the branchial opening; opercular opening, between upper and lower margins of the opercular opening; suborbital depth, from ventral margin of the orbit to ventral margin of the head; interorbital distance, the shortest distance between dorsal margins of the orbits; head width at opercle, horizontal distance measured across the opercle; head width at orbits, horizontal distance measured across the medial margins of orbits; head depth at supraoccipital, measured from the posterior limit of the supraoccipital bone to the ventral margin of the body; head depth at orbit, measured between the dorsal margin and ventral margins of the head along the vertical, through the middle portion of the orbit; maxilla length, from the tip to the posterior margin of the maxilla; oral width, the smallest distance between the rictus of each side.

Figure 1. Scanning electron micrographs (SEMs) of infraorbitals 1 + 2, lateral view, anterior to left: A, ***Eigenmannia antonioi* sp. nov.** (MPEG 10182, 88.7 mm LEA); B, ***Eigenmannia matintapereira* sp. nov.** (MZUSP 109618, 118.3 mm LEA). Arrow indicates the posterodorsal expansion. Abbreviations: DPE, depth of the posterodorsal expansion; LIB, length of the infraorbital bones 1 + 2. Scale bar: 1 mm.

Counts were obtained under a stereomicroscope, preferably on the left side. Counts are: pectoral-fin rays, anal-fin rays, number of longitudinal series of scales above the lateral line (counted at the highest point along the body, approximately in line with the distal portion of the longest pectoral-fin ray), and number of perforated lateral-line scales from the first perforated lateral-line scale to the insertion of the last anal-fin ray. In descriptions, the frequencies of each count are presented in parentheses and holotype data are indicated with an asterisck. In the pectoral- and anal-fin ray counts, the unbranched rays are represented by lower case Roman numerals and branched rays are indicated by Arabic numerals. Specimens were cleared and stained (CS) following Taylor & Van Dyke (1985). Infraorbital and maxillary bones were cleaned of soft tissues for scanning electron micrograph images by immersion for less than 5 minutes in <1% sodium hypochlorite solution, and then air-dried. The number of precaudal vertebrae includes the four vertebrae of the Weberian apparatus. The numbers of caudal and total vertebrae are not provided, as specimens with damaged or regenerated posterior portions of the body were selected for clearing and stained. The nomenclature of osteological characters was based on Hilton *et al*. (2007) and de Santana & Vari (2010), except for the nomenclature of the proximal tip of the posteroventral abdominal bone, which follows Albert (2001), and that of the infraorbitals, which follows Mago-Leccia (1978). In addition, infraorbitals 1 + 2 shows a laminar posterodorsal expansion. This expansion is interspecifically variable; therefore, the posterodorsal expansion was analysed as the proportion of the total length of infraorbitals 1 + 2. Then, the depth of the posterodorsal expansion (DPE) was measured from base to distal limits, and the total length of infraorbital bones 1 + 2 (LIB) was measured from its anterior portion, near to the first osseous arch, to the posterior limit, posterior to the third osseous arch (Fig. 1).

Members of the *E. trilineata* species group have a pigmentation pattern of four longitudinal dark stripes: the lateral line stripe is the dark stripe along the lateral line; the superior medial stripe is the concentration of small separate chromatophores with diffuse margins located below the lateral line; the inferior medial stripe is the dark stripe located over the proximal portion of anal-fin pterygiophores; and the anal-fin base stripe refers to the dark stripe located on the base of the anal fin.

Institutional abbreviations: AMNH, American Museum of Natural History, New York; BMNH, The Natural History Museum (formerly British Museum of Natural History), London; FMNH, Field Museum of Natural History, Chicago; IAvH, Institute Alexander von Humboldt, Bogotá; INPA, Instituto Nacional de Pesquisas da Amazônia, Manaus; LBP, Laboratório de Biologia e Genética de Peixes, Universidade Estadual Paulista, Botucatu; MACN, Museo Argentino de Ciências Naturales Bernadino Rivadavia, Buenos Aires; MCNIP, Museu de Ciências Naturais – Ictiologia, Pontifícia Universidade Católica de Minas Gerais, Belo Horizonte; MCP, Museu de Ciências e Tecnologia, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre; MNRJ, Museu Nacional do Rio de Janeiro, Rio de Janeiro; MPEG, Museu Paraense Emílio Goeldi, Belém; MZUSP, Museu de Zoologia da Universidade

KEY TO THE SPECIES OF *EIGENMANNIA TRILINEATA* SPECIES GROUP

1a. Pectoral fin dusky or with conspicuous dark blotch; anal fin uniformly darkened……
……***Eigenmannia matintapereira* sp. nov.** (Rio Uneiuxi and Rio Urubaxi, Rio Negro basin, Brazil)
1b. Pectoral and anal fins hyaline……2
2a. Mouth subterminal……3
2b. Mouth terminal……4
3a. Body depth at vertical through the tip of the longest pectoral-fin ray, 14.9–18.7% LEA; nine or ten longitudinal series of scales above lateral line……
……***Eigenmannia waiwai* sp. nov.** (Rio Mapuera and Rio Trombetas, Rio Trombetas basin, Brazil)
3b. Body depth at vertical through the tip of the longest pectoral-fin ray, 10.5–14.5% LEA; seven or eight longitudinal series of scales above lateral line……
……*Eigenmannia vicentespelaea* (caves of São Vicente I and II, Rio Tocantins basin, Brazil)
4a. Suborbital depth, 29.9–46.6% HL……5
4b. Suborbital depth, 18.2–28.9% HL……6
5a. Total number of premaxillary teeth 31–33, arranged in four rows; total number of dentary teeth 31; length of coronomeckelian bone 20% length of Meckel's cartilage……
……*Eigenmannia trilineata* (Río Yabebury and Río San Javier, Rio Paraná basin; and Río de La Plata basin, Argentina)
5b. Total number of premaxillary teeth 16 arranged in three rows; total number of dentary teeth 16; length of coronomeckelian bone 45% length of Meckel's cartilage……
……*Eigenmannia microstoma* (Rio São Francisco basin, Brazil)
6a. Inferior medial stripe, one scale high; precaudal vertebrae 11–12……
……***Eigenmannia desantanai* sp. nov.** (Rio Cuiabá, Rio Paraguai basin, Brazil)
6b. Inferior medial stripe, two or three scales high; precaudal vertebrae 13–15……7
7a. Pectoral-fin rays, ii,11–12……8
7b. Pectoral-fin rays, ii,13–15……9
8a. Orbital diameter 15.4–19.4% HL; 170–198 anal-fin rays; eight or nine endopterygoid teeth; 13–14 precaudal vertebrae.
…..***Eigenmannia muirapinima* sp. nov.** (Igarapé Santo Antônio and Lago Jará, Rio Amazonas basin, Brazil)
8b. Orbital diameter 11.4–15.0% HL; 151–170 anal-fin rays; five or six endopterygoid teeth; 15 precaudal vertebrae……***Eigenmannia guairaca* sp. nov.** (Riacho Água do Ó, upper Rio Paraná basin, Brazil)
9a. Width of mouth, 20.0–25.1% HL; 11–13 premaxillary teeth……
……***Eigenmannia antonioi* sp. nov.** (Rio Anapu, Rio Amazonas basin, Brazil)
9b. Width of mouth, 10.8–19.0 HL; 15–21 premaxillary teeth……
……***Eigenmannia pavulagem* sp. nov.** (Rio Capim, Rio Guamá basin, Brazil)

de São Paulo, São Paulo; NUP, Núcleo de Pesquisa em Limnologia, Ictiologia e Aquicultura, Maringá; USNM, National Museum of Natural History, Smithsonian Institution, Washington DC; and ZMUC, Zoological Museum University of Copenhagen, Copenhagen, Denmark.

RESULTS

MONOPHYLY OF *EIGENMANNIA TRILINEATA* SPECIES-GROUP

All genera of the Sternopygidae (see comparative material examined) were used for the purpose of character polarization. The results revealed a putative synapomorphy that supports the monophyly of the *E. trilineata* species group (*Eigenmannia antonioi* sp. nov., *Eigenmannia desantanai* sp. nov., *Eigenmannia guairaca* sp. nov., *Eigenmannia matintapereira* sp. nov., *E. microstoma*, *Eigenmannia muirapinima* sp. nov., *Eigenmannia pavulagem* sp. nov., *E. trilineata*, *E. vicentespelaea*, and *Eigenmannia waiwai* sp. nov.): presence of a superior medial stripe. The species of the Eigenmanniinae lack a stripe characterized by a concentration of chromatophores between the lateral line and the proximal portion of the pterygiophores of the anal fin. In contrast, this character is uniquely present in all species of the *E. trilineata* species group. This feature is consequently hypothesized to be an exclusive synapomorphy for the *E. trilineata* species group.

TAXONOMIC ACCOUNTS

***EIGENMANNIA ANTONIOI* SP. NOV.**

(FIGS 1B, 2, 3, 4B, 5B; TABLE 1)

Eigenmannia trilineata, Montag *et al*., 2008: 20 (in listing of species from Floresta Nacional de Caxiuanã, Brazil).

Diagnosis: *Eigenmannia antonioi* can be distinguished from other species in the *E. trilineata* species

Figure 2. Lateral view of ***Eigenmannia antonioi* sp. nov.**, holotype, MPEG 10181, 153.2 mm LEA, Rio Anapu at Floresta Nacional de Caxiuanã, Município de Portel, Rio Amazonas basin, state of Pará, Brazil, 2°05′0.7″ S, 51°29′43.8″ W.

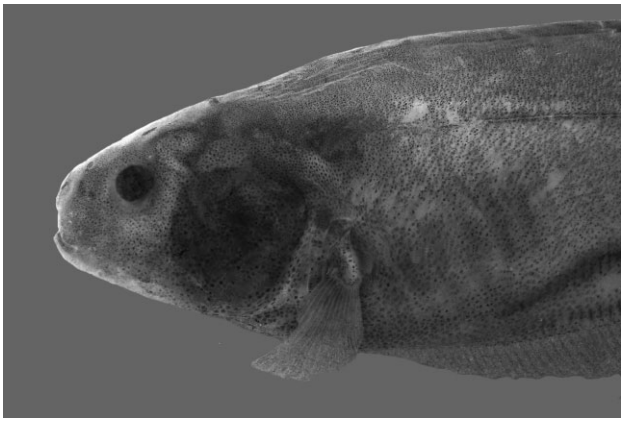

Figure 3. Lateral view of head of ***Eigenmannia antonioi* sp. nov.**, holotype, MPEG 10181, 153.2 mm LEA, Rio Anapu at Floresta Nacional de Caxiuanã, Município de Portel, Rio Amazonas basin, Pará, Brazil, 2°05′0.7″ S, 51°29′43.8″ W.

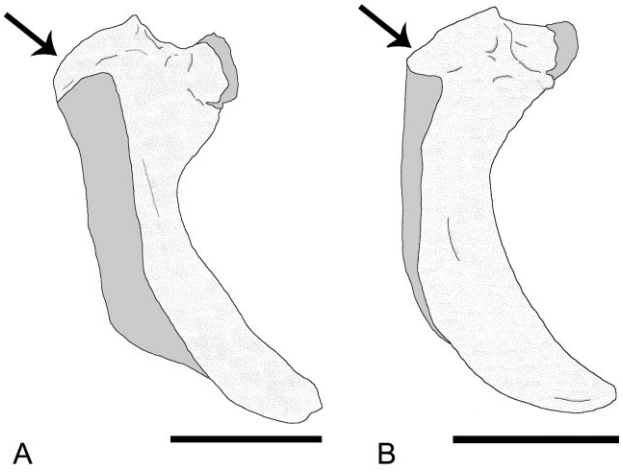

Figure 4. Schematic illustration of lateral view of maxilla: A, ***Eigenmannia matintapereira* sp. nov.** (MZUSP 109618, 118.3 mm LEA); B, ***Eigenmannia antonioi* sp. nov.** (MPEG 10182, 88.7 mm LEA). Cartilage represented by grey. Arrow indicates anterodorsal process. Scale bar: 1 mm.

group, except *E. microstoma* and *E. trilineata*, by the mouth width 20.0–25.1% HL (versus 13.1–18.4% in *E. desantanai*; 12.9–17.5% in *E. guairaca*; 12.6–16.1% in *E. matintapereira*; 13.2–18.1% in *E. muirapinima*; 10.8–19.0 in *E. pavulagem*; 9.5–17.2% in *E. vicentespelaea*; and 9.5–14.6% in *E. waiwai*). *Eigenmannia antonioi* differs from *E. microstoma* and *E. trilineata* by the suborbital depth 18.4–27.8% HL (versus 29.9–40.8% and 32.5–46.6%, respectively); by the dentition pattern of the premaxilla with eight to 12 teeth distributed in two rows (outermost row with three to six teeth; innermost row with four to six teeth) [versus 16 teeth distributed in three rows (outermost row with five teeth; median row with six; innermost with five teeth) in *E. microstoma*; and the 31–33 teeth distributed in four rows (outermost row with eight or nine teeth; second row with five or six; third row with ten; innermost with seven or nine teeth) in *E. trilineata*] and by the length of anterodorsal process of maxillary corresponding to 50% of the width of the posterior nostril (Fig. 4; versus equal to the width of the posterior nostril in *E. trilineata* and *E. microstoma*). *Eigenmannia antonioi* can be further distinguished from *E. microstoma* by the length of the coronomeckelian bone 20% of the length of Meckel's cartilage (Fig. 5; versus 45% of the length of Meckel's cartilage in *E. microstoma*). Additionally, *E. antonioi* can be

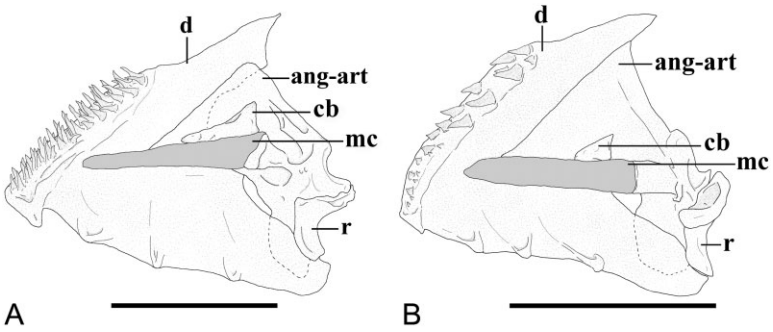

Figure 5. Medial view of dentary: A, *Eigenmannia vicentespelaea* (MZUSP 83461, 152.1 mm LEA); B, ***Eigenmannia antonioi* sp. nov.** (MPEG 10182, 88.7 mm LEA), showing differents lengths of coronomeckelian bone, equal to 45% the length of Meckel's cartilage in *E. vicentespelaea* and to 20% the length of Meckel's cartilage in ***E. antonioi* sp. nov.** Abbreviations: ang-art, anguloarticular; mc, Meckel's cartilage; cb, coronomeckelian bone; d, dentary; r, retroarticular. Cartilage represented by grey. Scale bars: 2 mm.

distinguished from *E. trilineata* by the depth of the posterodorsal expansion on infraorbitals 1 + 2, which approximately equals the total length of infraorbitals 1 + 2 (Fig. 1; versus less than 50% of the length of infraorbitals 1 + 2 in *E. trilineata*), and by eight or nine endopterygoid teeth (versus 17 in *E. trilineata*).

Description: Morphometric data in Table 1. Body elongate and laterally compressed. Dorsal profile of body nearly straight from rear of head to vertical through middle of anal fin, and then posteroventrally aligned with distal portion of caudal filament. Ventral profile of body slightly concave along anterior half of abdominal cavity, then posterodorsally aligned with last anal-fin ray. Ventral profile of caudal filament straight. Greatest body depth at vertical through distal margin pectoral fin.

Head laterally compressed, with greatest width at opercular region and greatest depth at posterior margin of supraoccipital. Dorsal profile of head convex from upper lip to vertical through branchial opening. Ventral profile of head slightly concave from anterior margin of lower lip to branchial opening. Snout rounded in profile. Mouth terminal. Upper lip slightly overlapping lower lip. Premaxillary teeth 8(1), 9(2), or 12(1); distributed in two rows [outermost row with 3(1), 4(1), 5(1), or 6(1) teeth; innermost row with 4(2) or 6(2) teeth]. Maxilla with sickle-shaped anterodorsal process equal to 50% of width of posterior nostril. Dentary teeth 8(1), 11(1), 14(1), or 15(1), distributed in one or two rows [outermost row with 6(2), 7(1), or 8(1) teeth; innermost row with 5(2) or 7(1) teeth]. Dentary teeth increasing abruptly in size from the fourth or fifth teeth of outermost row towards rictus. Coronomeckelian bone equal to 20% length of Meckel's cartilage. Endopterygoid with 8(3) or 9(1) teeth in single row. Mouth rictus at vertical through anterior nostril or in region between nares. Anterior naris tube-like, with posterior margin located at vertical through posterior margin of rictus or in median portion of rictus. Posterior naris elliptical, without tube, located closer to anterior margin of eye than snout tip. Eye approximately circular, covered by skin, laterally located on anterior half of head. Antorbital and infraorbitals 1–4 in form of enlarged, partial cylinders with slender osseous arches. Fifth and sixth infraorbitals slender and tubular. Depth of posterodorsal expansion on infraorbitals 1 + 2 approximately equals total length of infraorbitals 1 + 2. Branchial opening moderately elongate. Branchial membrane joined to isthmus. Anus and urogenital papilla shifting anteriorly ontogenetically. Anus and urogenital papilla at vertical through posterior margin of orbit in mature specimens.

