New Species of *Steindachnerina* (Characiformes: Curimatidae) from the Rio Tapajós, Brazil, and Review of the Genus in the Rio Tapajós and Rio Xingu Basins

André L. Netto-Ferreira¹ and Richard P. Vari²
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André L. Netto-Ferreira¹ and Richard P. Vari²

A new species of *Steindachnerina*, family Curimatidae, is described from the headwaters of the Rio Jamanxim in the central portion of the Rio Tapajós basin of the Brazilian Amazon. The species is distinguished from its congeners on the basis of pigmentation and various meristic and morphometric features. The phylogenetic placement of the new species within *Steindachnerina* is investigated, and notwithstanding the similarities in pigmentation patterns between that species and *S. fasciata*, those forms were not found to be closely related. The new species represents the first reported occurrence of a species of *Steindachnerina* within the Rio Tapajós, the fifth largest component of the Amazon. The occurrence of a second species of the genus, *S. fasciata*, in the Rio Teles Pires, another tributary of the Rio Tapajós basin is also documented. *Steindachnerina brevipinna*, a species widespread through major portions of the Rio de La Plata system, is confirmed to occur in the Rio Xingu of the Amazon basin.

**Materials and Methods**

Museum abbreviations follow Leviton et al. (1985). Counts and measurements follow Vari (1991a). Measurements were point-to-point linear distances taken using digital calipers with a precision of 0.1 mm. In the description, the number of examined specimens with a particular count is provided in parentheses with the value of the holotype in square brackets. Comparative information for other species of *Steindachnerina* was taken from Vari (1991b), Pavanelli and Britski (1999), and Lucinda and Vari (2009), but with the use of *S. vari* rather than *S. runa* following Vari (1993). No specimens of *S. corumbae* were available for osteological examination and that species is not included in the phylogenetic analysis. Abbreviations in the text are cleared

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new species

S. holotype, MZUSP 97569, 78.9 mm SL, Brazil, Pará, Novo Progresso, Rio Jamanxim, Rio Tapajós basin.

S. varii by the presence of HL, respectively). It differs from all S. S. gracilis, S. hypostoma, S. planiventris, S. argentea, S. bimaculata, S. fasciata. S. notograptos, S. guentheri, S. hypostoma, S. insculpta, S. variii in the pigmentation pattern along the midlateral portions of the body and caudal fin (the absence of such pigmentation on the fin throughout ontogeny, respectively), from S. amazonica, S. argentea, S. atratensis, S. biornata, S. brevipinna, S. conspersa, S. dobula, S. elegans, S. fasciata. S. guentheri, S. hypostoma, S. insculpta, S. notonota, and S. variii in the pigmentation pattern along the midlateral portions of the body and caudal fin versus the presence of a dark midlateral stripe extending along the middle line and/or a patch of horizontally elongate dark pigmentation along the caudal peduncle and/or dark pigmentation along the middle caudal-fin rays, respectively).

Description.—Steindachnerina seriata is distinguished from all congeners with the exception of S. fasciata by the presence of multiple narrow, dark stripes extending along the lateral and dorsolateral portion of the body. It differs from S. fasciata in the position on the scales of the dark stripes extending along the body (positioned along the areas of contact of proximate horizontal scale rows versus situated along the middle of the scales of each row, respectively), in the pigmentation pattern of the lateral surface of the caudal peduncle (the absence of a horizontally elongate, midlateral, dark stripe on the caudal peduncle versus the presence of such pigmentation, respectively), the distance from the tip of the snout to the origin of the anal fin (79.2–82.7% versus 84.1–88.9% of SL, respectively), the distance from the tip of the snout to the anus (76.2–78.0% versus 78.8–83.9% of SL, respectively), the length of the snout to the origin of the anal fin (79.2–82.7% versus 39.7–43.6% of HL, respectively). Steindachnerina seriata can be further distinguished from S. argentea, S. bimaculata, S. binotata, S. conspersa, S. leucisca, and S. notograptos in the form of the fleshy lining of the roof of the oral cavity (the presence of a distinct series of multiple very fleshy folds extending ventrally from the dorsal surface of the oral cavity versus the presence of only three weakly to moderately developed longitudinal folds in that region, respectively), from S. gracilis, S. hypostoma, S. planiventris, and S. quasimodoi in the transverse form of the prepelvic region (obtusely flattened versus distinctly flattened, respectively) and the number of scales across the transversely flattened prepelvic region immediately anterior to the insertion of the pelvic fins (3 or 4 versus 5 or 6 scales, respectively), from S. binotata, S. coronabile, S. dobula, S. hypostoma, S. insculpta, S. leucisca, S. notograptos, and S. variii in the pigmentation of the dorsal fin (the presence of a spot of dark pigmentation on the basal portions of the fin versus the absence of such pigmentation on the fin throughout ontogeny, respectively), from S. amazonica, S. argentea, S. atratensis, S. biornata, S. brevipinna, S. conspersa, S. dobula, S. elegans, S. fasciata. S. guentheri, S. hypostoma, S. insculpta, S. notonota, and S. variii in the pigmentation pattern along the midlateral portions of the body and caudal fin (the absence of distinct dark pigmentation along the midlateral surface of the body and caudal fin versus the presence of a dark midlateral stripe extending along the lateral line and/or a patch of horizontally elongate dark pigmentation along the caudal peduncle and/or dark pigmentation along the middle caudal-fin rays, respectively).

