New *Steindachnerina* Species (Teleostei: Characiformes: Curimatidae) from the Rio Tocantins Drainage

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A new species, *Steindachnerina notograptos*, is described from the middle portions of the Rio Tocantins drainage, Brazil. The possession of a small, fleshy, lobulate body situated on each side of the posterior limit of the medial fold of the buccopharyngeal complex is autapomorphic for *S. notograptos*. The combination of other aspects of the buccopharyngeal complex along with meristic and pigmentation features further distinguish the species from all of its congeners.

Uma nova espécie, *Steindachnerina notograptos*, é descrita da porção média da drenagem do rio Tocantins no Brasil. A possessão de somente um par de pequenos corpos lobulados situados em cada lado da porção posterior da prega mediana do complexo bucofaríngeo é autapomórfica para *S. notograptos*. A combinação de outros aspectos do complexo bucofaríngeo com caracteres merísticos e de pigmentação distingue a espécie de todas suas congêneres.

STEINDACHNERINA, a genus of the characiform family Curimatidae, is distributed across a major portion of South America from the Río Magdalena basin west of the Andean Cordilleras through the Orinoco, Amazon, São Francisco, and La Plata basins to many of the smaller river systems of the Atlantic versant of the continent from Suriname to Uruguay. Vari (1991a) defined *Steindachnerina* as monophyletic based on four synapomorphies of the basihyal and components of the gill arches. In his subsequent revision of the genus, Vari (1991b) recognized 21 species in *Steindachnerina*, and Pavanelli and Britski (1999) subsequently described an additional species, *S. corumbae*, from the upper Rio Paraná basin in Brazil. Recent ichthyofaunal surveys throughout the middle portions of Rio Tocantins drainage yielded samples of a new species of *Steindachnerina* that we formally describe herein.

MATERIALS AND METHODS

Institutional abbreviations are as listed at http://www.asih.org/codons.pdf with the addition of Núcleo de Estudos Ambientais, Universidade Federal do Tocantins (NEAMB-UFT) and Laboratório de Ictiologia Sistemática, Universidade Federal do Tocantins (UNT). Measurements and counts follow the procedures used by Vari (1991b) with addition of the number of principal caudal-fin rays. Nomenclature of the buccopharyngeal complex follows Vari (1991b). Values for the holotype in the text are indicated in brackets. Cleared-and-stained specimens (CS) were prepared using the technique of Taylor and Van Dyke (1985). The use of *S. varii* rather than *S. runa* follows Vari (1993). The phylogenetic position of the new species in the genus was elucidated using Hennig86 vers. 1.5 (J. Farris, 1988) and the ''ie*'' command which is guaranteed to find all the most parsimonious trees (Platnick, 1989) along with the ACCTRAN option. Outgroups, rooting, polarization, and ordering of transformation series follow Vari (1983, 1991b). Character-state assignments in transformation series are based on those presented and illustrated in the phylogenetic analysis of *Steindachnerina* by Vari (1991b) with the addition of the data for the new species (Appendix 1, Table 2). No specimens of *S. corumbae*, a species described subsequent to Vari (1991b), were available for osteological examination and that species is not included in the phylogenetic analysis.

Steindachnerina notograptos, new species

Figure 1, Table 1

Holotype.—MCP 42579, 89.8 mm SL Brazil, Tocantins, Paranã, Rio Palmas, 12°37′S, 47°52′W, 29 May 2007, staff of NEAMB-UFT.