Cycloid scales present from immediately posterior to head to distal portion of caudal filament. Lateral line complete, with 113(1), 115(1), 120(2), 121(1), 122(2), 123(3), 124(4), 126(2), 127(3), 128(4), 130(2), 131(1), or 132*(3) perforated scales to vertical through end of anal fin. Longitudinal series of scales above lateral line, 8(18), 9*(8), or 10(3). Scales over anal-fin pterygiophores approximately one-half size of others.

Pectoral-fin rays ii,13*(13) or ii,14(16). Distal margin of pectoral fin slightly rounded. Tip of pectoral fin reaching vertical through anal-fin rays 16–19. Anal-fin origin immediately posterior to vertical through pectoral-fin base. Total anal-fin rays, 166–207 (190*, $N = 29$; Table 2). Distal margin of anal fin slightly convex. Caudal filament cylindrical, tapering gradually distally, relatively short and approximately 30% of LEA in mature specimens.

Precaudal vertebrae, 13(1) or 14(3). Anterior vertebrae, 11(3) or 12(1), transitional vertebrae, 2(2) or 3(2). Displaced haemal spines, 3(4).

Coloration in alcohol: Background colour brown. Dorsal region of head dark brown; gradually becoming lighter

Table 1. Morphometrics for examined specimens of ***Eigenmannia antonioi* sp. nov.**, ***Eigenmannia desantanai* sp. nov.**, ***Eigenmannia guairaca* sp. nov.**, and ***Eigenmannia matintapereira* sp. nov.**

	***Eigenmannia antonioi* sp. nov.**					***Eigenmannia desantanai* sp. nov.**					***Eigenmannia guairaca* sp. nov.**					***Eigenmannia matintapereira* sp. nov.**				
	H	Range	Mean	SD	*N*	*H*	Range	Mean	SD	*N*	*H*	Range	Mean	SD	*N*	*H*	Range	Mean	SD	*N*
Total length (mm)	204.6	11.5–204.6	–	–	29	167.4	91.9–186.0	–	–	20	172.8	87.1–172.8	–	–	11	231.1	124.3–219.8	–	–	10
Length to end of anal fin (mm)	154.2	66.4–154.2	–	–	29	129.2	78.3–142.8	–	–	20	133.3	81.4–135.8	–	–	11	152.9	65.7–143.5	–	–	10
Head length (mm)	17.3	10.0–17.3	–	–	29	18.5	11.4–19.9	–	–	20	17.9	11.9–17.9	–	–	11	18.5	10.2–20.3	–	–	10
Percentage of length to end of anal fin																				
Head length	11.2	10.3–15.5	13.1	1.2	29	14.3	10.2–14.8	13.3	1.2	20	13.4	12.1–15.5	14.2	1.1	11	12.1	11.1–12.8	12.1	0.6	10
Preanal distance	13.2	8.6–20.7	17.1	2.5	29	18.2	11.7–20.0	16.4	1.7	20	17.2	16.7–20.0	18.2	1.0	11	14.6	13.5–16.4	14.8	1.0	10
Prepectoral distance	11.9	10.2–16.2	13.8	1.2	29	14.1	10.7–17.2	14.2	1.4	20	13.5	13.0–16.5	14.8	1.1	11	13.6	12.8–15.3	13.5	0.9	10
Snout to anus	5.9	4.6–10.0	6.9	1.1	29	7.2	6.0–8.8	7.4	0.9	20	7.6	6.2–16.7	8.8	2.8	11	7.5	12.8–15.3	7.5	1.9	10
Body depth at pectoral fin	13.3	10.8–18.7	15.5	1.6	29	16.7	12.0–18.3	16.3	1.4	20	16.0	15.6–19.1	17.3	1.1	11	14.5	14.1–15.0	14.5	0.4	10
Body depth at anal fin	12.1	9.8–18.0	14.6	1.6	29	15.8	9.7–17.3	14.3	1.9	20	15.1	14.7–17.8	16.1	1.0	11	11.7	11.6–12.5	12.0	0.4	10
Body width	4.8	4.6–7.4	5.9	0.8	29	5.7	4.4–6.7	5.8	0.6	20	6.5	5.9–8.7	6.9	1.0	11	4.1	3.8–4.4	4.1	0.2	10
Anal-fin length	88.7	53.1–88.7	82.0	5.9	29	80.7	70.8–88.4	83.1	4.1	20	83.5	80.7–85.9	83.4	1.5	11	88.2	86.3–89.2	87.7	1.0	10
Pectoral-fin length	6.6	5.1–9.6	7.6	0.8	29	9.8	6.7–10.5	9.1	1.0	20	8.9	7.2–15.0	9.3	2.0	11	10.2	10.1–10.8	10.3	0.3	10
Caudal filament length	32.7	22.3–45.9	36.5	6.6	29	29.6	10.7–48.7	30.4	8.8	20	29.6	22.4–35.1	25.9	4.0	9	51.1	44.0–72.4	55.7	9.5	10
Percentage of head length																				
Snout length	22.6	18.2–26.9	23.3	2.0	29	22.9	18.3–28.0	22.6	2.2	20	25.6	20.4–26.1	23.0	2.2	11	28.4	25.9–31.5	27.7	2.2	10
Internasal distance	9.4	6.9–16.2	9.9	2.1	29	9.5	7.8–12.0	9.3	1.1	20	11.2	9.4–12.0	10.4	0.8	11	8.6	7.2–10.6	8.6	1.1	10
Snout to posterior naris distance	16.8	16.3–22.4	18.4	1.4	29	17.7	15.0–20.7	17.7	1.4	20	18.7	16.6–20.8	18.2	1.2	11	20.2	19.8–22.2	20.9	0.9	10
Posterior naris to orbit distance	10.6	4.6–10.7	9.0	1.7	29	5.8	5.4–9.0	6.9	1.0	20	8.2	7.0–10.6	8.5	1.0	11	5.8	2.5–6.6	5.1	1.4	10
Internarial width	17.5	9.3–19.6	16.1	2.1	29	14.5	12.3–19.2	15.0	1.5	20	16.3	14.1–16.5	15.5	0.8	11	13.4	12.6–15.0	14.0	0.9	10
Orbital diameter	16.6	12.5–19.6	16.5	2.0	29	18.9	14.5–19.6	17.0	1.3	20	11.4	11.4–15.0	13.3	1.1	11	24.5	21.6–29.9	26.1	3.0	10
Postorbital distance	61.6	49.6–66.8	59.2	3.5	29	57.2	54.4–66.0	58.4	3.1	20	60.3	56.8–61.9	58.7	1.5	11	50.8	47.8–53.3	50.3	1.9	10
Opercular opening	27.8	19.4–32.5	26.6	2.8	29	24.4	20.8–31.7	25.5	2.9	20	26.5	24.3–31.0	27.4	2.4	11	30.9	26.4–30.9	29.0	1.8	10
Suborbital depth	22.2	18.4–27.8	24.5	2.3	29	23.7	20.8–28.9	24.4	2.1	20	26.7	22.2–27.5	24.2	1.7	11	24.3	18.2–26.1	22.7	3.0	10
Interorbital distance	32.0	26.1–37.9	30.7	2.8	29	26.0	24.8–33.1	28.5	2.4	20	34.8	28.8–37.0	32.1	2.6	11	25.4	24.7–28.2	26.5	1.3	10
Head width at opercle	59.3	54.9–65.8	60.2	3.1	29	56.9	50.1–63.2	57.1	3.8	20	56.8	53.6–64.5	58.7	2.9	11	59.9	56.7–65.8	60.4	3.4	10
Head width at orbits	41.0	33.1–41.0	36.5	2.3	29	34.1	30.6–40.7	35.7	2.9	20	41.2	33.4–42.0	38.9	2.8	11	38.4	34.1–47.5	40.3	4.4	10
Head depth at supraoccipital	81.4	75.2–95.4	85.0	4.9	29	76.9	74.4–90.1	81.2	4.7	20	82.3	75.0–86.4	80.4	3.8	11	76.5	69.2–77.6	72.9	3.5	10
Head depth at orbits	57.7	46.6–61.4	54.2	3.6	29	52.4	46.9–58.0	52.9	3.2	20	55.1	48.9–55.7	51.8	2.0	11	51.3	49.6–56.5	53.2	3.0	10
Maxilla length	18.3	15.0–20.1	17.9	1.3	29	17.8	12.0–20.8	16.1	2.1	20	17.6	13.5–18.3	16.0	1.4	11	17.9	14.7–22.2	18.6	2.5	10
Oral width	21.4	20.0–25.1	21.4	1.2	29	18.0	13.1–18.4	16.1	1.7	20	17.5	12.9–17.5	15.7	1.5	11	14.7	12.6–16.1	14.3	1.2	10
Percentage of caudal filament length																				
Caudal filament depth	1.8	1.0–13.3	2.1	2.2	29	2.3	1.4–2.6	2.0	0.3	20	2.5	1.4–2.5	1.8	0.4	11	1.5	0.9–1.9	1.5	0.3	10
Caudal filament width	1.1	0.3–1.5	0.7	0.3	29	0.5	0.4–1.4	0.7	0.3	20	0.8	0.5–1.5	0.9	0.3	11	0.9	0.5–1.3	0.8	0.3	10

Table 2. Frequency distribution for anal-fin rays of *Eigenmannia trilineata* species group

	Anal-fin rays													
	151–155	156–160	161–165	166–170	171–175	176–180	181–185	186–190	191–195	196–200	201–205	206–210	211–215	216–222
Eigenamnnnia antonioi sp. nov.				3	1	10	5	5	4			1		
***Eigenmannia desantanai* sp. nov.**				1	3	4	2	4	5	2				
***Eigenmannia guairaca* sp. nov.**	3	3	3	2										
***Eigenmannia matintapereira* sp. nov.**														10
Eigenmannia microstoma					1	2	1		1	4	5	1		
***Eigenamnnia muirapinima* sp. nov.**				1	1	5	2	4	2	3				
***Eigenmannia paulagem* sp. nov.**						1	6	3	14	9	4	1		
Eigenmannia trilineata						1	4	3	4	7	2	3	1	1
Eigenmannia vicentespelaea				1			1	3	2	1	2			
***Eigenmannia waiwai* sp. nov.**				1	2	1	1	6	4					

ventrally. Lips and suborbital region light brown. Dorsal region of body dark brown, gradually becoming lighter in region overlying anal-fin pterygiophores. Four longitudinal dark stripes along body. Lateral-line stripe thin, one scale deep, extending from first perforated lateral line scale to distal portion of caudal filament. Superior medial stripe thick, three scales deep, tapering from vertical between base of anal-fin rays 21–33 to posterior one-third of body. Inferior medial stripe moderately thick, two scales deep, extending from vertical between base of anal-fin rays 15–31 to posterior one-third of body. Anal-fin base stripe thick, two or three scales deep, extending from vertical between base of ninth and 20th anal-fin ray to last anal-fin ray. Pectoral and anal fins hyaline, with scattered tiny chromatophores on interradial membranes.

Distribution: Eigenmannia antonioi sp. nov. is known only from Rio Anapu at Floresta Nacional de Caxiuanã, a tributary of the lower portion of Rio Amazonas, state of Pará, Brazil (Fig. 6).

Etymology: The epithet *antonioi* is in memory to Antônio da Silva Wanderley, grandfather of the first author.

Material examined

Holotype: Brazil. Pará: MPEG 10181, 152.2 mm LEA, Rio Anapu at Floresta Nacional de Caxiuanã, Município de Portel, Rio Amazonas basin, 02°05′0.7″S, 51°29′43.8″W, collected by L. Montag, 25 March 2004.

Paratypes: Brazil. Pará: all from Rio Anapu at Floresta Nacional de Caxiuanã, Município de Portel, Rio Amazonas basin. MPEG 9940, 1, 66.4 mm LEA, collected by L. Montag, 10 November 2004. MPEG 10156, 1, 97.4 mm LEA, collected by L. Montag, 10 November 2004. MPEG 10167, 4, 79.5–112.3 mm LEA, collected by L. Montag, 25 March 2004. MPEG 10182, 6 + 1CS, 77.0–118.3 mm LEA, collected by L. Montag, 24 November 2003. MPEG 10186, 5, 71.7–109.0 mm LEA, 2°05′0.7″ S, 51°29′43.8″ W, collected by L. Montag, 24 November 2003. MPEG 29486, 2, 81.2–84.6 mm LEA, collected with holotype. MZUSP 116795, 2 + 2CS, 107.5–121.6 mm LEA; INPA 46983, 2, 80.7–88.3 mm LEA; MCP 48613, 2, 88.6–91.0 mm LEA, collected with MPEG 10182.

Non-type specimens: Brazil. Pará: all from Rio Anapu at Floresta Nacional de Caxiuanã, Município de Portel, Rio Amazonas basin. MPEG 29487, 11, 63.6–79.3 mm LEA. MPEG 29488, 6, 37.1–74.8 mm LEA. MPEG 10170,

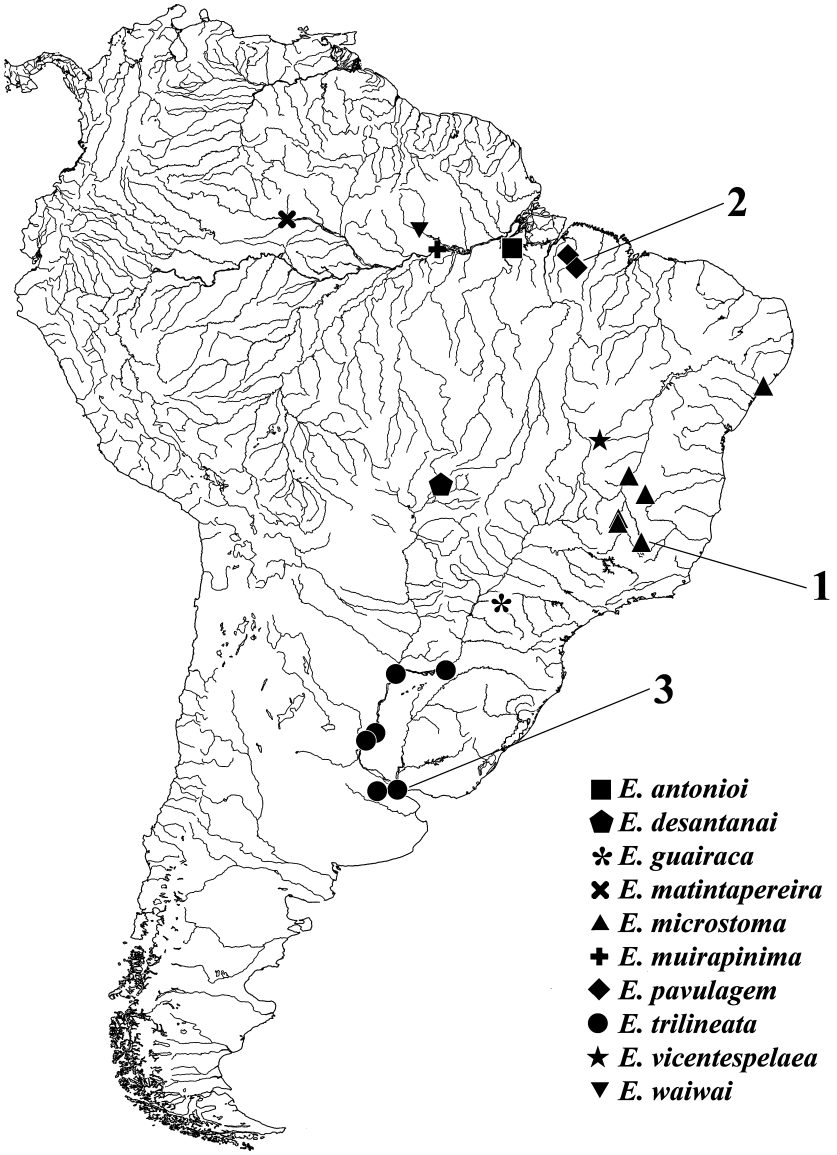

Figure 6. Map of South America showing the distribution of ***Eigenmannia antoinoi* sp. nov.**, ***Eigenmannia desantanai* sp. nov.**, ***Eigenmannia guairaca* sp. nov. sp. nov.**, ***Eigenmannia matintapereira* sp. nov.**, *Eigenmannia microstoma* (1 = type locality), ***Eigenmannia muirapinima* sp. nov.**, ***Eigenmannia pavulagem* sp. nov.** (2 = type locality), *Eigenmannia trilineata* (3 = type locality), *Eigenmannia vicentespelaea*, and ***Eigenmannia waiwai* sp. nov.** Some symbols represent more than one lot and/or locality.

1, 78.7 mm TL (damaged). MPEG 10177, 3 + 1CS, 41.3–75.7 mm LEA. MPEG 11508, 1, 16.1 mm TL (damaged).