Description.—Morphometric data presented in Table 1. Body robust overall, but somewhat compressed and moderately elongate. Dorsal profile of head convex from margin of upper lip to vertical situated slightly posterior of anterior nares, straight from that point to posterior terminus of supraoccipital spine. Dorsal profile of body slightly convex from tip of supraoccipital spine to dorsal-fin origin; straight to slightly convex and posteroventrally slanted from base of last dorsal-fin ray to origin of adipose fin and very slightly concave from rear of adipose-fin base to insertion of anteriormost dorsal procurent fin ray. Dorsal surface of

Fig. 1. Steindachnerina seriata, holotype, MZUSP 97569, 78.9 mm SL, Brazil, Pará, Novo Progresso, Rio Jamanxim, Rio Tapajós basin.
Table 1. Morphometrics of Holotype and Five Paratypes of Steindachnerina seriata, New Species. Range and mean include all specimens.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Holotype</th>
<th>Range</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard length (mm)</td>
<td>78.9</td>
<td>49.7–83.1</td>
<td>61.0</td>
</tr>
<tr>
<td>Percent of SL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greatest body depth</td>
<td>38.3</td>
<td>31.9–38.3</td>
<td>35.2</td>
</tr>
<tr>
<td>Snout to dorsal-fin origin</td>
<td>48.0</td>
<td>47.6–51.0</td>
<td>49.4</td>
</tr>
<tr>
<td>Snout to pectoral-fin origin</td>
<td>29.0</td>
<td>28.5–31.2</td>
<td>29.6</td>
</tr>
<tr>
<td>Snout to pelvic-fin origin</td>
<td>54.0</td>
<td>51.5–54.1</td>
<td>53.2</td>
</tr>
<tr>
<td>Snout to anal-fin origin</td>
<td>82.0</td>
<td>79.2–82.7</td>
<td>81.1</td>
</tr>
<tr>
<td>Snout to anus</td>
<td>77.8</td>
<td>76.2–78.0</td>
<td>77.1</td>
</tr>
<tr>
<td>Dorsal-fin origin to hyural joint</td>
<td>61.2</td>
<td>56.2–61.2</td>
<td>58.6</td>
</tr>
<tr>
<td>Dorsal-fin origin to anal-fin origin</td>
<td>50.8</td>
<td>46.1–50.8</td>
<td>47.7</td>
</tr>
<tr>
<td>Dorsal-fin origin to pelvic-fin insertion</td>
<td>38.6</td>
<td>32.0–38.6</td>
<td>35.4</td>
</tr>
<tr>
<td>Dorsal-fin origin to pectoral-fin insertion</td>
<td>36.0</td>
<td>30.8–36.0</td>
<td>33.9</td>
</tr>
<tr>
<td>Caudal-peduncle depth</td>
<td>12.9</td>
<td>12.2–13.3</td>
<td>12.7</td>
</tr>
<tr>
<td>Pectoral-fin length</td>
<td>19.4</td>
<td>17.2–20.0</td>
<td>18.8</td>
</tr>
<tr>
<td>Pelvic-fin length</td>
<td>21.5</td>
<td>20.3–22.2</td>
<td>21.4</td>
</tr>
<tr>
<td>Dorsal-fin length</td>
<td>29.2</td>
<td>28.5–29.8</td>
<td>29.1</td>
</tr>
<tr>
<td>Head length</td>
<td>28.2</td>
<td>26.7–30.7</td>
<td>29.0</td>
</tr>
<tr>
<td>Percent of HL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snout length</td>
<td>33.5</td>
<td>33.5–34.6</td>
<td>34.0</td>
</tr>
<tr>
<td>Orbital diameter</td>
<td>29.1</td>
<td>29.1–36.9</td>
<td>32.8</td>
</tr>
<tr>
<td>Postorbital length</td>
<td>36.2</td>
<td>36.3–38.8</td>
<td>37.0</td>
</tr>
<tr>
<td>Interorbital width</td>
<td>28.7</td>
<td>28.5–31.7</td>
<td>29.7</td>
</tr>
</tbody>
</table>