Paratypes.—All MCP and UNT lots collected by NEAMB-UFT staff. Brazil, Tocantins: UNT 7726, 2, 92.2–97.4 mm SL, Paranã, Rio Palmas, 12°37′S, 47°52′W, collected with holotype. UNT 2160, 93.4 mm SL, Paranã, Rio Paranã near its confluence with Córrego Areia, 12°43′S, 47°48′W, 12 October 2004. MCP 42580, 4, 89.8–97.3 mm SL, same locality as UNT 2160, 27 May 2007. UNT 3682, 1, 49.5 mm SL, Peixe, Rio Tocantins, Usina Hidroelétrica Peixe Angical, 12°15′S, 48°23′W, 5 July 2005. UNT 6538, 2, 69.6–72.3 mm SL, Paranã, Rio Tocantins, Fazenda Traçadal, 12°29′S, 48°12′W, 28 October 2005. UNT 7566, 1 CS, 89.0 mm SL, São Salvador, Córrego Água Fria, 10°23′S, 48°25′W, 30 November 1997. UNT 7589, 7, 45.1–88.5 mm SL, Taipas do Tocantins, Rio Palmas, 15 August 2006. UNT 7590, 3, 81.1–90.4 mm SL, Paranã, Rio Palmas, 12°37′S, 47°52′W, 5 February 2007. UNT 7722, 1 CS, 91.7 mm SL, same locality as UNT 7590, 24 February 2007. MCP 42581, 3, 87.0–106.3 mm SL, same locality as UNT 7590, 28 May 2007. UNT 7591, 2, 70.7–78.1 mm SL, Paranã, Rio Paranã, near its confluence with Rio Lajes, 12°34′S, 48°03′W, 5 February 2007. UNT 7723, 1, 83.3 mm SL and UNT 7724, 1, 93.3 mm SL, same locality as UNT 7591, 9 February 2007. MCP 42582, 3, 91.0–98.3 mm SL, same locality as UNT 7591, 15 March 2007. UNT 7720, 4, 90.7–95.6 mm SL, same locality as UNT 7591, 19 March 2007. UNT 7721, 1, 100.2 mm SL, São Salvador, Rio Tocantins, near its confluence with Ribeirão Santa Cruz, 12°18′S, 48°15′W, 26 March 2007. MZUSP 99148, 5, 95.0–102.1 mm SL, Paranã, mouth of unnamed stream tributary to Rio Palmas, 12°24′47″S,

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Fig. 1. *Steindachnerina notograptos*, holotype, MCP 42579, 89.8 mm SL, Paranã, Rio Palmas, Rio Tocantins drainage, Tocantins, Brazil.

47°25′06″W, 5 February 2008, A. C. Ribeiro. MZUSP 99149, 1, 92.2 mm SL, Paranã, mouth of unnamed stream tributary to Rio Palmas, 12°25′28.2″S, 47°16′42.1″W, 5 February 2008, K. M. Ferreira and J. P. Silva.

Diagnosis.—*Steindachnerina notograptos* is autapomorphically distinct from its congeners in having a small, medial, lobulate process (Fig. 2, mlb) situated on each side of the posterior limit of the medial fold (mf) of the buccopharyngeal complex. *Steindachnerina notograptos* is further discriminated from all of its congeners with the exception of *S. argentea*, *S. bimaculata*, *S. binotata*, *S. conspersa*, *S. corumbae*, and *S. leucisca*, in possessing three weakly developed, longitudinally oriented, fleshy folds on the roof of the oral cavity (Fig. 2, lf, mf) rather than having three well-developed, longitudinally oriented, fleshy flaps and/or one or more series of lobulate fleshy processes in that region. The 57 to 64 scales in the lateral line from the supracleithrum to the hypural joint separates *Steindachnerina notograptos* from *S. argentea*, *S. bimaculata*, *S. conspersa*, and *S. corumbae*, each of which has 53 or fewer scales along the lateral line to the hypural joint and from *S. binotata*, which has 67 to 70 scales along that series. *Steindachnerina notograptos* can, in turn, be further distinguished from *S. leucisca* in details of the pigmentation pattern of the dorsolateral region (three irregular series of small, dark spots on the dorsolateral surface of the body above the midlateral band versus with either one or two series of larger spots about one-half size of pupil or very narrow bars of that vertical extent, respectively), and midlateral surface of the body (rounded to horizontally elongate diffuse dark spot larger than exposed portions of scales positioned over lateral line slightly anterior to vertical through origin of dorsal fin versus spot absent, respectively), and the profile of the anterior portion

Table 1. Morphometrics of Holotype and Paratypes of *Steindachnerina notograptos*, New Species. Mean includes all specimens.

	Holotype	Type series	*n*	Mean
Standard Length (mm)	89.8	45.1–106.3	37	85.1
Percent SL				
Greatest body depth	29.5	27.5–33.0	35	30.0
Snout to dorsal-fin origin	45.8	42.9–59.7	37	45.2
Snout to anal-fin origin	79.1	71.4–87.3	37	79.6
Snout to pelvic-fin origin	51.4	44.5–56.8	36	52.5
Snout to anus	71.5	64.8–74.0	33	71.8
Origin of dorsal fin to hypural joint	61.5	57.1–64.1	37	60.4
Caudal peduncle depth	11.1	10.1–12.4	36	11.3
Head length	26.2	24.7–28.8	35	26.0
Percent HL				
Snout length	30.6	25.6–35.0	37	31.6
Orbital diameter	35.7	28.7–40.4	37	34.9
Postorbital length	42.5	36.4–43.3	35	39.4
Interorbital width	37.4	28.5–45.2	37	36.5