EIGENMANNIA DESANTANAI SP. NOV.
(FIGS 7, 8; TABLE 1)

Diagnosis: *Eigenmannia desantanai* can be distinguished from other species in the *E. trilineata* species group by the inferior medial stripe, which is one scale deep (versus two or three scales deep). *Eigenmannia desantanai* can be further distinguished from the other members of the species group, except for *E. waiwai*, by the 11 or 12 precaudal vertebrae (versus 13 or 14 in *E. antonioi*; 15 in *E. guairaca*, *E. muirapinima*, and *E. vicentespelaea*; 13 in *E. matintapereira*; 14 or 15 in *E. microstoma* and *E. trilineata*; and 13–15 in *E. pavulagem*). *Eigenmannia desantanai* can be differentiated from *E. waiwai* by the terminal mouth

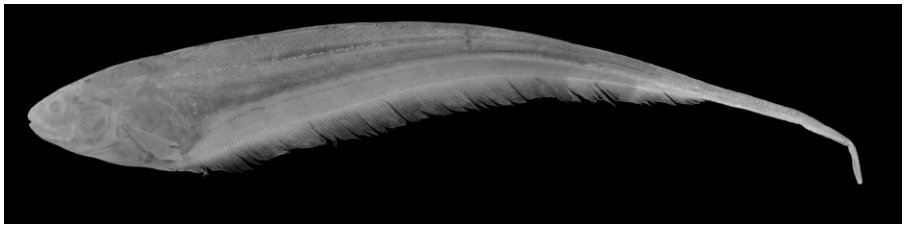

Figure 7. Lateral view of ***Eigenmannia desantanai* sp. nov.**, holotype, MPEG 31306, 129.2 mm LEA, Rio Cuiabá, Rio Paraguay basin, Município de Barão de Malgaço, Mato Grosso, Brazil, 16°14′58.9″ S, 55°52′44.4″ W.

Figure 8. Lateral view of head of ***Eigenmannia desantanai* sp. nov.**, holotype, MPEG 31306, 129.2 mm LEA, Rio Cuiabá, Rio Paraguai basin, Município de Barão de Malgaço, Mato Grosso, Brazil, 16°14′58.9″ S, 55°52′44.4″ W.

(versus subterminal); the orbital diameter 14.5–19.6% HL (versus 22.6–28.8%); the length of the anterodorsal process of the maxilla equal to 50% of the width of the posterior nostril (versus 1.5 times the width of the posterior nostril); the depth of the posterodorsal expansion on infraorbitals 1 + 2 approximately equal to the total length of infraorbitals 1 + 2 (versus less than 50% of the length of infraorbitals 1 + 2); and by the dentition pattern of the dentary with 21–23 teeth distributed in two rows (outermost row with ten to 12 teeth; innermost row with nine to 13 teeth) [versus 37 or 38 teeth distributed in four rows (outermost row with seven teeth; second with 11–15 teeth; third with eight to 15; innermost row with four to eight teeth)].

Description: Morphometric data in Table 1. Body elongate and laterally compressed. Dorsal profile of body slightly convex from rear of head to vertical through middle of anal fin, and then posteroventrally aligned with tip of caudal filament. Ventral profile of body slightly concave from anterior margin of dentary to first anal-fin ray, then posteroventrally aligned with last anal-fin ray. Ventral profile of caudal filament nearly straight. Greatest body depth at vertical through distal margin of pectoral fin.

Head laterally compressed with greatest width at opercular region and greatest depth at posterior margin of supraoccipital. Dorsal profile of head slightly convex from upper lip to vertical through branchial opening. Ventral profile of head slightly concave from anterior margin of lower lip to branchial opening. Snout rounded in profile. Mouth terminal. Upper lip slightly overlapping lower lip. Premaxillary teeth 24(1) or 25(1) distributed in four rows [outermost row with 5(2) teeth; second row with 6(1) or 8(1) teeth; third row with 6(1) or 7(1) teeth; innermost row with 7(1) or 8(1) teeth]. Maxilla with sickle-shaped anterodorsal process equal to 50% width of posterior nostril. Dentary teeth, 21(1) or 23(1) distributed in two rows [outermost row with 10(1) or 12(1) teeth; innermost row with 9(1) or 13(1) teeth]. Dentary teeth all similar in size. Coronomeckelian bone equal to 20% of length of Meckel's cartilage. Endopterygoid with 14(1) or 15(1) teeth in two series. Mouth rictus at vertical through anterior nostril or in region between nares. Anterior naris tube-like, with posterior margin located at vertical through posterior margin of rictus or in median portion of rictus. Posterior naris elliptical, without tube, located closer to anterior margin of eye than snout tip. Eye approximately circular, covered by skin, laterally located on anterior one-half of head. Antorbital and infraorbitals 1–4 in form of enlarged, partial cylinders with slender osseous arches. Fifth and sixth infraorbitals slender and tubular. Depth of posterodorsal expansion on infraorbitals 1 + 2 equal to total length of infraorbitals 1 + 2. Branchial opening moderately elongate. Branchial membrane joined to isthmus, extending to inferior margin of branchial aperture. Anus and urogenital papilla shifting anteriorly ontogenetically. Anus and urogenital papilla at vertical through posterior margin of orbit in mature specimens.

Cycloid scales present from immediately posterior to head to distal portion of caudal filament. Lateral line complete, with 112(6), 113(1), 118(1), 120(3), 121(1), 125(1), 128*(4), 130(1), or 132(2) perforated scales to vertical through end of anal fin. Longitudinal series

of scales above lateral line, 8(7), 9(6), or 10*(7). Scales over anal-fin pterygiophores approximately one-half size of others.

Pectoral-fin rays, ii,12*(18), ii,13(1), or ii,14(1). Distal margin of pectoral fin slightly rounded. Tip of pectoral fin reaching vertical through base of anal-fin rays 16–20. Anal-fin origin immediately posterior to vertical through pectoral-fin base. Total anal-fin rays, 170–198 (185*, $N = 20$; Table 2). Distal margin of anal fin approximately concave. Caudal filament cylindrical, tapering gradually distally, relatively short, and approximately 25% LEA in mature specimens.

Precaudal vertebrae 11(1) or 12(1). Anterior vertebrae 9(2), transitional vertebrae 2(1) or 3(1). Displaced haemal spines 3(2).

Coloration in alcohol: Background colour dark yellow. Dorsal region of head dark brown; gradually becoming lighter ventrally. Lips and suborbital region light brown. Dorsal region of body dark brown, gradually becoming lighter in region overlying anal-fin pterygiophores. Four longitudinal dark stripes along body. Lateral-line stripe thin, one scale deep, extending from first perforated lateral-line scale to distal portion of caudal filament. Superior medial stripe moderately thick, two scales deep, tapering from vertical between base of anal-fin rays 20–28 to posterior one-third of body. Superior medial stripe hardly discernible in specimens over 85.0 mm LEA. Inferior medial stripe thin, one scale deep, extending from vertical through base of anal-fin rays 13–17 to posterior one-third of body. Anal-fin base stripe thick, two scales deep, extending from vertical between base of anal-fin rays 9–14 to last anal-fin ray. Pectoral and anal fins hyaline, with scattered tiny chromatophores on interradial membranes.

Distribution: *Eigenmannia desantanai* sp. nov. is known only from Rio Cuiabá, Rio Paraguay basin, Mato Grosso, Brazil (Fig. 6).

Etymology: The epithet '*desantanai*' is in honour of Carlos David de Santana, in recognition of his contributions to our knowledge of the Gymnotiformes.

Material examined

Holotype: Brazil. Mato Grosso: MPEG 31306, 129.2 mm LEA, Rio Cuiabá, Baía de Chacororé, Rio Paraguai basin, Município de Barão de Melgaço, 16°14′58.9″ S, 55°52′44.4″ W, collected by Nupélia's team, 20 October 2003.

Paratypes: Brazil. Mato Grosso: NUP 12500, 9, 78.3–106.1 mm LEA, collected with holotype. NUP 3470, 9 + 1CS, 119.8–142.8 mm LEA, Rio Cuiabá, Rio Paraguai basin, Município de Santo Antônio do Leverger, 15°58′26″ S, 55°56′26″ W, collected by Nupélia's team, 24 October 2002; MPEG 31164, 1 + 1CS, 136.1–136.8 mm LEA, collected with NUP 3470.

EIGENMANNIA GUAIRACA SP. NOV.

(FIGS 9, 10; TABLE 1)

Diagnosis: *Eigenmannia guairaca* can be distinguished from other species in the *E. trilineata* species group, except *E. desantanai*, *E. microstoma*, and *E. muirapinima*, by the ii,11–12 pectoral-fin rays (versus ii,13–14 in *E. antonioi* and *E. pavulagem*; ii,16–17 in *E. matintapereira*; ii,14–15 in *E. trilineata*; ii,15–17 in *E. vicentespelaea*; and ii,13–15 in *E. waiwai*). *Eigenmannia guairaca* differs from *E. desantanai*, *E. microstoma*, and *E. muirapinima* by the number of total anal-fin rays, 151–170 (versus 170–198 in *E. desantanai* and *E. muirapinima*; and 173–207 in *E. microstoma*). *Eigenmannia guairaca* can be further distinguished from *E. desantanai* and *E. muirapinima* by the five or six endopterygoid teeth (versus 14–15 in *E. desantanai* and eight or nine in *E. muirapinima*). *Eigenmannia guairaca* differs from *E. desantanai* by the dentition pattern of the premaxilla with nine or ten teeth distributed in two rows (outermost row with four teeth; innermost row with five or six teeth) [versus 21–23 teeth distributed in two rows (outermost row

Figure 9. Lateral view of ***Eigenmannia guairaca* sp. nov.**, holotype, MPEG 31307, 133.3 mm LEA, Riacho Água do Ó, upper Rio Paraná basin, Município de Santa Fé, Paraná, Brazil, 23°01′08″ S, 51°51′ 37.8″ W.

Figure 10. Lateral view of head of ***Eigenmannia guairaca* sp. nov.**, holotype, MPEG 31307, 133.3 mm LEA, Riacho Água do Ó, upper Rio Paraná basin, Município de Santa Fé, Paraná, Brazil, 23°01′08″ S, 51°51′ 37.8″ W.

with ten to 12 teeth; innermost row with nine to 13 teeth)]. *Eigenmannia guairaca* can be further distinguished from *E. microstoma* by the suborbital depth, 22.2–27.5% HL (versus 29.9–40.8%); the length of anterodorsal process of the maxilla equal to 50% of the width of posterior nostril (versus equal to the width of the posterior nostril); and the length of the coronomeckelian bone equal to 20% of the length of Meckel's cartilage (versus 45% of the length of Meckel's cartilage). *Eigenmannia guairaca* can be further distinguished from all species in the *E. trilineata* species group, except *E. microstoma* and *E. pavulagem*, by 15 precaudal vertebrae (versus 13 or 14 in *E. antonioi*, *E. muirapinima* and *E. vicentespelaea*; 11 or 12 in *E. desantanai*; 13 in *E. matintapereira* and *E. trilineata*; and 12 or 13 in *E. waiwai*).

Description: Morphometric data in Table 1. Body elongate and laterally compressed. Dorsal profile of body nearly straight from rear of head to posterior one-third of anal fin, and then posteroventrally aligned with distal portion of caudal filament. Ventral profile of body posteroventrally aligned from anterior margin of dentary to first anal-fin ray, and then posterodorsally aligned with last anal-fin ray. Ventral profile of caudal filament straight. Greatest body depth at vertical through distal margin of pectoral fin.

Head laterally compressed with greatest width at opercular region and greatest depth at posterior margin of supraoccipital. Dorsal profile of head slightly convex from upper lip to vertical through branchial opening. Ventral profile of head slightly concave from anterior margin of lower lip to branchial opening. Snout rounded in profile. Mouth terminal. Upper lip slightly overlapping lower lip. Premaxillary teeth, 9(1) or 10(1); distributed in two rows [outermost row with 4(2) teeth; innermost row with 5(1) or 6(1) teeth]. Maxilla with sickle-shaped anterodorsal process equal to 50% of width of posterior nostril. Dentary teeth 17(1) or 19(1) distributed in two rows [outermost row with 10(1) or 11(1) teeth; innermost row with 7(1) or 8(1) teeth]. Dentary teeth all similar in size. Coronomeckelian bone equal to 20% length of Meckel's cartilage. Endopterygoid with 5(1) or 6(1) teeth in single row. Mouth rictus at vertical through anterior nostril or in region between nares. Anterior naris tube-like, with posterior margin located at vertical through posterior margin or in median portion of rictus. Posterior naris elliptical, without tube, located closer to anterior margin of eye than snout tip. Eye approximately circular, covered by skin, laterally located on anterior half of head. Antorbital and infraorbitals 1–4 in form of enlarged, partial cylinders with slender osseous arches. Fifth and sixth infraorbitals slender and tubular. Depth of posterodorsal expansion on infraorbitals 1 + 2 equals total length of infraorbitals 1 + 2. Branchial opening moderately elongate. Branchial membrane joined to isthmus. Anus and urogenital papilla shifting anteriorly ontogenetically. Anus and urogenital papilla at vertical through posterior margin of orbit in mature specimens.

Cycloid scales present from immediately posterior to head to distal portion of caudal filament. Lateral line complete, with 113(1), 119(1), 120(1), 122(2), 124(2), 132*(1), or 143(3) perforated scales to vertical through end of anal fin. Longitudinal series of scales above lateral line, 9*(5), 10(5), or 11(1). Scales over anal-fin pterygiophores approximately one-half the size of others.

Pectoral-fin rays, ii,11(3) or ii,12*(8). Distal margin of pectoral fin slightly rounded. Tip of pectoral fin reaching vertical through base of anal-fin rays 16–20. Anal-fin origin immediately posterior to vertical through pectoral-fin base. Total anal-fin rays 151–170 (155*, $N = 11$; Table 2). Distal margin of anal fin slightly convex. Caudal filament cylindrical, tapering gradually distally; relatively short and approximately 25% LEA in sexually mature specimens.

Precaudal vertebrae 15(2). Anterior vertebrae 13(2). Transitional vertebrae 2(2). Displaced haemal spines 3(1) or 4(1).

Coloration in alcohol: Background colour pale brown. Dorsal region of head dark brown; gradually becoming lighter ventrally. Lips and suborbital region yellowish. Dorsal region of body brown; gradually becoming lighter to region overlying anal-fin pterygiophores. Four longitudinal dark stripes along body. Lateral-line stripe thin, one scale deep, extending from first perforated lateral-line scale to distal portion of caudal filament. Superior medial stripe thick, three scales deep, taper-

Figure 11. Lateral view of ***Eigenmannia matintapereira* sp. nov.**, holotype, MZUSP 109618, 152.9 mm LEA, Rio Uneiuxi, Rio Negro basin, Município de Santa Isabel do Rio Negro, Amazonas, Brazil, 0°21′45″ S, 65°04′13″ W.

ing from vertical between base of anal-fin rays 20–30 to posterior one-third of body. Inferior medial stripe moderately thick, two scales deep, extending from vertical between base of anal-fin rays 12–23 to posterior one-third of body. Anal-fin base stripe thick, two scales deep, extending from vertical between base of anal-fin rays 1–16 to last anal-fin ray. Pectoral and anal fins hyaline, with scattered tiny chromatophores on interradial membranes.

Distribution: *Eigenmannia guairaca* sp. nov. is known only from Riacho Água do Ó, a tributary of the Rio Paranapanema, upper Rio Paraná basin, Paraná, Brazil (Fig. 6).

Etymology: The epithet '*guairaca*' is a reference to the legendary Guairacá, a brave Indian chief who was protector of the lands and the Guarani people. A noun in apposition.

Material examined
Holotype: Brazil. Paraná: MPEG 31307, 133.3 mm LEA, Riacho Água do Ó, tributary of Rio Paranapanema, upper Rio Paraná basin, Município de Santa Fé, 23°01′08″ S, 51°51′37.8″ W, collected by C. Pavanelli and others, 16 December 2008.

Paratypes: Brazil. Paraná: NUP 6467, 8 + 1CS, 81.4–135.8 mm LEA; MPEG 31165, 1 + 1CS (damaged), 115.7 mm LEA, collected with holotype.

EIGENMANNIA MATINTAPEREIRA SP. NOV.
(FIGS 1A, 4A, 11, 12; TABLE 1)

Diagnosis: *Eigenmannia matintapereira* differs from other species in the *E. trilineata* species group by the pectoral-fin, which is uniformly dark or has a dark medial blotch (versus hyaline), and the anal-fin coloration of a uniformly darkened (versus hyaline). *Eigenmannia matintapereira* can be further distinguished from species of the *E. trilineata* species group, except *E. vicentespelaea*, by the ii,16–17 pectoral-fin rays (versus ii,13–14 in *E. antonioi* and *E. pavulagem*; ii,11–12 in *E. guairaca* and *E. muirapinima*; ii,12–14 in *E. desantanai*; ii,14–15 in *E. microstoma* and *E. trilineata*; and ii,13–15 in *E. waiwai*). *Eigenmannia matintapereira* can be distinguished from *E. vicentespelaea* by the terminal mouth (versus subterminal); the number of total anal-fin rays 216–222 (versus 169–191); between ten and 12 scales above lateral line (versus seven or eight); and 130–145 scales to the end of anal fin (versus 110–125). *Eigenmannia matintapereira* also differs from species allocated to the *E. trilineata* species-group, except *E. trilineata*, by the number of total anal-fin rays 216–222 (versus 166–207 in *E. antonioi*; 170–198 in *E. desantanai* and *E. muirapinima*; 151–170 in *E. guairaca*; 173–207 in *E. microstoma*; 176–201 in *E. pavulagem*; 197–201 in *E. vicentespelaea*; and 167–195 in *E. waiwai*). *Eigenmannia matintapereira* can be distinguished from *E. trilineata* by the suborbital depth 18.2–26.1% HL (versus 32.5–46.6%); the orbital diameter 21.6–28.8% HL (versus 15.3–21.6%); and the ii,16–17 pectoral-fin rays (versus ii,14–15).