All scales of lateral line pored with primary laterosensory canal straight. Pored lateral line scales from supracleithrum to hyuralt joint 36 (1), 37 (4), or 38 (1) [36]. Pored scales on basolatal series of caudalfin posterior to hyural joint 2 (4) or 3 (2) [2]. Scales in transverse series from dorsal-fin origin to lateral line not including median scale 5 (6) [5]. Scales in transverse series from anal-fin origin to lateral line not including median scale 4 (6) [4]. Scales across obtusely transversely flattened prepelvic region immediately anterior to insertion of pelvic fin 3 or 4. Scales between anus and anal-fin origin 2 (6) [2]. Middorsal series of scales from rear of supraoccipital spine to dorsal-fin origin 10 (4) or 11 (2) [10]. Caudal fin lacking adherent scales continuing posteriorly onto each lobe of fin.

Dorsal-fin rays iii,9 (6) [iii,9]; with first ray very short. Anal-fin rays iii,7 (6) [iii,7]; with first ray very short. Pelvic-fin rays i,8 (6) [i,8]. Pectoral-fin rays i,13 (4) or i,14 (2) [i,13]. Total vertebrae 31 (1) or 32 (5) [31].

Coloration in alcohol.—Overall coloration of head and body light brown, but darker dorsally. Upper lip, dorsolateral portion of snout, dorsal half of opercle and dorsal surface of head with variably intense dark pigmentation; pigmentation most developed over dorsal surface of head. Dark spot of pigmentation situated on medial surface of opercle variably apparent externally midway along vertical extent of translucent bone. Ventrolateral and ventral portions of head lacking dark pigmentation.

Scales of lateral and dorsolateral portions of body with dark pigmentation situated along dorsal and ventral limits of exposed portions of scales. Dark body pigmentation pattern on body differs somewhat in smaller examined specimens (49.7–52.8 mm SL) versus larger available individuals (78.9–83.9 mm SL). Smaller individuals with dark pigmentation on sequential scales conjoined to form irregularly margined narrow stripes along dorsolateral and
all examined sizes with small, variably positioned, vertically elongate or ovoid dark spots situated on dorsolateral portion of body.

Fin rays of last unbranched dorsal-fin ray covered with small, dark chromatophores. Distinct dark blotch present on basal portions of first through sixth branched dorsal-fin rays. Blotch separated basally from body margin anteriorly, but continuing to base of fin rays posteriorly. Spot very dark and prominent in smaller examined specimens, but more dusky, albeit still obvious, in larger individuals. Remainder of dorsal fin hyaline. Adipose fin with scattered small dark chromatophores. Caudal fin hyaline or with limited dark pigmentation along dorsal and ventralmost rays in largest specimens. Anal, pectoral, and pelvic fins hyaline.

**Coloration in life.**—Based on photograph of recently captured holotype. Overall dark pigmentation of head, body, and dorsal fin comparable to that in preserved specimen, except for more intense silver coloration of ventrolateral and ventral portions of head and of lateral and ventral surfaces of body. Guanine on scales of body slightly masks dark horizontal stripes running along dorsal and ventral margins of scale rows and completely obscures deep-lying dusky midlateral stripe along posterior portion of body. Dorsal portion of iris distinctly yellowish-orange with that pigmentation progressively fading ventrally in areas anterior and posterior to pupil and completely absent ventral of pupil. Pectoral, pelvic, anal, and most caudal-fin rays yellowish orange with pigmentation most intense on ventralmost branched and unbranched caudal-fin principal rays and forming distinct reddish patch in that region.