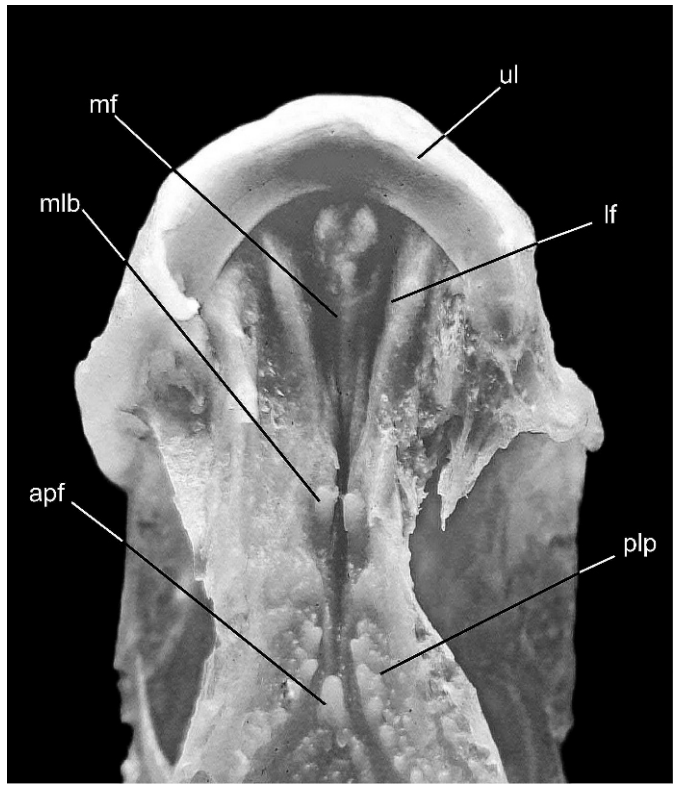

Fig. 2. Roof of buccopharyngeal region and anterior portion of gill arches of *Steindachnerina notograptos*, UNT 7726, paratype, showing various elaborations in that region. Hyoid apparatus, ventral portion of gill arches, eyes, and associated tissues removed. Abbreviations: apf, anterior posteromedian flap; lf, lateral fold; mf, median fold; mlb, medial lobulate body; plp, posterior lobulate process; ul, upper lip.

Table 2. Character State Data Matrix for *Steindachnerina* Species (Modified from Vari, 1991b with Addition of Data for *S. notograptos*). See Vari (1991b) for discussions and illustrations of character states.

	Characters																												
Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
S. amazonica	3	1	0	1	1	2	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0
S. argentea	0	0	1	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
S. atratoensis	2	1	0	1	1	2	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0
S. bimaculata	0	0	1	0	1	1	0	1	1	1	0	0	0	0	1	1	1	0	0	1	1	1	0	1	1	0	0	0	0
S. binotata	0	0	1	0	1	1	0	1	1	1	0	0	0	0	1	1	1	0	0	1	1	1	0	0	0	1	1	1	0
S. biornata	1	1	0	1	1	2	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
S. brevipinna	3	1	0	1	1	2	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0
S. conspersa	0	0	1	0	1	1	0	1	1	1	0	0	0	0	1	1	1	0	0	1	1	0	0	1	1	0	0	0	0
S. dobula	3	1	0	1	1	2	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S. elegans	3	1	0	1	1	2	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0
S. fasciata	3	1	0	1	1	2	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0
S. gracilis	3	1	0	1	1	2	1	1	0	1	1	1	1	1	0	0	0	1	2	0	0	0	1	0	1	1	1	0	1
S. guentheri	3	1	0	1	1	2	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0
S. hypostoma	3	1	0	1	1	2	1	1	0	1	1	1	1	1	0	0	0	1	2	0	0	0	1	0	0	1	1	0	1
S. insculpta	3	1	0	1	1	2	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
S. leucisca	0	0	1	0	1	1	0	1	1	1	0	0	0	0	1	1	1	0	0	1	1	1	0	0	0	1	1	1	0
S. notograptos	1	1	0	1	1	2	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	1
S. notonota	3	1	0	1	1	2	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	0	0
S. planiventris	3	1	0	1	1	2	1	1	0	1	1	1	1	1	0	0	0	1	2	0	0	0	1	0	1	1	1	0	1
S. pupula	3	1	0	1	1	2	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
S. quasimodoi	3	0	0	1	1	2	1	1	0	1	1	1	1	1	0	0	0	1	1	0	0	0	1	0	1	1	1	0	1
S. varii	3	1	0	1	1	2	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0

of the snout (somewhat rounded versus more pointed, respectively; see also Vari [1991b:figs 12, 13]).