Figure 12. Lateral view of head of ***Eigenmannia matintapereira* sp. nov.**, holotype, MZUSP 109618, 152.9 mm LEA, Rio Uneiuxi, Rio Negro basin, Município de Santa Isabel do Rio Negro, Amazonas, Brazil, 0°21′45″ S, 65°04′13″ W.

Description: Morphometric data in Table 1. Body elongate and laterally compressed. Dorsal profile of body straight from rear of head to vertical through middle of anal fin; then posteroventrally aligned with distal portion of caudal filament. Ventral profile of body slightly concave or posteroventrally aligned along anterior half of abdominal cavity; then posterodorsally aligned with last anal-fin ray. Ventral margin of caudal filament straight. Greatest body depth at vertical through distal margin of pectoral fin.

Head laterally compressed with greatest width at opercular region and greatest depth at posterior margin of supraoccipital. Dorsal profile of head posterodorsally aligned from upper lip to posterior margin of orbit, concave to vertical through posterior margin of opercle, and straight to vertical through branchial opening. Ventral profile of head posteroventrally aligned from anterior margin of lower lip to branchial opening. Snout rounded in profile. Mouth terminal. Upper lip slightly overlapping lower lip or anterior profile of lips in same vertical. Premaxillary teeth 22(1) or 24(1) distributed in four rows [outermost row with 3(1) or 4(1) teeth; second row with 5(1) or 6(1) teeth; third row with 7(2) teeth; innermost with 6(1) or 8(1) teeth]. Maxilla with sickle-shaped anterodorsal process equal to width of posterior nostril. Dentary teeth 25(1) or 27(1) distributed in two series [outermost row with 15(1) or 16(1) teeth; innermost row with 9(1) or 11(1) teeth]. Dentary teeth similar in size. Coronomeckelian bone equal to 20% of length of Meckel's cartilage. Endopterygoid with 9(1) or 12(1) teeth in one or two series. Mouth rictus at vertical through anterior nostril or in region between nares. Anterior naris tube-like, with posterior margin located at vertical through posterior margin of rictus or in median portion of rictus. Posterior naris elliptical, without tube, located closer to anterior margin of eye than snout tip. Eye approximately circular, covered by skin, laterally located on anterior half of head. Antorbital and infraorbitals 1–4 in form of enlarged, partial cylinders with slender osseous arches. Fifth and sixth infraorbitals slender and tubular. Depth of posterodorsal expansion on infraorbitals 1 + 2 equals 50% length of infraorbitals 1 + 2. Branchial opening moderately elongate. Branchial membrane joined to isthmus. Anus and urogenital papilla shifting anteriorly ontogenetically. Anus and urogenital papilla at vertical through middle of, or posterior margin of, orbit in mature specimens.

Cycloid scales present from immediately posterior to head to distal portion of caudal filament. Lateral line complete, with 130(2), 131(1)*, 132(2), 136(3), or 145(2) perforated scales to vertical through end of anal fin. Longitudinal series of scales above lateral line, 10(3), 11*(4), or 12(3). Scales over anal-fin pterygiophores approximately one-half the size of others.

Pectoral-fin rays, ii,16(4) or ii,17*(6). Distal margin of pectoral fin approximately straight. Tip of pectoral fin reaching vertical through base of anal-fin rays 28–35. Anal-fin origin at vertical on base of first pectoral-fin ray; total anal-fin rays, 216–222 (206*, $N = 10$; Table 2). Distal margin of anal fin straight. Caudal filament cylindrical, tapering gradually distally; relatively short and approximately 50% LEA in mature specimens.

Precaudal vertebrae 13(2). Anterior vertebrae 9(1) or 10(1). Transitional vertebrae 3(1) or 4(1). Displaced haemal spines 2(1) or 3(1).

Coloration in alcohol: Background colour dark. Head dark dorsally and gradually becoming lighter ventrally. Lips and suborbital region dark. Body dark dorsally and gradually becoming lighter to region overlying anal-fin pterygiophores. Specimens up to 80.0 mm LEA, with background colour yellowish. Four longitudinal dark stripes along body. Lateral-line stripe thin, one scale deep, extending from first perforated lateral-line scale to distal portion of caudal filament. Superior medial stripe thick, between three and five scales deep, tapering from vertical between base of anal-fin rays 25–31 to posterior one-third of body. Inferior medial stripe thick, two scales deep, extending from vertical between base of anal-fin rays 27–30 to posterior one-third of body. Anal-fin base stripe thick, six or seven scales deep, extending from vertical through base of first to vertical through base of last anal-fin ray. Stripes in specimens up to 80.0 mm LEA, less conspicuous. Pectoral fin uniformly darkened or with dark blotch in median portion, distal margin hyaline. Anal fin uniformly dark. Pectoral and anal fins hyaline, with scattered tiny chromatophores on interradial membranes in juveniles up to 80.0 mm LEA.

Distribution: *Eigenmannia matintapereira* sp. nov. is known from Rio Uneiuxi and Rio Urubaxi, tributaries of the Rio Negro, Amazonas, Brazil (Fig. 6).

Etymology: The epithet '*matintapereira*' is a reference to 'Matinta Pereira', the mythical figure that haunts people in search of tobacco and coffee in northern Brazil. According to reports, its appearance is marked by a blackened aspect, an allusion to the colour pattern present in *Eigenmannia matintapereira* sp. nov.

Remarks: *Eigenmannia matintapereira* sp. nov. has an intensely dark background colour, a pectoral fin that is black or with a dark blotch, and an anal fin uniformly darkened. This colour pattern is similar to that in *E. nigra*; however, it can be easily distinguished from *E. nigra* by: the presence of four stripes along the body (versus stripes absent); 216–222 anal-fin rays (versus 231–247); body depth at the vertical through the tip

of longest pectoral-fin ray, 14.1–15.0% LEA (versus 16.6–18.9%); body depth at the vertical through first anal-fin ray, 11.6–12.5% LEA (versus 13.3–15.0%); orbital diameter, 21.6–28.8% LEA (versus 15.1–20.0%); and suborbital depth 18.2–26.1% HL (versus 28.9–35.2%).

Material examined

Holotype: Brazil. Amazonas: MZUSP 109618, 152.9 mm LEA, Rio Uneiuxi, Rio Negro basin, Município de Santa Isabel do Rio Negro, 0°21′45.0″ S, 65°04′13.0″ W, collected by M. Toledo-Piza, O. Oyakawa, G. Mattox, and J. Santana, 8 February 2011.

Paratypes: Brazil. Amazonas: MZUSP 117004, 3 + 1CS, 79.7–143.6 mm LEA, collected with holotype. MZUSP 109695, 5 + 1CS, 65.7–167.7 mm LEA, Rio Urubaxi, Rio Negro basin, 0°30′6″ S, 64°49′11″ W, collected by M. Toledo-Piza, O. Oyakawa, G. Mattox, and J. Santana, 9 February 2011; MPEG 963, 1, 91.62 mm LEA, Rio Negro, collected by M. Goulding, 24 October 1979; MPEG 1314, 2, 76.9–94.6, Ilha Gavião, Rio Negro basin, collected by T. Bullock, 15 May 1967. MZUSP 29973, 1, 99.7 mm LEA, Rio Arirará, collected by M. Goulding, 6 October 1979. MZUSP 29974, 1, 123.6 mm LEA, Rio Marauiá, Rio Negro Basin, collected by M. Goulding, 13 October 1979. MZUSP 29975, 3, 100–120.6 mm LEA (1 specimen damaged) Rio Negro, collected by M. Goulding, 18 October 1979. MZUSP 29981, 1, 120.3 mm LEA, Rio Negro, collected by M. Goulding, 16 February 1980.

Non-type specimens: LBP 18301, 9, 49.1–142.3 mm LEA, Rio Negro, 0°30′5.3″ S, 64°49′12.2″ W (all specimens damaged).

EIGENMANNIA MICROSTOMA (REINHARDT, 1852) (FIGS 13, 14; TABLE 3)

Sternopygus microstomus Reinhardt, 1852: 147 (type locality: Lagoa Santa). Eigenmann & Ward, 1905: 173 (synonym of *Eigenmannia virescens*). Eigenmann, 1910: 499 (synonym of *E. virescens*). Ellis, 1913: 127 (synonym of *E. virescens*). Fowler, 1951: 434 (synonym of *E. virescens*). Nielsen, 1974: 48 (in catalogue of type specimens at ZMUC). Mago-Leccia, 1978: 16 (synonym of *E. virescens*). Britski, 2001: 19 (types collected by Reinhardt).

Sternopygus virescens, Lütken, 2001: 134, 161 (description and reference to *S. microstomus*).

Eigenmannia microstoma, Mago-Leccia, 1994: 20 (catalogue). Albert, 2003: 488 (catalogue).

Eigenmannia virescens (in part), Alves & Leal 2010: 49 (only specimens from Rio Pandeiros).

Diagnosis: *Eigenmannia microstoma* can be distinguished from other species in the *E. trilineata* species group, except *E. trilineata*, by the suborbital depth 29.9–40.8% HL (versus 18.4–27.8% in *E. antonioi*; 20.8–28.9% in *E. desantanai*; 22.2–27.5% in *E. guairaca*; 18.2–26.1% in *E. matintapereira*; 18.7–28.4% in *E. muirapinima*; 19.4–27.4% in *E. pavulagem*; 21.7–27.4% in *E. vicentespelaea*; and 19.0–28.3% in *E. waiwai*). *Eigenmannia microstoma* differs from *E. trilineata* by the premaxillary dentition, 16 teeth distributed in three rows (outermost row with five teeth; median row with six; innermost row with five teeth) [versus 31–33 distributed in four rows (outermost row with eight to nine teeth; second row with five to six teeth; third row with ten teeth; innermost with seven to nine teeth)]; by the dentary dentition with 16 teeth distributed in two rows (outermost row with ten teeth; innermost row with six teeth) [versus 23 distributed in two rows (outermost row with eight teeth; innermost row with 15 teeth)]; and depth of the posterodorsal expansion on infraorbitals 1 + 2 approximately equal to the total length of infraorbitals 1 + 2 (versus less than 50% of the length of infraorbitals 1 + 2). *Eigenmannia microstoma* also differs from other species in the *E.trilineata*

Figure 13. Lateral view of *Eigenmannia microstoma*, MCP 19840, 182.9 mm LEA, Brazil, Minas Gerais, Rio São Francisco between Município de Três Marias and Pirapora, Rio São Francisco basin, 18°13′ S, 45°15′ W.

Figure 14. Lateral view of head of *Eigenmannia microstoma*, MCP 19840, 182.9 mm LEA, Brazil, Minas Gerais, Rio São Francisco between Município de Três Marias and Pirapora, Rio São Francisco basin, 18°13′ S, 45°15′ W.

species-group, except *E. vicentespelaea*, by the length of the coronomeckelian bone, which equals 45% of the length of Meckel's cartilage (versus 20% of the length of Meckel's cartilage). *Eigenmannia microstoma* can be distinguished from *E. vicentespelaea* by: the terminal mouth (versus subterminal); 11–15 longitudinal series of scales above the lateral line (versus seven or eight); the body depth at the vertical through the tip of longest pectoral-fin ray, 16.9–20.8% LEA (versus 10.5–14.5%); the body depth at the vertical through the first anal-fin ray, 14.0–18.1% LEA (versus 11.5–13.3%); the head depth at the posterior limit of the supraoccipital bone, 76.1–101.1% HL (versus 68.6–74.7%); the head depth at the orbit, 56.7–78.1% HL (versus 49.3–55.8%); and the length of anterodorsal process of maxillar, which is equal to the width of the posterior nostril (versus 50% of the width of the posterior nostril).

Description: Morphometric data are presented in Table 3. Body elongate and laterally compressed. Dorsal profile of body nearly straight from rear of head to vertical through middle of anal fin, and then posteroventrally aligned with distal portion of caudal filament. Ventral profile of body slightly concave along anterior half of abdominal cavity, then posterodorsally aligned with last anal-fin ray. Ventral margin of caudal filament straight. Greatest body depth at vertical through distal margin of pectoral fin.

Head laterally compressed, with greatest width at opercular region and greatest depth at posterior margin of supraoccipital. Dorsal profile of head slightly convex from upper lip to vertical through branchial opening. Ventral profile of head slightly concave from anterior margin of lower lip to branchial opening. Snout rounded in profile. Mouth terminal. Upper lip slightly overlapping lower lip. Premaxilla teeth 16(1); distributed in three rows [outermost row with 5(1) teeth; median row with 6(1) teeth; inner row with 5(1) teeth]. Maxilla with sickle-shaped anterodorsal process equal to width of posterior nostril. Dentary teeth 16(1); distributed in two rows [outer row with 10(1) teeth; inner row with 6(1) teeth]. Dentary teeth all similar in size. Coronomeckelian bone equal to 45% length of Meckel's cartilage. Endopterygoid with 11(1), 13(1), or 16(1) teeth in one or two series. Mouth rictus extending posteriorly to vertical through anterior nostril of, or in region between, naris. Anterior naris tube-like, with posterior margin located at vertical through posterior margin of, or in median portion of, rictus. Posterior naris elliptical, without tube, located closer to anterior margin of eye than snout tip. Eye approximately circular, covered by skin, laterally located on anterior half of head. Antorbital and infraorbitals 1–4 in form of enlarged, partial cylinders with slender osseous arches. Fifth and sixth infraorbitals slender and tubular. Depth of posterodorsal expansion on infraorbitals 1 + 2 equals total length of infraorbitals 1 + 2. Branchial opening moderately elongate. Branchial membrane joined to isthmus. Anus and urogenital papilla shifting anteriorly ontogenetically. Anus and urogenital papilla at vertical through posterior margin of orbit in mature specimens.

Cycloid scales present from immediately posterior to head to distal portion of caudal filament. Lateral line complete with 112(2), 117(1), 118(1), 119(2), 120(1), 121(2), 126(1), 128(2), 132(1), 135(1), or 142(1) [syntypes, 121(1), 126(1), 128(1), or 132(1)] perforated scales to vertical through end of anal fin. Longitudinal series of scales above lateral line 11(1), 12(3), 13(6), 14(7), or 15(1) [syntypes, 12(1), 13(3), 14(1), or 15(1)]. Scales over anal-fin pterygiophores approximately one-half the size of others.

Pectoral-fin rays, ii,12(2), ii,13 (6), ii,14(10), or ii,15(5) [syntypes, ii,13(2), ii,14(3), or ii,15(1)]. Distal margin of fin approximately straight. Tip of pectoral fin reaching vertical through base of anal-fin rays 25–27. Anal-fin origin immediately posterior to vertical through pectoral-fin base. Total anal-fin rays, 173–207 [syntypes, 180–207 total anal-fin rays, $N = 15$; Table 2). Distal margin of anal fin slightly concave. Caudal filament cylindrical, tapering gradually distally; relatively short and approximately 25% LEA in mature specimens.

Precaudal vertebrae 14(6) or 16(1). Anterior vertebrae 10(6) or 12(1). Transitional vertebrae 3(3) or 4(3). Displaced haemal spines 3(7).