**Habitat and ecology.**—All examined specimens of *Steindachnerina seriata* were collected in flooded areas along the margin of the river among stands of dense aquatic vegetation.

**Distribution.**—*Steindachnerina seriata* is only known from two localities that lie relatively close to each other in the Rio Jamamxim, a right bank tributary of the Rio Tapajos in the eastern portions of the Amazon basin (Fig. 2). Further sampling is necessary in order to determine whether *S. seriata* has a restricted range as proposed for various groups of Brazilian freshwater fishes by Nogueira et al. (2010). Alternatively, the apparent limited distribution for the species might reflect the undersampling of the Rio Tapajos ichthyofauna as evidenced by the recent discovery of *S. seriata* and *S. fasciata* in that catchment (see comments below).

**Etymology.**—The specific name, *seriata*, from the Latin for arranged in a series, is in reference to multiple series of narrow dark stripes situated along the scale row margins on the lateral and dorsolateral surface of the body in the species.

**Generic placement and phylogenetic relationships.**—As now defined, *Steindachnerina* is delimited by its possession of four synapomorphies involving aspects of the first and second infrapharyngobranchials, the ligaments of the ventral portion of the gill arches and the form of the basihyal and basihyal tooth plate (for details see Vari, 1989:58, 1991a:23). Analysis has shown that these character states are present in *Steindachnerina seriata*. The strict consensus (Fig. 3) of the
four most parsimonious trees derived from the parsimony analysis of the data matrix provided in Lucinda and Vari (2009), with the addition of Steindachnerina seriata, is isomorphic with that of Vari (1991a) and Lucinda and Vari (2009; Table 2; tree length = 53 steps; CI = 0.64; RI = 0.87). It places S. seriata within the largest subclade within Steindachnerina delimited by Vari (1991a:21) and now comprising S. amazonica, S. atratoensis, S. biornata, S. brevipinna, S. dobula, S. fasciata, S. gracilis, S. guntheri, S. hypostoma, S. insculpta, S. notograptos, S. notonota, S. planiventris, S. pupula, S. quasimodoi, S. seriata, and S. vari (s. varii of Vari, 1991a). The position of S. seriata in clade 11 including S. dobula, S. gracilis, S. hypostoma, S. planiventris, S. pupula, and S. quasimodoi is supported by the absence of dark pigmentation along the lateral line (although faint pigmentation along the lateral line may be present on occasion in S. quasimodoi, S. planiventris, S. hypostoma, and S. gracilis as noted by Vari, 1991a). Steindachnerina seriata and S. fasciata are not retrieved as each other’s closest relatives (Fig. 3), notwithstanding the superficially similar, albeit positionally nonhomologous, pattern of dark horizontal striping on the bodies of both species, a pigmentation pattern rare within the Curimatidae and unique to these two species in Steindachnerina. Coding of multistate characters as unordered retains the major clades within the phylogeny (2, 6, 12) but results in reduced resolution in the remainder of the tree.

Steindachnerina in the Rio Tapajós basin.—The inadequacy of the present state of our knowledge of the composition of the Neotropical ichthyofauna was commented on by Vari and Malabarba (1998), with that theme repeated by subsequent authors. Vari and Géry (1985:1030) and Vari (1991a:65, fig. 41) documented the presence of Steindachnerina fasciata in various upriver locations along right bank tributaries of the Rio Madeira. One of these collection sites was in the upper portions of the Rio Aririúaná above the Cachoeira de Dardanelos (approximately 10°19’42”S, 59°12’30”W). In that region, the headwaters of the Rio Aririúaná (Rio Madeira system) lie close to streams draining into the Rio Juruena (Rio Tapajós basin). A series of specimens of S. fasciata examined during our study (see Material Examined, below), originated in the Rio Teles Pires within the upper reaches of the Rio Tapajós (Fig. 2) and represent the first records of the species from the basin. The occurrence of S. fasciata in the Rio Tapajós is in some mode a consequence of faunal interchange or past continuity between the ichthyofaunas of the middle reaches of that basin and the adjoining Rio Aririúaná of the Rio Tapajós basin. These records for S. fasciata along with the discovery of S. seriata represent the first records for Steindachnerina in that river system.