Description.—Morphometric data presented in Table 1. Body moderately elongate, somewhat compressed. Dorsal profile of head distinctly convex anteriorly and slightly convex posterior of vertical through posterior nostril. Dorsal profile of body slightly convex from rear of head to origin of dorsal fin; straight to slightly convex and posteroventrally slanted at base of dorsal fin; gently convex or straight from base of ultimate dorsal-fin ray to caudal peduncle. Dorsal surface of body with distinct median keel anterior to dorsal fin; keel more obvious proximate to fin. Surface of body smoothly rounded transversely posterior of base of dorsal fin. Ventral profile of head slightly convex to nearly straight from anterior margin of lower jaw posteriorly to vertical through insertion of pectoral fin, slightly convex from that point to insertion of pelvic fin, straight from that point to anal-fin insertion, and then slightly sigmoid to insertion of ventralmost caudal-fin ray. Prepelvic region obtusely transversely flattened with indistinct lateral keels. Indistinct median keel present posterior to pelvic-fin insertion. Anus located distinctly anterior of insertion of first anal-fin ray.

Dorsal fin acute in profile; anteriormost rays approximately 3.0–4.8 [3.7] times length of ultimate ray. Pectoral-fin profile pointed, its tip extending to point approximately two-thirds of distance to vertical through insertion of pelvic fin. Pelvic fin pointed, its tip reaching to point approximately three-quarters of distance to origin of anal fin. Caudal fin forked with tips somewhat pointed. Adipose fin well developed. Anal fin emarginate, anteriormost branched ray approximately 2.5–3.0 [2.8] times length of ultimate ray. Tip of adpressed anal fin falling slightly short of insertion of ventralmost rays of caudal fin.

Head profile pointed overall, but more rounded anteriorly. Upper jaw longer than lower jaw with mouth subterminal. Anterior portion of buccopharyngeal complex on roof of oral cavity consisting of three weakly developed, longitudinally aligned, fleshy folds; one medial and paired lateral folds (Fig. 2; mf and lf, respectively). Buccopharyngeal complex lacks multiple fleshy lobulate bodies characteristic of many congeners (Vari, 1991a:fig. 2), but with small, medial, lobulate body (Fig. 2, mlb) on each side of midline slightly posterior of posterior terminus of medial fold of buccopharyngeal complex. Medial lobulate body situated immediately anterior of anterior margin of posterior lobulate process (Fig. 2, plp) and distinctly anterior of anterior posteromedian flap (Fig. 2, apf; see Vari, [1991b] for discussion of morphology of buccopharyngeal complex in other members of the Curimatidae). Nostrils very close, anterior circular, posterior crescent-shaped, with aperture closed by thin flap of skin separating nares. Adipose eyelid present, with broad, vertically ovoid opening located over center of eye.

Pored lateral-line scales to hypural joint 57(6), 58 (5), 59(5), 60 (7), 61(5), 64(1), 65 (1) [60]; all scales of lateral line pored; primary laterosensory canals of scales straight; 1(2), 2(13), 3(16), 4(1) [3] scales extending beyond hypural joint onto basal portions of caudal fin; 10 [16], 11(15),12(2) [11] scales in transverse series from origin of dorsal fin to lateral line; 7(1), 8(31), 9(4) [8] scales in transverse series from lateral line to origin of anal fin; 4(5), 5(15), 6(1) [4] scales between anus and anal-fin origin. Branched dorsal-fin rays 9(39) [39]. Branched anal-fin rays 7 (39) [7]. Total pectoral-fin rays 14(2), 15(20), 16(13), 17(1) [15]. Branched pelvic-fin rays 8 (38) or 9 (1) [8]. Principal caudal-fin rays 19 (35) [19]. Total vertebrae 29 (2).