Coloration in alcohol: Background colour pale yellow to dark brown. Head dark brown dorsally and gradually becoming lighter ventrally. Lips and suborbital region yellowish. Body dark brown gradually and becoming lighter to region overlying anal-fin

Table 3. Morphometrics for examined specimens of *Eigenmannia microstoma*, ***Eigenmannia muirapinima* sp. nov.**, and ***Eigenmannia pavulagem* sp. nov.**

	Eigenmannia microstoma					***Eigenmannia muirapinima* sp. nov.**					***Eigenmannia pavulagem* sp. nov.**				
	Syntypes	Range	Mean	SD	*N*	*H*	Range	M	SD	*N*	*H*	Range	Mean	SD	*N*
Total length (mm)	119.6–246.1	108.5–139.4	139.4	–	16	139.2	99.0–142.6	–	–	19	263.3	33.4–263.3	–	–	36
Length to end of anal fin (mm)	101.0–176.6	57.7–182.9	182.9	–	17	98.7	76.2–98.8	–	–	19	176.6	26.2–176.6	–	–	36
Head length (mm)	11.8–23.5	8.9–23.5	23.5	–	23	12.9	9.9–13.0	–	–	19	19.3	5.01–19.3	–	–	36
Percentage of length to end of anal fin															
Head length	10.9–13.3	10.9–15.5	13.1	1.3	17	13.1	12.1–14.6	13.1	0.6	19	10.9	10.9–19.1	14.1	1.8	36
Preanal distance	16.1–20.0	15.0–20.4	17.9	1.6	16	15.1	14.5–17.4	16.0	0.9	19	13.3	13.3–25.2	17.7	2.4	36
Prepectoral distance	12.5–14.1	12.0–16.7	13.8	1.2	17	13.1	8.5–15.0	13.5	1.3	19	11.0	11.0–19.8	14.6	1.9	36
Snout to anus	5.7–10.0	5.7–14.8	8.4	2.7	15	6.3	5.8–11.0	7.7	1.7	19	5.1	5.1–17.4	10.0	3.4	36
Body depth at pectoral fin	18.3–20.4	16.9–20.8	19.1	1.0	17	17.6	15.5–18.6	17.2	1.0	19	11.6	11.6–17.9	15.7	1.3	36
Body depth at anal fin	14.0–17.0	14.0–18.1	16.5	1.0	16	14.9	13.2–17.5	14.6	1.0	19	11.0	11.0–18.8	15.2	1.7	36
Body width	5.4–6.4	5.3–7.6	6.5	0.7	17	6.1	5.1–7.1	6.1	0.6	19	4.8	4.4–8.4	6.2	0.9	36
Anal-fin length	82.4–85.3	80.9–87.4	84.5	2.0	16	85.4	80.8–90.0	84.9	2.1	19	87.1	67.1–96.8	82.1	4.8	36
Pectoral-fin length	9.3–11.2	7.9–11.9	10.1	1.1	15	8.3	7.4–10.0	8.5	0.7	19	6.4	6.4–9.8	8.3	0.9	36
Caudal filament length	18.2–39.5	15.3–39.5	25.6	7.2	15	41.3	18.4–50.4	40.2	7.2	19	48.8	11.6–48.8	35.3	6.7	36
Percentage of head length															
Snout length	27.9–33.4	23.5–35.0	30.5	2.6	23	21.5	19.6–26.6	23.1	1.9	19	27.7	19.9–28.7	25.5	2.2	36
Internasal distance	9.3–11.7	8.5–13.9	10.1	1.3	23	10.2	7.8–11.5	9.7	1.0	19	8.4	5.8–10.7	8.5	1.3	36
Snout to posterior naris distance	19.8–23.9	18.3–25.9	22.4	2.1	23	17.1	16.1–20.0	18.2	1.2	19	21.0	15.8–22.8	19.0	1.4	36
Posterior naris to orbit distance	5.6–7.0	5.6–11.3	7.6	1.7	23	8.4	6.7–11.0	8.7	1.2	19	6.6	5.4–11.3	8.3	1.3	36
Internarial width	15.0–18.1	13.5–19.7	17.2	1.7	23	16.8	7.9–17.8	15.4	2.3	19	16.5	10.6–20.9	16.6	2.0	36
Orbital diameter	20.3–25.7	15.2–25.7	20.2	2.3	23	18.4	15.4–19.4	17.7	1.0	19	14.2	12.3–19.3	15.8	1.7	36
Postorbital distance	52.5–58.9	49.5–60.2	55.3	3.3	23	53.3	28.4–60.6	55.0	7.2	19	53.9	50.2–60.8	55.7	2.6	36
Opercular opening	34.9–38.6	23.4–42.6	33.8	5.1	21	25.5	18.3–30.1	25.1	2.8	19	25.1	18.0–29.5	25.9	3.1	36
Suborbital depth	29.9–40.8	29.9–40.8	35.1	3.1	13	21.7	18.7–28.4	23.3	2.3	19	25.7	19.4–27.4	23.5	2.0	36
Interorbital distance	30.5–40.5	26.0–41.3	33.8	3.8	23	35.6	24.5–36.3	32.7	2.9	19	25.5	25.5–39.1	31.4	2.8	36
Head width at opercle	52.7–62.2	52.7–71.0	59.7	4.5	23	59.1	57.3–63.8	60.9	1.9	19	54.2	50.2–60.6	55.8	2.9	36
Head width at orbits	38.3–51.0	35.0–58.3	46.6	5.8	23	46.8	28.0–48.1	43.3	2.8	19	38.0	33.8–45.3	39.4	3.2	36
Head depth at supraoccipital	81.6–100.5	76.1–101.1	90.6	7.1	23	96.5	79.4–99.5	89.1	5.4	19	81.7	75.0–89.4	82.1	4.2	36
Head depth at orbits	60.9–78.1	56.7–78.1	65.7	5.5	23	54.6	50.0–61.0	55.1	3.3	19	53.1	48.3–61.8	55.4	3.3	36
Maxilla length	17.3–21.4	17.3–27.2	21.0	2.5	22	16.8	12.7–18.6	16.1	1.7	19	20.0	11.5–20.8	15.9	2.2	36
Oral width	14.1–18.0	13.9–23.0	18.4	2.7	21	13.2	13.2–18.1	15.6	1.5	19	13.0	10.8–19.0	14.8	2.1	36
Percentage of caudal filament length															
Caudal filament depth	5.7–9.3	4.7–15.5	9.7	3.2	14	1.3	1.2–1.9	1.5	0.2	19	1.7	0.7–1.8	1.4	0.2	36
Caudal filament width	2.6–4.1	1.1–5.2	3.3	1.2	14	1.1	0.4–1.3	0.8	0.2	19	0.9	0.4–0.9	0.7	0.1	36

pterygiophores. Four longitudinal dark stripes along body. Lateral-line stripe thin, one scale deep, extending from first perforated lateral-line scale to distal portion of caudal filament. Superior medial stripe thick, two scales deep, tapering from vertical between anal-fin rays 18–20 and posterior one-third of body. Inferior medial stripe moderately thick, two scales deep, extending from vertical between anal-fin rays 15–22 and posterior one-third of body. Anal-fin base stripe thick, two or three scales deep, extending from vertical through base of first to last anal-fin ray. Pectoral and anal fins hyaline, with scattered tiny chromatophores on interradial membranes.

Distribution: *Eigenmannia microstoma* is known from Rio São Francisco basin, Minas Gerais, Brazil (Fig. 6).

Remarks: *Eigenmannia microstoma* was considered a junior synonym of *E. virescens* for years until its revalidation by Mago-Leccia (1994). Mago-Leccia (1994) did not, however, present any basis for recognizing *E. microstoma* as a valid species, resulting in doubts about the identity of the species. Campos-da-Paz (1997) redescribed *E. microstoma* and commented that this species has no, or only one or two, body stripes. This information differs from that in the original description (Reinhardt, 1852), which reports four body stripes in this species. All syntypes have lost their colour pattern, but recently specimens collected from the type locality have been found to bear four stripes on the flanks. We only recognize specimens with four stripes as belonging to *E. microstoma*. Albert (2001) proposed that *E. microstoma* could be more closely related to *Eigenmannia humboldtii* (Steindachner, 1878) and *Eigenmannia limbata* (Schreiner & Miranda Ribeiro, 1903) than to *E. trilineata* because of the body depth in mature specimens (more than 11% TL) and total length over 350 mm in sexually mature individuals; however, *E. microstoma* shares with the other species of the *E. trilineata* species group the presence of the putative synapomorphy we proposed herein. Therefore, we included *E. microstoma* as a member of the *E. trilineata* species group.

Material examined

Syntypes: Brazil. Minas Gerais: all from Município de Lagoa Santa, Rio São Francisco basin. BMNH 1868.7.8.2–3, 2 syntypes, 101.1–139.3 mm LEA. ZMUC P2516 (formerly ZMUC 21), 1 syntype (only photo and radiograph), 162.8 mm LEA. ZMUC P2517 (formerly ZMUC 23), 1 syntype, 153.8 mm LEA. ZMUC P2518 (formerly ZMUC 24), 1 syntype, 176.6 mm LEA. ZMUC P2519 (formerly ZMUC 25), 1 syntype, 105.1 mm LEA. ZMUC P2520 (formerly ZMUC 26), 1 syntype, 101.1 mm LEA.

Non-type specimens: Brazil. Alagoas: MNRJ 24494, 3, 130.8–178.8 mm LEA, floodplain of Marituba, village of Maribuba do Peixe, Município de Penedo. Minas Gerais: MCNIP 143, 3, 99.5–119.0 mm LEA, Rio Juramento at Juramento Dam. MCP 14109, 1, 83.6 mm TL (damaged), Rio São Francisco between Município de Três Marias and Pirapora, 18°13′ S, 45°15′ W. MCP 19840, 1, 182.9 mm LEA, same data as MCP 14109. MCP 45216, 5 + 1CS, 57.7–91.6 mm LEA, Rio Pandeiros, Município de Januária, 15°40′18″ S, 44°38′12″ W. MZUSP 22955, 2, 154.6–156.6 mm LEA, Rio São Francisco, Município de Três Marias, 18°30′ S, 45°17′ W. MZUSP 24643, 1 + 1CS, 131.1 mm LEA, Três Marias dam, 18°30′ S, 45°17′ W. USNM 44966, 1, 165.9 mm LEA, Município de Lagoa Santa.

EIGENMANNIA MUIRAPINIMA SP. NOV.

(FIGS 15, 16; TABLE 3)

Diagnosis: *Eigenmannia muirapinima* can be distinguished from other species in the *E. trilineata* species group, except *E. desantanai*, *E. guairaca*, and

Figure 15. Lateral view of ***Eigenmannia muirapinima* sp. nov.**, holotype, MPEG 21778, 98.7 mm LEA, Brazil, Pará, Rio Amazonas, Igarapé Santo Antônio, tributary of Rio Amazonas, Município de Juruti, Brazil, 2°09′15.9″ S, 56°05′17.9″ W.

Figure 16. Lateral view of head of ***Eigenmannia muirapinima* sp. nov.**, holotype, MPEG 21778, 98.7 mm LEA, Brazil, Pará, Rio Amazonas, Igarapé Santo Antônio, tributary of Rio Amazonas, Município de Juruti, Brazil, 2°09′15.9″ S, 56°05′17.9″ W.

E. microstoma, by the ii,11–12 pectoral-fin rays (versus ii,13–14 in *E. antonioi* and *E. pavulagem*; ii,16–17 in *E. matintapereira* and *E. trilineata*; ii,15–17 in *E. vicentespelaea*; and ii,13–15 in *E. waiwai*). *Eigenmannia muirapinima* differs from *E. desantanai* and *E. microstoma* by the pattern of premaxillary dentition with eight to ten teeth distributed in two rows (outer row with three to five teeth; inner with four to six teeth) [versus 24–25 teeth distributed in four rows (outermost row with five teeth; second row with six to eight teeth; third row with six to seven teeth; innermost row with seven to eight teeth); and 16 teeth distributed in three rows (outermost row with five teeth; middle row with six; innermost with five teeth), respectively]. *Eigenmannia muirapinima* also differs from *E. desantanai* by depth of the inferior medial stripe of two or three scales deep (versus one scale deep). *Eigenmannia muirapinima* can be further distinguished from *E. microstoma* by: suborbital depth 18.7–28.4% HL (versus 29.9–40.8%); length of anterodorsal process of maxillar equal to 50% of the width of the posterior nostril (versus equal to the width of posterior nostril); and coronomeckelian bone length equal to 20% of the length of Meckel's cartilage (versus 45% of the length of Meckel's cartilage). *Eigenmannia muirapinima* also differs from *E. guairaca* by the number of total anal-fin rays 170–198 (versus 151–170).

Description: Morphometric data are presented in Table 3. Body elongate and laterally compressed. Dorsal profile of body nearly straight from rear of head to vertical through middle of anal fin, and then posteroventrally aligned with distal portion of caudal filament. Ventral profile of body posteroventrally aligned from anterior margin of dentary to anal-fin rays 15–30, and then posterodorsally aligned with last anal-fin ray. Ventral margin of caudal filament straight. Greatest body depth at vertical through distal margin of pectoral fin.

Head laterally compressed with greatest width at opercular region and greatest depth at posterior margin of supraoccipital. Dorsal profile of head slightly convex from upper lip to vertical through branchial opening. Ventral profile of head slightly concave from anterior margin of lower lip to branchial opening. Snout rounded in profile. Mouth terminal. Upper lip slightly overlapping lower lip or jaws of same length. Premaxilla teeth, 8(1), 9(2), or 10(1), distributed in two rows [outer row with 3(1), 4(1), or 5(1) teeth; inner row with 4(2), 5(2), or 6(1) teeth]. Maxilla with sickle-shaped anterodorsal process equal to 50% of width of posterior nostril. Dentary teeth 11(2), 13(1), 15(1), or 16(1), distributed in one or two rows [outer row with 7(1), 8(1), 9(1), 10(1), or 11(1) teeth; inner row with 4(1) or 5(3) teeth]. Dentary teeth increasing abruptly in size from fifth, sixth, or seventh teeth of outer row towards rictus. Coronomeckelian bone equal to 20% of length of Meckel's cartilage. Endopterygoid with 8(2) or 9(3) teeth in two series. Mouth rictus at vertical through anterior nostril or in region between nares. Anterior naris tube-like, with posterior margin located at vertical through posterior margin of or in median portion of rictus. Posterior naris elliptical, without tube, located closer to anterior margin of eye than snout tip. Eye approximately circular, covered by skin, laterally located on anterior half of head. Antorbital and infraorbitals 1–4 in form of enlarged, partial cylinders with slender osseous arches. Fifth and sixth infraorbitals slender and tubular. Depth of posterodorsal expansion on infraorbitals 1 + 2 equals total length of infraorbitals 1 + 2. Branchial opening moderately elongate. Branchial membrane joined to isthmus. Anus and urogenital papilla shifting anteriorly ontogenetically. Anus and urogenital papilla at vertical through posterior margin of orbit in mature specimens.

Cycloid scales present from immediately posterior to head to distal portion of caudal filament. Lateral line complete, with 100(2), 101(1), 113(1), 117*(4), 119(2), 120(1), 121(1), 126(1), 128(3), 129(2), or 140(1) perforated scales to vertical through end of anal fin. Longitudinal series of scales above lateral line, 8(2), 9(4), 10*(5), 11(3), 12(2), or 13(3). Scales over anal-fin pterygiophores approximately one-half the size of others.

Pectoral-fin rays ii,11*(11) or ii,12(8). Distal margin of fin slightly rounded. Tip of pectoral fin margin reaching vertical through base of anal-fin rays 18–21. Anal-fin origin located immediately posterior to vertical through pectoral-fin base; total anal-fin rays, 170–198 (179*, $N = 18$; Table 2). Distal margin of anal fin approximately concave. Caudal filament cylindrical,

tapering gradually distally, relatively short and approximately 30% of LEA in mature specimens.

Precaudal vertebrae 13(4) or 14(1). Anterior vertebrae 11(5). Transitional vertebrae 2(4) or 3(1). Displaced haemal spines 2(1) or 3(4).

Coloration in alcohol: Background colour darkened. Head dark dorsally and gradually becoming lighter ventrally. Lips and suborbital region dark yellow. Body dark brown dorsally, gradually becoming lighter to region overlying anal-fin pterygiophores. Four longitudinal dark stripes along body. Lateral-line stripe thin, one scale deep, extending from first perforated lateral-line scale to distal portion of caudal filament. Superior medial stripe thick, two or three scales deep, tapering from vertical between base of anal-fin rays 21–30 to posterior one-third of body. Inferior medial stripe moderately thick, two or three scales deep, extending from vertical between base of anal-fin rays 12–22 to posterior one-third of body. Anal-fin base stripe thick, two scales deep, extending from vertical between base of anal-fin rays 1–10 to last anal-fin ray. Pectoral and anal fins hyaline, with scattered tiny chromatophores on interradial membranes.

Distribution: *Eigenmannia muirapinima* sp. nov. is known from Igarapé Santo Antônio and Lago Jará, both tributaries of Rio Amazonas, Rio Amazonas basin, Pará, Brazil (Fig. 6).

Etymology: The epithet '*muirapinima*' is a tribute to the indigenous people of the tribe Muirapinima, who inhabit the region near the type locality of the species.

Material examined

Holotype: Brazil. Pará: MPEG 21778, 98.7 mm LEA, Igarapé Santo Antônio, tributary of Rio Amazonas, Rio Amazonas basin, 2°09′15.9″ S, 56°05′17.9″ W, collected by W. Wosiacki, R. Raiol, and M. Mendonça, 6 October 2011.

Paratypes: Brazil. Pará: MPEG 21777, 1 + 3 CS, 84.6–98.5 mm LEA, Lago Jará, tributary of Rio Amazonas, Rio Amazonas basin, 2°12′45″ S, 56°00′45.4″ W, collected by W. Wosiacki, 6 October 2011. MPEG 22163, 1, 86.7 mm LEA, Lago Jará, tributary of Rio Amazonas, Rio Amazonas basin, 2°09′15.9″ S, 56°05′17.9″ W, collected by L. Peixoto, 5 October 2011; MPEG 29489, 9, 76.2–97.7 mm LEA; MZUSP 116796, 2 + 2CS, 80.0–96.9 mm LEA, collected with holotype.

EIGENMANNIA PAVULAGEM SP. NOV.
(FIGS 17, 18; TABLE 3)

Eigenmannia gr. *trilineata*, Vari *et al*., 2012: 697 (comparative material).