Steindachnerina in the Rio Xingu basin.—In his revisionary study of Steindachnerina, Vari (1991a:102) reported that one lot of relatively small examined specimens of the genus which originated in the upper Rio Curuá in the region of the Serra do Cachimbo in the upper Rio Xingu apparently represented S. brevipinna or a very similar member of the genus. The size and condition of the specimens made a definitive identification of that sample impossible. This lot was highlighted because it represented the only examined sample of Steindachnerina that originated in the Rio Xingu basin. Furthermore, if it was indeed S. brevipinna it represented both a major range extension in terms of absolute distance and more significantly the first record of the species from outside the Rio de la Plata basin (Vari, 1991a:fig. 73).

A series of adult specimens from the Rio Curuá in the Serra do Cachimbo region in the Rio Xingu examined during the course of this study (see Material Examined, below) could not be distinguished from populations of S. brevipinna in the Rio Paraguay system. As such, S. brevipinna represents the first species of the Curimatidae known to be common to the Rio Xingu and Rio de La Plata basins. The only other exception to the typical pattern of different curimatid faunas in the Amazon versus La Plata basins is the occurrence of Psectrogaster curviventris throughout major portions of the Rio de La Plata basin and also in the upper
reaches of the Rio Madeira, in the southwestern portions of the Amazon basin (Vari, 1991b:fig. 20). *Steindachnerina brevipinna* remains the only member of the genus confirmed to be present in the Rio Xingu basin, although that catchment is far from exhaustively sampled ichthyologically, and the situation may reflect the incomplete knowledge of the fish fauna in that river.

**MATERIAL EXAMINED**

*Steindachnerina brevipinna*: Brazil, Pará, Município de Alta-mira, Rio Iriri basin: MZUSP 96878, 2, Rio Curuá, at cofferdam of Pequena Central Hidroelétrica Buriti, 08°46′09″S, 54°57′02″W; MZUSP 96935, 2, Rio Curuá, upstream of highest falls, near restaurant along margin of road BR-163, 08°44′09″S, 54°57′46″W; MZUSP 97581, 48, Rio Curuá, upstream of BR-163 bridge, 08°53′54″S, 54°59′20″W; MZUSP 101303, 3, Rio Curuá, 08°45′55″S, 54°57′04″W; MZUSP 101383, 2, Rio Curuá, upstream of BR-163 bridge, 08°53′54″S, 54°59′20″W.

*Steindachnerina fasciata*: Brazil, Rio Teles Pires basin: MZUSP 95994, 2, Mato Grosso, Itauba, Rio Matrinchá, 10°51′09″S, 55°13′44″W; MZUSP 95995, 20, Mato Grosso, Itauba, at mouth of Rio Renato, 11°05′12″S, 55°18′19″W; MZUSP 96575, 3, Mato Grosso Peixoto de Azevedo, Rio Peixoto de Azevedo, 10°13′14″S, 54°58′02″W; MZUSP 96767, 6, Mato Grosso Peixoto de Azevedo, right bank tributary of Rio Peixoto de Azevedo, 10°17′14″S, 54°50′57″W; MZUSP 96802, 4, Mato Grosso, Peixoto de Azevedo, Cachoeira da Neblina, unnamed tributary of Rio Peixoto de Azevedo, 10°23′10″S, 54°18′22″W; MZUSP 99963, 6, Pará, Jacareacanga, Rio Teles Pires, downstream of Sete Quedas rapids, 09°20′38″S, 56°46′42″W; MZUSP 105938, 6, Mato Grosso, Novo Mundo, Rio Braço Norte, downstream of Pequena Central Hidroelétrica Braço Norte IV; MZUSP 105939, 12, Mato Grosso, Novo Mundo, Rio Braço Norte, bridge downstream of Pequena Central Hidroelétrica Braço Norte IV; MZUSP 105940, 8, Mato Grosso, Novo Mundo, stream tributary of Nhandu; MZUSP 105941, 2, Mato Grosso, Novo Mundo, Rio Braço Norte, downstream Pequena Central Hidroelétrica Braço Norte, approximately 600 m downstream of bridge.

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**LITERATURE CITED**