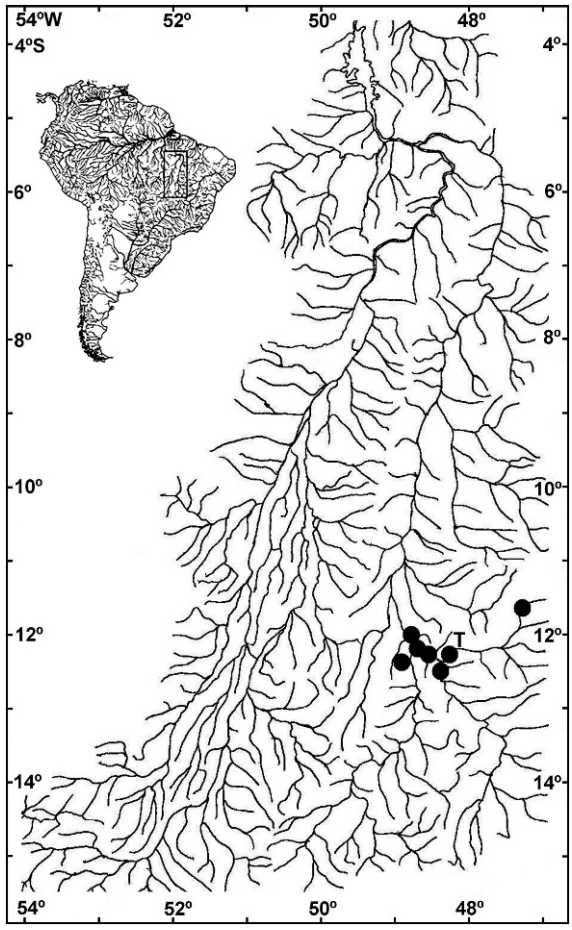

Fig. 3. Map of Rio Tocantins basin, Brazil, showing collection localities of *Steindachnerina notograptos* (dots; T = type locality). Some symbols represent more than one lot and/or locality.

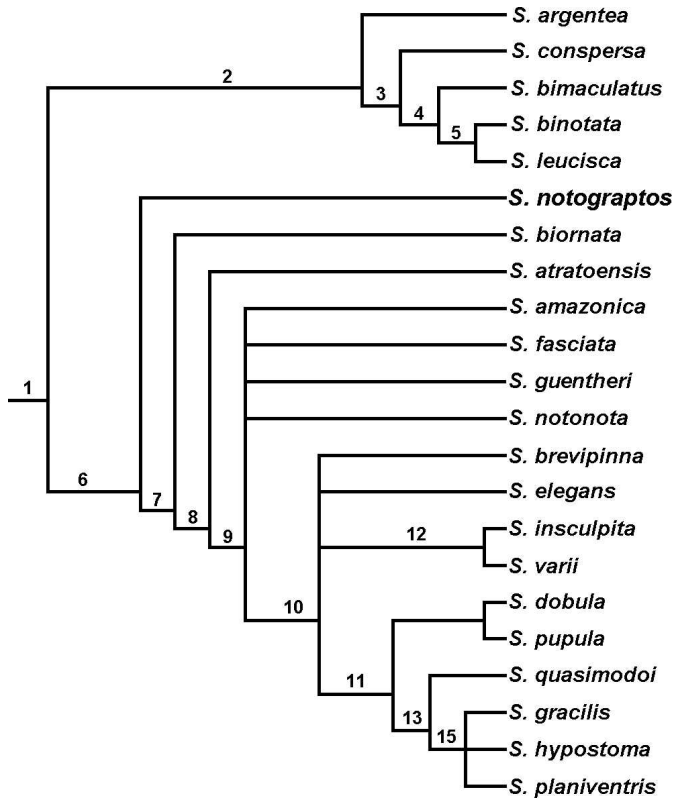

Fig. 4. Most parsimonious cladogram depicting hypothesis of phylogenetic relationships among species of *Steindachnerina*. Length = 49. Consistency Index = 0.69. Retention Index = 0.90. See Appendix 1 for descriptions of characters and characters states. Numbers above branches are node numbers, and, in the following listing, character codes are followed by character-state transformations (codes in parentheses refer to ambiguous optimizations): (1): 5-1, 6-1(6-2), 8-1, 10-1, 25-1(25-0); (2): 3-1, 24-1, (25-1); (3): 9-1, 15-1, 16-1, 17-1, 20-1, 21-1; (4): 22-1; (5): 24-0, 25-0, 26-1, 27-1, 28-1; (6): 1-1, 2-1, 4-1, 6-2 (6-1), (25-1); (7): 23-2; (8):1-2, 7-1; (9):1-3, 11-1, 12-1; (10): 13-1, 14-1; (11): 23-1; (12): 25-0; (13): 18-1, 19-1, 26-1, 27-1, 29-1; (14): 23-0; (15): 19-2. Known autapomorphies including autapomorphic reversals for species of *Steindachnerina* (character and character states as in Appendix 1): *S. notograptos*: 22-1, 26-1, 28-1, 29-1; *S. biornata*: 25-0; *S. dobula*: 25-0; *S. quasimodoi*: 2-0; and *S. hypostoma*: 25-0. Other species in the genus lack identified autapomorphies.