Diagnosis: *Eigenmannia pavulagem* can be distinguished from other species in the *E. trilineata* species group, except *E. guairaca* and *E. microstoma*, by the pattern of premaxillary dentition with 13–16 teeth distributed in three rows (outer row with three to five teeth; middle row with five to six; inner row with four to six) [versus eight to 12 teeth distributed in two rows [outer row with 3–6 teeth; inner row with 4–6 teeth] in E. antonioi; 24 or 25 teeth distributed in four rows [outermost row with 5 teeth; second row with 6–8 teeth; third row with 6 or 7 teeth; innermost row with 7 or 8 teeth] in E. desantanai; 22–24 teeth distributed in four rows (outermost row with three or four teeth; second row with five or six teeth; third row with seven teeth; innermost with six to eight teeth) in *E. matintapereira*; eight to ten teeth distributed in two rows (outer row with three to five teeth; inner row with four to six teeth) in *E. muirapinima*; 31–33 teeth distributed in four rows (outermost row with eight or nine teeth; second row with five or six; third row with ten; innermost row with seven to nine teeth) in *E. trilineata*; 25–26 teeth distributed in four rows (outermost with five or six teeth; second row with four to seven teeth; third row with seven or eight teeth; innermost row with five to nine teeth) in *E. vicentespelaea*; and 35–40 teeth distributed in five rows (outermost row with seven to eight teeth; second row with seven or eight teeth; third row with eight or nine teeth; fourth row with seven to nine teeth; innermost row with six teeth) in *E. waiwai*]. *Eigenmannia pavulagem* can be distinguished from *E. guairaca* by the ii,13–14 pectoral-fin

Figure 17. Lateral view of ***Eigenmannia pavulagem* sp. nov.**, holotype, MPEG 6887, 176.6 mm LEA, Igarapé Paraquequara, Rio Capim, Rio Guamá basin, Município de Paragominas, Pará, Brazil, 3°14′50″ S, 47°45′50″ W.

Figure 18. Lateral view of head of ***Eigenmannia pavulagem* sp. nov.**, holotype, MPEG 6887, 176.6 mm LEA, Igarapé Paraquequara, Rio Capim, Rio Guamá basin, Município de Paragominas, Pará, Brazil, 3°14′50″ S, 47°45′50″ W.

rays (versus ii,11–12), and by the number of total anal-fin rays 176–201 (versus 151–170). *Eigenmannia pavulagem* can be differentiated from *E. microstoma* by the suborbital depth 19.4–27.4% HL (versus 29.9–40.8%); the length of anterodorsal process of maxilla equal to 50% the width of the posterior nostril (versus equal to the width of the posterior nostril); and the coronomeckelian bone length equal to 20% the length of Meckel's cartilage (versus 45% the length of Meckel's cartilage).

Description: Morphometric data are presented in Table 3. Body elongate and laterally compressed. Dorsal profile of body nearly straight from rear of head to vertical through middle of anal fin, and then posteroventrally aligned with distal portion of caudal filament. Ventral profile of body slightly concave along anterior half of abdominal cavity, then posterodorsally aligned with last anal-fin ray. Ventral margin of caudal filament straight. Greatest body depth at vertical through distal margin of pectoral fin.

Head laterally compressed, with greatest width at opercular region and greatest depth at posterior margin of supraoccipital. Dorsal profile of head slightly convex from upper lip to vertical through branchial opening. Ventral profile of head slightly concave from anterior margin of lower lip to branchial opening. Snout rounded in profile. Mouth terminal. Upper lip slightly overlapping lower lip. Premaxillary teeth, 13(1), 14(1), 15(2), or 16(1), distributed in three rows [outermost row with 3(2), 4(2), or 5(1) teeth; median row with 5(1) or 6(4) teeth; innermost row with 4(2), 5(1), or 6(2) teeth]. Maxilla with sickle-shaped anterodorsal process equal to 50% of width of posterior nostril. Dentary teeth 15(1), 17(1), 20(2), or 21(1), distributed in two rows [outer row 11(1), 12(3), or 16(1) teeth; inner row with 4(1), 5(2), or 8(2) teeth]. Dentary teeth increasing abruptly in size from seventh, ninth, or tenth teeth of outer row towards rictus. Coronomeckelian bone equal to 20% of length Meckel's cartilage. Endopterygoid with 8(1), 9(1), 10(2), or 11(1) teeth in one or two rows. Mouth rictus at vertical through anterior nostril or in region between nares. Anterior naris tube-like, with posterior margin located at vertical through posterior margin of, or in median portion of, rictus. Posterior naris elliptical, without tube, located closer to anterior margin of eye than snout tip. Eye approximately circular, covered by skin, laterally located on anterior half of head. Antorbital and infraorbitals 1–4 in form of enlarged, partial cylinders with slender osseous arches. Fifth and sixth infraorbitals slender and tubular. Depth of posterodorsal expansion on infraorbitals 1 + 2 equals total length of infraorbitals 1 + 2. Branchial opening moderately elongate. Branchial membrane joined to isthmus. Anus and urogenital papilla shifting anteriorly ontogenetically and at vertical through posterior margin of orbit in mature specimens.

Cycloid scales present from immediately posterior to head to distal portion of caudal filament. Lateral line complete with 120(1), 121(2), 125(1), 126(1), 127(1), 128(1), 129(4), 130(1), 131(1), 132(3), 133(2), 134 (1), 135(2), 136(1), 137*(3), 138(1), 139(2), 140(2), 144(1), or 146(1) perforated scales to vertical through end of anal fin. Longitudinal series of scales above lateral line, 8(11), 9*(12), 10(6), 11(3), or 12(2). Scales over anal-fin pterygiophores approximately one-half the size of others.

Pectoral-fin rays, ii,13*(16) or ii,14(22). Distal margin of fin slightly rounded. Tip of pectoral fin reaching vertical through base of anal-fin rays 14–18. Anal-fin origin immediately posterior to vertical through pectoral-fin base; total anal-fin rays, 176–201 (192*, $N = 38$; Table 2). Distal margin of anal fin approximately concave. Caudal filament cylindrical, tapering gradually distally, relatively long and approximately 50% of LEA in mature specimens.

Precaudal vertebrae, 13(1), 14(3), or 15(1). Anterior vertebrae, 10(1), 11(3), or 13(1); transitional vertebrae, 1(1), 3(3) or 4(1). Displaced haemal spines, 3(5).

Coloration in alcohol: Background colour dark yellow. Dorsal region of head darkened; gradually becoming lighter ventrally. Lips and suborbital region clear yellow. Dorsal region of body yellowish, gradually lighter in region overlying anal-fin ray pterygiophores. Four longitudinal dark stripes along body. Lateral-line stripe thin, one scale deep, extending from first perforated lateral-line scale to distal portion of caudal filament.

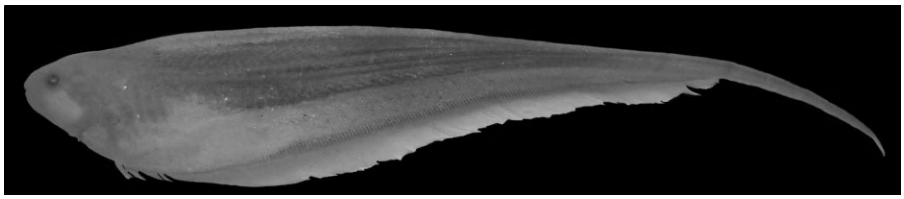

Figure 19. Lateral view of *Eigenmannia trilineata*, holotype, MACN 5470, 129.9 mm LEA, Río de La Plata, near Nuñes, Río de La Plata basin, Argentina, approximately 34°25′40.27″ S, 58°28′21.2″ W.

Superior medial stripe thick, two scales deep, tapering from vertical between base of anal-fin rays 25–30 to posterior one-third of body. Inferior medial stripe moderately thick, two scales deep, extending from vertical between base of anal-fin rays 14–30 to posterior one-third of body. Anal-fin base stripe thick, two scales deep, extending from vertical between base of anal-fin rays 10–20 to last anal-fin ray. Pectoral and anal fins hyaline, with scattered tiny chromatophores on interradial membranes.

Distribution: *Eigenmannia pavulagem* sp. nov. is known from small tributaries of the Rio Capim, Rio Guamá basin, north-eastern Pará, Brazil (Fig. 6).

Etymology: The epithet '*pavulagem*' is a tribute to the cultural movement created in the state of Pará, 'Arraial do Pavulagem', characterized by music of a unique traditional style that originated in Amazon region.

Material examined

Holotype: Brazil. Pará: MPEG 6887, 176.6 mm LEA, Igarapé Paraquequara, tributary of Rio Capim, Rio Guamá basin, Município de Paragominas, 3°14′50″ S, 47°45′50″ W, collected by A. Souza, 16 April 2003.

Paratypes: Brazil. Pará: MPEG 7307, 2, 120.8–133.1 mm LEA, Igarapé Paraquequara, tributary of Rio Capim, Rio Guamá basin, 3°16′05″ S, 47°46′05″ W, collected by A. Souza, 13 December 2002. MPEG 7308, 6, 63.1–94.9 mm LEA, Igarapé Paraquequara, tributary of Rio Capim, Rio Guamá basin, 3°16′05″ S, 47°46′05″ W, collected by V. Sena, 13 December 2002. MPEG 9524, 3CS, 90.7–108.5 mm LEA, Igarapé Anuera-Grande, tributary of Rio Capim, Rio Guamá basin, 2°30′2.9″ S, 48°16′52.6″ W, collected by A. Souza, 30 June 2005. MPEG 9535, 10, 42.6–102.7 mm LEA, Igarapé Arrainha, tributary of Rio Capim, Rio Guamá basin, 02°25′11.1″ S, 48°12′13.1″ W, collected by L. Montag, 1 July 2005. MPEG 29490, 17, 26.2–176.6 mm LEA; MZUSP 116797, 2, 118.4–152.8 mm LEA, collected with the holotype; INPA 46984, 2, 90.2–113.4 mm LEA, collected with holotype. NUP 17104, 2, 82.7–114.7 mm LEA, collected with holotype.

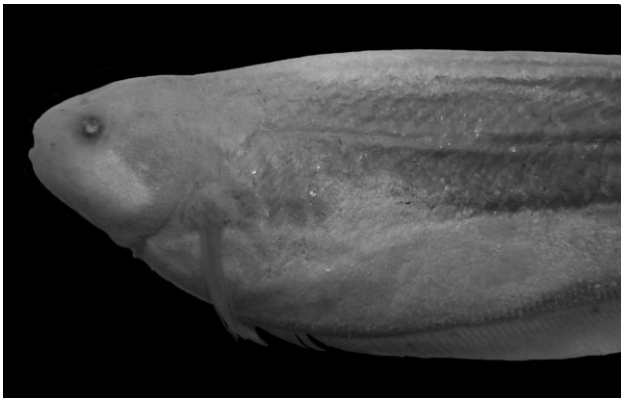

Figure 20. Lateral view of head of *Eigenmannia trilineata*, holotype, MACN 5470, 129.9 mm LEA, Río de La Plata, near Nuñes, Río de La Plata basin, Argentina, approximately 34°25′40.27″ S, 58°28′21.2″ W.

EIGENMANNIA TRILINEATA LÓPEZ & CASTELLO, 1966 (FIGS 19, 20; TABLE 4)

Eigenmannia trilineata López & Castello, 1966: 8 (original description; type locality, Nuñez, Río de La Plata, Argentina). Mago-Leccia, 1978: 16 (synonym of *E. virescens*). Mago-Leccia, 1994: 20 (catalogue). Braga and Piacentino, 1994: 106 (catalogue). Albert, 2003: 488 (catalogue). López *et al*., 2003: 65 (in listing of species from Argentina).

Diagnosis: *Eigenmannia trilineata* can be distinguished from other species in the *E. trilineata* species group, except *E. microstoma*, by the suborbital depth 32.5–46.6% HL (versus 18.4–27.8% in *E. antonioi*; 20.8–28.9% in *E. desantanai*; 22.2–27.5% in *E. guairaca*; 18.2–26.1% in *E. matintapereira*; 18.7–28.4% in *E. muirapinima*; 19.4–27.4% in *E. pavulagem*; 21.7–27.4% in *E. vicentespelaea*; and 19.0–28.3% in *E. waiwai*). *Eigenmannia trilineata* differs from *E. microstoma* by dentition pattern of the premaxilla with 31–33 teeth distributed in four rows (outermost row with eight or

Table 4. Morphometrics for examined specimens of *Eigenmannia trilineata*, *Eigenmannia vicentespelaea*, and ***Eigenmannia waiwai* sp. nov**

	Eigenmannia trilineata					*Eigenmania vicentespelaea*					***Eigenmania waiwai* sp. nov.**				
	H	Range	Mean	SD	*N*	*H*	Range	Mean	SD	*N*	*H*	Range	Mean	SD	*N*
Total length (mm)	165.1	103.8–204.9	–	–	24	148.2	108.9–207.9	–	–	10	224.1	158.8–224.1	–	–	26
Length to end of anal fin (mm)	130.0	70.0–161.4	–	–	25	114.9	83.6–157.4	–	–	10	146.1	74.9–146.1	–	–	37
Head length (mm)	16.0	11.3–20.8	–	–	25	14.6	11.1–18.6	–	–	10	18.7	13.6–18.7	–	–	37
Percentage of length to end of anal fin															
Head length	12.3	12.0–14.1	13.0	0.5	25	12.7	11.4–13.4	12.7	0.7	10	12.8	11.8–15.0	13.3	0.8	37
Preanal distance	17.2	14.0–20.0	17.2	1.4	25	17.2	15.1–17.2	16.2	0.8	10	16.2	15.6–19.6	17.5	1.4	37
Prepectoral distance	13.4	12.6–18.8	14.3	1.4	25	13.9	12.3–15.1	13.9	0.8	10	13.8	12.2–15.5	13.8	0.9	37
Snout to anus	7.1	6.6–11.5	8.8	1.5	25	8.0	7.0–9.1	7.9	0.7	10	6.3	6.2–8.8	7.2	0.9	37
Body depth at pectoral fin	19.0	15.8–20.1	18.1	1.2	25	13.5	10.5–14.5	12.9	1.5	10	15.3	14.9–18.7	16.4	1.1	37
Body depth at anal fin	16.5	13.6–18.4	15.7	1.3	25	13.3	11.5–13.3	12.0	0.9	10	13.3	13.2–16.5	14.9	1.1	37
Body width	5.7	3.9–6.8	5.9	0.6	25	5.3	3.5–5.8	4.8	0.7	10	6.7	5.6–8.9	6.7	0.8	37
Anal-fin length	87.4	80.6–90.7	86.3	2.5	25	81.2	81.2–88.0	85.2	2.5	10	88.3	75.0–88.3	82.5	3.3	37
Pectoral-fin length	10.3	7.9–11.2	9.7	0.8	25	–	7.6–11.0	9.5	1.1	10	8.2	7.9–11.5	9.8	0.9	37
Caudal filament length	27.0	19.8–37.1	26.6	4.4	24	29.0	27.5–33.5	30.3	2.2	10	53.4	47.2–66.9	56.9	6.2	26
Percentage of head length															
Snout length	27.8	16.8–29.5	24.2	3.0	25	36.8	28.6–36.8	32.5	2.7	10	29.5	23.8–31.5	27.2	2.0	37
Internasal distance	10.0	7.1–13.5	9.5	1.5	25	10.6	8.6–10.6	9.8	0.7	10	10.0	7.1–10.0	8.9	0.8	37
Snout to posterior naris distance	21.5	14.2–21.5	17.8	1.7	25	21.0	18.5–22.3	20.5	1.2	10	20.5	16.5–24.6	20.4	2.1	37
Posterior naris to orbit distance	9.3	4.8–9.3	7.3	1.4	25	11.2	6.9–13.9	10.2	2.3	10	8.1	4.5–9.4	6.9	1.4	37
Internarial width	15.8	10.7–23.5	16.6	2.6	25	17.2	14.0–17.4	15.6	1.3	10	12.3	11.8–16.1	14.2	1.2	37
Orbital diameter	17.3	15.3–21.6	17.9	1.5	25	8.0	5.0–18.0	9.6	4.1	10	26.3	22.6–28.8	25.8	2.0	37
Postorbital distance	55.8	51.3–65.4	57.9	3.3	25	56.9	45.8–58.3	52.6	3.9	10	49.7	43.9–55.4	48.8	3.2	37
Opercular opening	33.1	22.4–35.0	28.5	3.2	25	24.1	22.3–30.1	24.6	2.4	10	29.5	22.8–32.0	27.1	2.8	37
Suborbital depth	40.7	32.5–46.6	38.4	4.1	25	23.0	21.7–27.4	24.9	2.0	10	24.2	19.0–28.3	23.2	2.3	37
Interorbital distance	40.5	30.4–40.5	35.0	2.6	25	27.2	24.8–33.3	29.5	2.7	10	25.2	24.4–30.3	26.9	1.7	37
Head width at opercle	54.6	49.9–65.6	58.2	4.8	25	55.9	52.4–55.9	53.9	1.4	10	56.0	50.3–58.7	54.5	2.7	37
Head width at orbits	47.5	40.0–49.1	43.6	2.7	25	37.8	31.6–37.8	35.6	1.9	10	39.6	35.2–46.3	41.4	3.2	37
Head depth at supraoccipital	85.2	71.7–94.8	84.2	5.5	25	73.9	68.6–74.7	71.8	2.1	10	77.6	73.6–86.2	79.6	3.7	37
Head depth at orbits	69.4	55.4–71.7	63.4	4.4	25	52.5	49.3–55.8	53.2	2.3	10	50.7	50.1–56.1	53.9	1.8	37
Maxilla length	17.5	14.2–26.1	18.7	2.7	25	21.3	13.9–21.3	17.1	2.2	10	16.8	12.1–17.7	15.1	1.6	37
Oral width	18.5	14.6–20.1	17.5	1.8	25	15.2	9.5–17.2	13.0	2.3	10	12.1	9.5–14.6	12.3	1.4	37
Percentage of caudal filament length															
Caudal filament depth	2.4	1.9–3.0	2.3	0.3	24	1.4	1.1–1.5	1.4	0.2	10	1.7	1.2–2.2	1.7	0.3	26
Caudal filament width	0.4	0.4–1.4	0.9	0.3	24	0.5	0.4–0.6	0.5	0.1	10	1.2	0.6–1.6	1.1	0.3	26

nine teeth; second row with five or six teeth; third row with ten teeth; innermost with seven to nine teeth) [versus 16 teeth distributed in three rows (outermost row with five teeth; middle row with six teeth; innermost row with five teeth)]; the the dentition pattern of the dentary, 23 teeth distributed in two rows (outer row with eight teeth; inner row with 15 teeth) [versus 16 teeth distributed in two rows (outer row with 10 teeth; inner row with six teeth)]; and the length of the coronomeckelian bone equal to 20% of the length of Meckel's cartilage (versus 45% of the length of Meckel's cartilage).

Description: Morphometric data are presented in Table 4. Body elongate and laterally compressed. Dorsal profile of body nearly straight from rear of head to vertical through middle of anal fin, and then posteroventrally aligned with distal portion of caudal filament. Ventral profile of body slightly concave along anterior half of abdominal cavity, and then posterodorsally aligned with last anal-fin ray. Ventral margin of caudal filament straight. Greatest body depth at vertical through distal margin of pectoral fin.

Head laterally compressed, with greatest width at opercular region and greatest depth at posterior margin of supraoccipital. Dorsal profile of head slightly convex from upper lip to vertical through branchial opening. Ventral profile of head slightly concave from anterior margin of lower lip to branchial opening. Snout rounded in profile. Mouth terminal. Upper lip slightly overlapping lower lip. Premaxillary teeth, 31(2) or 33(1), distributed in four rows [outermost row with 8(1) or 9(1) teeth; second row with 5(1) or 6(1) teeth; third row with 10(2) teeth; innermost row with 7(1) or 9(1) teeth]. Maxilla with sickle-shaped anterodorsal process equal to width of posterior nostril. Dentary teeth 23(1) distributed in two rows [outer row with 8(1) teeth; inner row with 15(1) teeth]. Dentary teeth similar in size. Coronomeckelian bone equal to 20% of length of Meckel's cartilage. Endopterygoid with 16(1) or 17(1) teeth in two rows. Mouth rictus at vertical through anterior nostril, or in region between nares. Anterior naris tube-like, with posterior margin located at vertical through posterior margin of, or in median portion of, rictus. Posterior naris elliptical, without tube, located closer to anterior margin of eye than snout tip. Eye approximately circular, covered by skin, laterally located on anterior half of head. Antorbital and infraorbitals 1–4 in form of enlarged, partial cylinders with slender osseous arches. Fifth and sixth infraorbitals slender and tubular. Depth of posterodorsal expansion on infraorbitals 1 + 2 equals 50% the length of infraorbitals 1 + 2. Branchial opening moderately elongate. Branchial membrane joined to isthmus. Anus and urogenital papilla shifting anteriorly ontogenetically; at vertical through posterior margin of orbit in mature specimens.

Cycloid scales present from immediately posterior to head to distal portion of caudal filament. Lateral line complete, with 107(1), 112(2), 114(1), 115(1), 116(3), 117(1), 118(5), 119(2), 121(3), 123(2), 125*(2), 131(2), or 135(1) perforated scales to vertical through end of anal fin. Longitudinal series of scales above lateral line 9*(15), 10(6), 11(3), or 12(2). Scales over anal-fin pterygiophores approximately one-half size of others.

Pectoral-fin rays, ii,14*(20) or ii,15(6). Distal margin of fin approximately straight. Tip of pectoral-fin reaching vertical through base of anal-fin rays 16–20. Anal-fin origin immediately posterior to vertical through pectoral-fin base; total anal-fin rays, 176–217 (195*, $N = 26$; Table 2). Distal margin of anal fin approximately concave. Caudal filament cylindrical, tapering gradually distally, relatively long, and approximately 50% of LEA in mature specimens.

Precaudal vertebrae 14(3). Anterior vertebrae 11(3); transitional vertebrae 3(3). Displaced haemal spines 3(3).

Coloration in alcohol: Background colour yellowish to dark brown. Head dark dorsally, and gradually becoming lighter ventrally. Lips and suborbital region light yellow. Body dark brown dorsally and gradually becoming lighter to region overlying anal-fin pterygiophores. Four longitudinal dark stripes along body. Lateral line stripe, one scale deep, extending from first perforated lateral-line scale to distal portion of caudal filament. Superior medial stripe thick, two scales deep, tapering from vertical through base of anal-fin rays 19–35 to posterior one-third of body. Inferior medial stripe moderately thick, two scales deep, extending from vertical through base of anal-fin rays 20–31 to posterior one-third of body. Anal-fin base stripe thick, two scales deep, extending from vertical between base of anal-fin rays 20–35 to last anal-fin ray. Pectoral and anal fins hyaline, with scattered tiny chromatophores on interradial membranes.

Distribution: *Eigenmannia trilineata* is known from Río de La Plata basin and lower Río Paraná basin, Argentina (Fig. 6).

Remarks: Examination of the type specimens revealed some divergences from data in the original description. The authors gave the number pectoral-fin rays as 'i,14' or 'i,15' (López & Castello, 1966: 10; table 1); however, all the types have ii,14 or ii,15 pectoral-fin rays. This difference could be a function of the small size of the first unbranched pectoral-fin ray. Furthermore, López & Castello (1966: table 1) cited 193 anal-fin rays for the holotype; however, we detected 195 anal-fin rays. This difference may also be related to the small size of the first unbranched anal-fin rays.

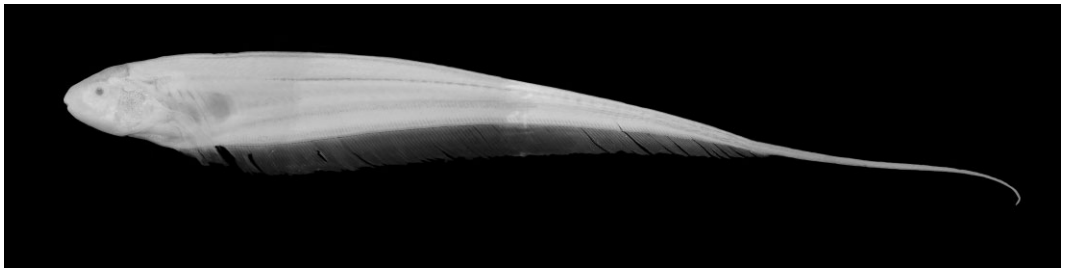

Figure 21. Lateral view of *Eigenmannia vicentespelaea*, MZUSP 83461, 108.5 mm LEA, Cave São Vicente I, Rio São Vicente, Rio Tocantins basin, Goiás, Brazil, approximately 13°35′30″ S, 46°21′ W.

Additionally, the original description of the colour pattern was described as 'three conspicuous dark horizontal stripes . . .' (López & Castello, 1966: 11; fig. 1). All types have lost their colour pattern, but specimens recently collected in the type locality (e.g. MACN 7390) have an additional stripe that we refer to in the description as the superior medial stripe.

During an examination of material from the lower Río Paraná and the Río de La Plata, we observed two species of *Eigenmannia* occurring in these localities: *E. trilineata* and a species with uniform colour pattern, without longitudinal stripes, designated in this study as *E. virescens* (see comparative material examined). This proposal is justified by the fact that the original illustration of that species provided by d'Orbigny (in Valenciennes, 1847; plate xiii) indicates that longitudinal dark stripes are absent, and the detailed historical record presented by Papavero (1971) indicates that the localities from which this material originated are the probable type localities. Additionally, other species collected by Alcide d'Orbigny and described by Valenciennes have been shown to have type localities in the Río de la Plata basin, Argentina, as *Astyanax orbigyanus* (Valenciennes, 1850), *Ancistrus cirrhosus* (Valenciennes, 1836), *Cynopotamus argenteus* (Valenciennes, 1836), and *Synbranchus pardalis* Valenciennes, 1842 (currently *S. marmoratus*). Thus, we assign the name *E. virescens* to the population without dark stripes from the hydrographic system of the lower Río Paraná basin and the Río de La Plata.

Material examined

Type specimens: Argentina. Nuñez: MACN 5470, holotype, 130.0 mm LEA, Río de La Plata, approximately 34°25′40.27″ S, 58°28′21.2″ W, 24 August 1966. MACN 5471, 9 paratypes, 79.9–161.3 mm LEA.

Non-type specimens: Argentina: MACN 6003, 98 + 2 dissected, 89.5–153.6 mm LEA, Río de La Plata, approximately 34°25′57″ S, 58°26′35″ W. MACN 6927, 60, 98.5–155.6 mm LEA, Río Paraná, 31°02′55″ S, 59°47′10″ W. MACN 7023, 10, 95.5–143.5 mm LEA, Río San Javier, Río de Paraná basin, 31°29′50″ S, 60°20′32″ W.

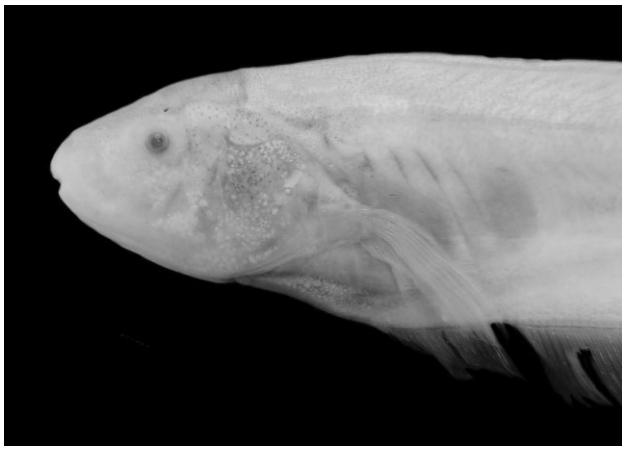

Figure 22. Lateral view of head of *Eigenmannia vicentespelaea*, MZUSP 83461, 108.5 mm LEA, Cave São Vicente I, Rio São Vicente, Rio Tocantins basin, Goiás, Brazil, approximately 13°35′30″ S, 46°21′ W.

MACN 7024, 1, 115.7 mm LEA, Río Paraná basin, 34°31′ S, 59°41′ W. MACN 7390, 8, 94.4–118.1 mm LEA, Río de La Plata, 34°25′57″ S, 58°26′35″ W. MACN 7947, 2, 119.5–145.6 mm LEA, Río Yabebury, Río de Paraná basin, 27°18′11.84″ S, 55°34′11.20″ W. MACN 9306, 3, 82.8–87.1 mm LEA, Río Paraná, 27°31′ S, 58°34′ W. MZUSP 111151, 1, 95.9 mm LEA, Río de La Plata, 34°25′40.27″ S, 58°28′21.20″ W. MZUSP 22616, 1CS, 142.9 mm LEA, Río de La Plata, 34°25′40.27″ S, 58°28′21.20″ W.

EIGENMANNIA VICENTESPELAEA TRIQUES, 1996 (FIGS 5A, 21, 22; TABLE 4)

Eigenmannia vicentespelaea Triques, 1996: 3 (original description; type locality, State of Goiás, Rio Tocantins basin, Rio São Vicente, Cave São Vicente II, Brazil). Romero & Paulson, 2001: 29 (cheklist). –Albert, 2003: 488 (catalogue). Bichuette & Trajano, 2006: 101 (comments on morphology, distribution, and expanded diagnosis).

Diagnosis: *Eigenmannia vicentespelaea* can be distinguished from others species in the *E. trilineata* species group, except *E. waiwai*, by the subterminal mouth (versus terminal mouth). *Eigenmannia vicentespelaea* also differs from species in the *E. trilineata* species group, except *E. microstoma*, by the length of the coronomeckelian bone equal to 45% of the length of Meckel's cartilage (Fig. 5; versus 20% of the length of Meckel's cartilage). *Eigenmannia vicentespelaea* can be distinguished from *E. microstoma* and *E. waiwai* by the body depth at the vertical through the longest pectoral-fin ray, 10.5–14.5% LEA (versus 16.9–20.8% and 14.9–18.7%, respectively); seven or eight longitudinal series of scales above the lateral line (versus 11–15 and nine or ten, respectively); and length of anterodorsal process of the maxilla equal to 50% of the width of the posterior nostril (versus equal to the width of the posterior nostril in *E. microstoma* and 1.5 times the width of the posterior nostril in *E. waiwai*). *Eigenmannia vicentespelaea* also differs from *E. microstoma* by the body depth at the vertical through the first anal-fin ray, 11.5–13.3% LEA (versus 14.0–18.1%); head depth at the posterior limit of the supraoccipital, 68.6–74.7% HL (versus 76.1–101.1%); suborbital depth, 21.7–27.4% HL (versus 29.9–40.8%); and head depth at the orbit, 49.3–55.8% HL (versus 56.7–78.1%). *Eigenmannia vicentespelaea* can be further distinguished from *E. waiwai* by the depth of posterodorsal expansion on infraorbitals 1 + 2 approximately equal to the total length of infraorbitals 1 + 2 (versus less than 50% of the length of infraorbitals 1 + 2).

Description: Morphometric data are presented in Table 4. Body elongate and laterally compressed. Dorsal profile of body nearly straight from rear of head to vertical through middle of anal fin, and then posteroventrally aligned with distal portion of caudal filament. Ventral profile of body slightly concave along anterior half of abdominal cavity, then posterodorsally aligned with the last anal-fin ray. Ventral margin of caudal filament straight. Greatest body depth at vertical through distal margin of pectoral fin.

Head laterally compressed with greatest width at opercular region and greatest depth at posterior margin of supraoccipital. Dorsal profile of head slightly convex from upper lip to vertical through branchial opening. Ventral profile of head slightly concave from anterior margin of lower lip to branchial opening. Snout rounded in profile. Mouth subterminal. Upper lip overlapping lower lip. Premaxillary teeth 25(1) or 26(2), distributed in four rows [outermost row with 5(1) or 6(2) teeth; second row with 4(1) or 7(2) teeth; third row with 7(2) or 8(1) teeth; innermost row with 5(1), 6(1), or 9(1) teeth]. Maxilla with sickle-shaped anterodorsal process equal to 50% width of posterior nostril. Dentary teeth 38(1), 41(1), or 45(1) distributed in three or four rows [outermost row with 12(1), 15(1), or 21(1) teeth; second row with 14(2) or 16(1) teeth; third row with 10(1) teeth; innermost row with 2(1) or 10(2) teeth]. Dentary teeth all similar in size. Coronomeckelian bone equal to 45% of length of Meckel's cartilage. Endopterygoid with 10(1), 12(1), or 15(1) teeth in two rows. Mouth rictus at vertical through anterior nostril or in region between nares. Anterior naris tube-like, posterior margin located at vertical through posterior margin of, or in median portion of, rictus. Posterior naris elliptical, without tube, located closer to anterior margin of eye than snout tip. Eye approximately circular; of different stages of development ranging from completely absent to fully developed, with no apparent link to ontogenetic development. When present, covered by skin, laterally located on anterior half of head. Antorbital and infraorbitals 1–4 in form of enlarged, partial cylinders with slender osseous arches. Fifth and sixth infraorbitals slender and tubular. Depth of posterodorsal expansion on infraorbitals 1 + 2 approximately equal to total length of infraorbitals 1 + 2. Branchial opening moderately elongate. Branchial membrane joined to isthmus. Anus and urogenital papilla shifting anteriorly ontogenetically; at vertical through posterior margin of orbit in mature specimens.

Cycloid scales present from immediately posterior to head to distal portion of caudal filament. Lateral line complete, with 110(1), 117(1), 119(1), 121*(1) 122(2), 123(2), or 125(2) perforated scales to vertical through end of anal fin. Longitudinal series of scales above lateral line 7*(3) or 8(7). Scales over anal-fin pterygiophores approximately one-half the size of others.

Pectoral-fin rays, ii,15*(4), ii,16 (5), or ii,17(1). Distal margin of fin approximately straight. Tip of pectoral fin reaching vertical throught base of anal-fin rays 15–19. Anal fin origin immediately posterior to vertical through pectoral-fin base. Total anal-fin rays, 169–191* (most specimens with anal fin damage, including holotype, $N = 10$; Table 2). Distal margin of anal fin approximately concave. Caudal filament cylindrical, tapering gradually distally, relatively short and approximately 30% of LEA in sexually mature specimens.

Precaudal vertebrae, 13(1) or 14(2). Anterior vertebrae, 11(2) or 12(1). Transitional vertebrae, 2(2) or 3(1). Displaced haemal spine 4(2).

Coloration in alcohol: Background colour yellowish. Head dark dorsally and gradually becoming lighter ventrally. Lips and suborbital region light yellow. Body yellowish dorsally, gradually becoming lighter to region overlying anal-fin pterygiophores. Four longitudinal dark stripes along body. Lateral-line stripe thin, one scale deep, extending from first perforated lateral-line scale to distal portion of caudal filament. Lateral-line stripe hardly discernible in specimens over 100 mm LEA. Superior medial stripe thick, two scales deep, tapering

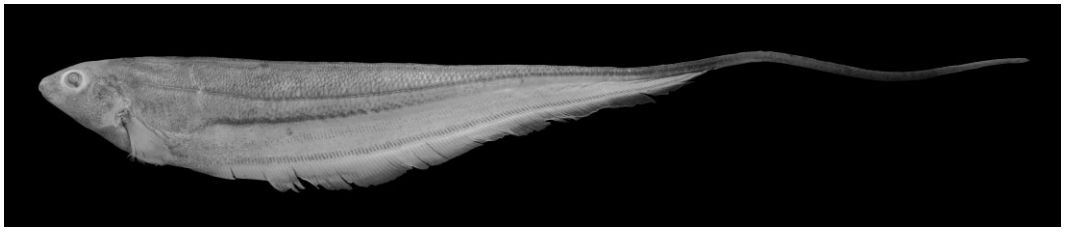

Figure 23. Lateral view of ***Eigenmannia waiwai* sp. nov.**, holotype, INPA 37594, 146.1 mm LEA, Rio Mapuera near Cachoeira Porteira, Rio Trombetas basin, Município de Oriximiná, Pará, Brazil, 1°04′60″ S, 57°01′60″ W.

from vertical between base of anal-fin rays 12–22 to posterior one-third of body. Inferior medial stripe moderately thick, two scales deep, extending from vertical between base of anal-fin rays 10–13 to posterior one-third of body. Anal-fin base stripe thick, two scales deep, extending from vertical between base of anal-fin rays 12–15 to last anal-fin ray. Pectoral and anal fins hyaline, with scattered tiny chromatophores on interradial membranes.

Distribution: *Eigenmannia vicentespelaea* is known from the Caves of São Vicente I and II, Rio São Vicente, tributary of Rio Tocantins basin, Goiás, Brazil (Fig. 6).

Remarks: *Eigenmannia vicentespelaea* was diagnosed by the extreme reduction of eyes (Triques, 1996: 3). Subsequently, Bichuette & Trajano (2006) proposed an expanded diagnosis for *E. vicentespelaea* based on a larger sample of specimens, and using statistical data and colour-pattern characters to distinguish the species from an undescribed epigean congener ('*Eigenmannia* sp.' in Bichuette & Trajano, 2006). In view of intraspecific variability in the development of the eyes in *E. vicentespelaea*, which ranges from eyes completely absent (Triques, 1993; Bichuette & Trajano, 2006) to eyes fully developed (e.g. MZUSP 83470), the diagnosis for *E. vicentespelaea* herein uses a combination of morphometric, meristic, and osteological features.

Material examined

Type specimens: Brazil. Goiás: MZUSP 42605, holotype, 114.9 mm LEA, Cave of São Vicente II, São Domingos karst area, Rio São Vicente, Rio Tocantins basin, 13°35′ S, 46°22′ W. MZUSP 47984, 1 paratype, 157.4 mm LEA.

Non-type specimens: Brazil. Goiás: MZUSP 83461, 3 + 1CS, 108–164.5 mm LEA, Cave of São Vicente I, Rio São Vicente, Rio Tocantins basin, approximately 13°35′30″ S, 46°21′ W. All from Cave of São Vicente II, Rio São Vicente, Rio Tocantins basin, 13°35′ S, 46°22′ W, MZUSP 55989, 2, 109.2–110.9 mm LEA, MZUSP 83462, 2, 117.2–121.9 mm LEA, MZUSP 83463, 1CS, 118.9 mm LEA, MZUSP 83464, 1, 161.6 mm LEA. MZUSP 83465, 2, 106.2–109.2 mm LEA. MZUSP 83466, 1, 119.0 mm LEA. MZUSP 83467, 3, 109.7–123.3 mm LEA. MZUSP 83468, 3, 81.6–116.2 mm LEA. MZUSP 83469, 1, 112.1 mm LEA. MZUSP 83470, 3, 83.6–95.6 mm LEA. MZUSP 83471, 1CS, 106.7 mm LEA.

Figure 24. Lateral view of head of ***Eigenmannia waiwai* sp. nov.**, holotype, INPA 37594, 146.1 mm LEA, Rio Mapuera near Cachoeira Porteira, Rio Trombetas basin, Município de Oriximiná, Pará, Brazil, 1°04′60″ S, 57°01′60″ W.

EIGENMANNIA WAIWAI SP. NOV.

(FIGS 23, 24; TABLE 4)

Eigenmannia virescens, Ferreira, 1993: 51 (cheklist).

Diagnosis: *Eigenmannia waiwai* can be distinguished from other species in the *E. trilineata* species group by the length of anterodorsal process of maxilla equal to 1.5 times the width of the posterior nostril (versus equal to 50% of the width of posterior nostril in *E. antonioi*, *E. desantanai*, *E. guairaca*, *E. muirapinima*, *E. pavulagem*, and *E. vicentespelaea*, or equal to the width of the posterior nostril in *E. matintapereira*, *E. microstoma*, and *E. trilineata*; Fig. 4). *Eigenmannia waiwai* also differs from species of the *E. trilineata* species group, except *E. vicentespelaea*, by the subterminal mouth (versus terminal mouth).

Eigenmannia waiwai sp. nov. can be distinguished from *E. vicentespelaea* by the nine or ten longitudinal series of scales above the lateral line (versus seven or eight); body depth at the vertical through the tip of longest pectoral-fin ray, 14.9–18.7% LEA (versus 10.5–14.5%); depth of the posterodorsal expansion on infraorbitals 1 + 2 less than 50% of length of infraorbitals 1 + 2 (versus approximately equal to length of infraorbitals 1 + 2); and length of the coronomeckelian bone equal to 20% of the length of Meckel's cartilage (versus 45% of the length of Meckel's cartilage).

Description: Morphometric data are presented in Table 4. Body elongate and laterally compressed. Dorsal profile of body nearly straight from rear of head to vertical through middle of anal fin, and then posteroventrally aligned with distal portion of caudal filament. Ventral profile of body posteroventrally aligned from anterior margin of lower lip to anal-fin rays 10–20, nearly concave along anterior half of abdominal cavity, then posterodorsally aligned with last anal-fin ray. Ventral margin of caudal filament straight. Greatest body depth at vertical through distal margin of pectoral fin.

Head laterally compressed, with greatest width at opercular region and greatest depth at posterior margin of supraoccipital. Dorsal profile of head slightly convex from upper lip to vertical through branchial opening. Ventral profile of head slightly concave from anterior margin of lower lip to branchial opening. Snout rounded in profile. Mouth subterminal. Upper lip overlapping lower lip. Premaxillary teeth, 35(1) or 40(1), distributed in five rows [outermost row with 7(1) or 8(1) teeth; second row with 7(1) or 8(1) teeth; third row with 8(1) or 9(1) teeth; fourth row with 7(1) or 9(1) teeth; innermost row with 6(2) teeth]. Maxilla with sickle-shaped anterodorsal process equal to 1.5 times width of posterior nostril. Dentary teeth 37(1) or 38(1), distributed in four rows [outermost row with 7(2) teeth; second row with 11(1) or 15(1) teeth; third row with 8(1) or 15(1) teeth; innermost row with 4(1) or 8(1) teeth]. Dentary teeth similar in size. Coronomeckelian bone equal to 20% of length of Meckel's cartilage. Endopterygoid with 14(1) or 17(1) teeth, distributed in two rows. Mouth rictus at vertical through anterior nostril or in region between nares. Anterior naris tube-like, with posterior margin located at vertical through posterior margin of, or in median portion of, rictus. Posterior naris elliptical, without tube, located closer to anterior margin of eye than snout tip. Eye approximately circular, covered by skin, laterally located on anterior half of head. Antorbital and infraorbitals 1–4 in form of enlarged, partial cylinders with slender osseous arches. Fifth and sixth infraorbitals slender and tubular. Depth of posterodorsal expansion on infraorbitals 1 + 2 less than 50% of length of infraorbitals 1 + 2. Branchial opening moderately elongate. Branchial membrane joined to isthmus. Anus and urogenital papilla shifting anteriorly ontogenetically, at vertical through posterior margin of orbit in mature specimens.

Cycloid scales present from immediately posterior to head to distal portion of caudal filament. Lateral line complete, with 112(3), 113(3), 114(4), 115(5), 118(2), 122(3), 123(2), 127(1), or 128*(3) perforated scales to vertical through end of anal fin. Longitudinal series of scales above lateral line, 9(4) or 10*(17). Scales over anal-fin pterygiophores approximately one-half the size of others.

Pectoral-fin rays, ii,13(3), ii,14(9), or ii,15*(12). Distal margin approximately straight. Tip of pectoral-fin reaching vertical through base of anal-fin rays 19–25. Anal-fin origin immediately posterior to vertical through pectoral-fin base; total anal-fin rays, 167–195 (189*, $N = 15$; Table 2). Distal margin of anal fin approximately concave. Caudal filament cylindrical, tapering gradually distally, relatively short and approximately 25% LEA in mature specimens.

Precaudal vertebrae, 12(1) or 13(2). Anterior vertebrae, 10(3); transitional vertebrae, 2(2) or 3(1). Displaced haemal spines, 2(1) or 3(1).

Coloration in alcohol: Background colour dark brown. Head dark brown dorsally and gradually becoming lighter ventrally. Lips and suborbital region yellowish. Body dark brown dorsally, gradually becoming lighter to region overlying anal-fin pterygiophores. Four longitudinal dark stripes along body. Lateral-line stripe thin, one scale deep, extending from first perforated lateral-line scale to distal portion of caudal filament. Superior medial stripe thick, two scales deep, tapering from vertical between base of anal-fin rays 26–32 to posterior one-third of body. Inferior medial stripe moderately thick, two scales deep, extending from vertical between base of anal-fin rays 21–32 to posterior one-third of body. Anal-fin base stripe thick, two scales deep, extending from vertical between base of anal-fin rays 8–28 to last anal-fin ray. Pectoral and anal fins hyaline, with scattered tiny chromatophores on interradial membranes.

Distribution: *Eigenmannia waiwai* sp. nov. is known from Rio Mapuera, a tributary of the Rio Trombetas basin, Pará, Brazil (Fig. 6).

Etymology: The epithet '*waiwai*' is a reference to the indigenous people whose home territory proximates the type locality for the species.

Material examined

Holotype: Brazil. Pará: INPA 37594, 146.1 mm LEA, Rio Mapuera, Rio Trombetas basin, 01°05′ S, 57°02′ W, collected by E. Ferreira and M. Jégu, 19 April 1985.

Paratypes: Brazil. Pará: INPA 46985, 24 + 2CS, 94.0–138.1 mm LEA, collected with holotype. INPA 37597, 3 + 1CS, 74.9–154.8 mm LEA, Rio Trombetas near Cachoeira Porteira, Município de Oriximiná, 01°04′45″ S, 57°02′39″ W, collected by E. Ferreira and M. Jégu, 19 April 1985; MZUSP 116798, 3, 95.8–122.29 mm LEA; MPEG 31166, 3, 104.2–123.43, collected with holotype.

Comparative material examined

Archolaemus blax: INPA 6424, 4CS, 114.9–227.0 mm LEA, Rio Tocantins above Tucuruí Dam, Pará, Brazil. *Archolaemus ferreirai*: INPA 6422, 4CS paratypes, 125.8–203.3 mm LEA, Rio Mucajaí, mouth of Igarapé Traíra, Roraima Brazil. INPA 36379, 1CS paratype, 111.3 mm LEA, Rio Mucajaí, Cachoeira Paredão 2, Roraima, Brazil. *Archolaemus janeae*: INPA 36380, 2CS paratypes, 114.9–131.0 mm TL, Rio Iriri, just upriver of its mouth into Rio Xingu, Pará, Brazil. *Archolaemus luciae*: INPA 20964, 2CS paratypes, 135.7–200.0 mm LEA, Rio Trombetas, Cachoeira Porteira, Pará, Brazil. *Archolaemus orientalis*: FMNH 94418, 1CS paratype, 129.0 mm LEA, Rio São Francisco at Pirapora, Minas Gerais, Brazil. *Archolaemus santosi*: INPA 36382, 3CS paratypes, 79.1–128.6 mm LEA, Rio Jamari, above site of Usina Hidroelétrica Samuel, Rondônia, Brazil. *Eigenmannia goajira*: USNM 121596, holotype, 377.0 mm LEA, Río Socuy, Zulia, Venezuela. USNM 121596, paratype, 335.6 mm LEA, Río Socuy, Río Socuy, Zulia, Venezuela. *Eigenmannia humboldtii*: NMW 64988, 1 syntype (only photo), Río Magdalena, Colombia. IAvH-P 6806, 1CS, 205.7 mm LEA, Yuto, Chocó, Colombia. IAvH-P 7415, 2, 241.0–270.0 mm LEA, Rio Atrato, Colombia. IAvH-P 7823, 1, 264.0 mm LEA, Rio Magdalena, Honda, Colombia. *Eigenmannia limbata*: INPA 28510, 2 + 1CS, 185.9–222.2 mm LEA, Rio Caeté, left tributary of Rio Purus, Acre, Brazil. MCP 28641, 1, 330.0 mm LEA, Lago Pirapora, Acre, Brazil. MNRJ 1186, holotype, 324.0 mm LEA, Amazonas, Brazil. *Eigenmannia macrops*: BMNH 1897.8.6.1, holotype, 128.5 mm LEA, Potaro River, British Guiana. USNM 402672, 12 + 2CS, 65.3–165.3 mm LEA, Cuyuni River, Cuyuni-Mazaruni, Guyana. *Eigenmannia nigra*: AMNH 58642, 3 paratypes, 235.4–296.5 mm LEA, Caño Urami, tributary of Rio Negro, Amazonas, Venezuela. *Eigenmannia virescens*: MACN 4536, 1, 98.0 mm LEA, Río de La Plata, Argentina. MACN 5122, 8, 162.0–252.3 mm LEA, Río de La Plata, Argentina. MACN 5965, 15, 76.7–121.8 mm LEA, Río Paraná, Argentina. MACN 6040, 15, 105.9–144.6 mm LEA, Río de La Plata, Argentina. MACN 6924, 6, 122.5–184.9 mm LEA, Río Paraná, Argentina. MZUSP 22917, 1CS, 205.4 mm LEA, Río de La Plata, Argentina. *Distocyclus conirostris*: INPA 28879, 2CS of 19, 108.7–165.0 mm LEA, Carvoeiro, Rio Negro. MZUSP 6982, 2 + 1CS, 156.2–166.0 mm LEA, Rio Madeira. *Japigny kirschbaum*: FMNH 50185, 3CS, 94.2–108.3 mm LEA, New River drainage, head of Itabu Creek, Guyana. *Rhabdolichops caviceps*: INPA 20157, 8 + 2CS, 111.1–137.3 mm LEA, Paraná do Xiboquena, Rio Solimões, Amazonas, Brazil. *Rhabdolichops eastwardi*: MPEG 1189, 2CS, 115.1–127.8 mm LEA, Rio Goiapi, Ilha do Marajó, Pará, Brazil. *Rhabdolichops electrogrammus*: INPA 28863, 8 + 2CS of 79,68.2–164.1 mm LEA, Rio Negro, Amazonas, Brazil. *Rhabdolichops lundbergi*: INPA 11406, 7 + 3CS of 111, 124.2–186.1 mm LEA, Rio Coari, tributary of Rio Solimões, Amazonas, Brazil. *Rhabdolichops nigrimans*: INPA 28862, 11 + 2CS, 109.7–143.8 mm LEA, Rio Negro, Amazonas, Brazil. *Rhabdolichops troscheli*: MPEG 2604, 2CS, 93.0–94.7 mm LEA, Rio Goiapi, Ilha do Marajó, Pará, Brazil. MPEG 2803, 1CS, 222.0 mm LEA, Rio Goiapi, Ilha do Marajó, Pará, Brazil. MPEG 8482, 1CS, 170.1 mm LEA, Tomé-Açu, Pará, Brazil. *Sternopygus astrabes*: INPA 30502, 2CS of 13, 112.0–156.2 mm LEA, Igarapé Tucumã, Parque Estadual do Rio Negro, Amazonas, Brazil. *Sternopygus macrurus*: INPA 4869, 4CS of 6, 31.9–84.1 mm LEA, Paraná Janauacá, Lago Castanho, Amazonas, Brazil. *Sternopygus xingu*: MPEG 10191, 1CS, 136.0 mm LEA, FLONA Caxiuanã, Município de Portel, Pará, Brazil.

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