Color in alcohol.—Overall coloration of specimens retaining guanine on scales silvery or silvery golden. Coloration darker on dorsal portions of head and body. Ground coloration of specimens lacking guanine yellowish tan to brown. Specimens retaining guanine with obscure deep-lying, silvery midlateral stripe extending from supracleithrum onto caudal peduncle but terminating posteriorly in advance of hypural joint. Three irregular series of dark brown dots located on dorsolateral portion of body and above silvery midlateral band, when latter present. Spots smaller than exposed portions of scales in that region. Round to horizontally elongate diffuse dark spot larger than exposed portions of scales positioned over lateral line slightly anterior to vertical through origin of dorsal fin. Spot situated within midlateral silvery stripe in those specimens retaining guanine in that region. Distinct dark spot present along dorsal midline immediately anterior to origin of dorsal fin. Caudal-fin rays outlined by series of small, dark chromatophores. Basal to middle portions of lower lobe of caudal fin range from slightly dusky to very dark. Anterior and distal portions of dorsal fin variably dusky. Anal, pectoral, and pelvic fins hyaline.

Distribution.—Middle portions of Rio Tocantins drainage in central Brazil (Fig. 3).

Remarks.—The most parsimonious cladogram (length = 49, CI = 0.69, RI = 0.90) is isomorphic with that discussed in Vari (1991b), and indicates that *Steindachnerina notograptos* is sister to clade 7, which is composed of 16 species (Fig. 4). Interestingly, although *S. notograptos* is most similar externally to *S. leucisca* (see Diagnosis), these two species do not resolve as sister taxa, but with *S. leucisca* rather deeply embedded within clade 2.

The distribution of *Steindachnerina notograptos* within *Steindachnerina* is congruent with the pattern discussed by Vari (1991b), wherein basal components of that genus (clades 2 through 11 of Fig. 4; see Vari, 1991b:fig. 79) are all distributed outside of, or peripheral to, the central portions of the Amazon basin (herein considered the Rio Amazonas downstream of Leticia, the Rio Negro and more eastern left bank tributaries of the Amazon, and the lower portions of the Rio Madeira, Rio Tapajós, Rio Xingu, and intervening right bank tributaries). Alternatively, the species of the terminal portions of the tree for *Steindachnerina* (nodes 13, 15 of Fig. 4: see also Vari, 1991b:fig. 80) apparently underwent speciation and secondary dispersal

within the central portions of the Amazon basin and immediately adjoining tributary rivers.

Comparisons.—Only three species of *Steindachnerina* (*S. amazonica*, *S. gracilis*, and *S. notograptos*) are known from the Rio Tocantins basin, with each apparently endemic to that drainage system. *Steindachnerina notograptos* is readily distinguished from both *S. amazonica* and *S. gracilis* by the morphology of the roof of the mouth (the absence of the well-developed, multiple, fleshy, lobulate structures on the roof of the oral cavity, versus presence of those structures, respectively) and pigmentation of the dorsal fin (dark spot at the base of the dorsal fin absent versus present, respectively). *Steindachnerina notograptos* further differs from *S. amazonica* in the number of lateral-line scales to the hypural joint (57 to 65 versus 36 to 41, respectively) and the number of scales in a transverse series from the origin of the dorsal fin to the lateral line (10 to 12 versus 6 or 7, respectively). *Steindachnerina notograptos* also differs from *S. amazonica* in the number of lateral-line scales to the hypural joint (57 to 65 versus 50 to 54, respectively), the number of scales in a transverse series from the origin of the dorsal fin to the lateral line (11 or 12 versus 6 or 7, respectively), and in the form of the prepelvic region of the body (distinctly transversely flattened versus transversely obtusely flattened, respectively).

Species of *Steindachnerina* are often externally similar to species of the curimatid genus *Cyphocharax*, albeit differing in the morphology of the roof of the mouth. Four species of *Cyphocharax* (*C. gouldingi*, *C. notatus*, *C. plumbeus*, and *C. stilbolepis*) are known from the Rio Tocantins basin or areas immediately adjoining the lower portions of that river system (Vari, 1992). *Steindachnerina notograptos* differs from those species in possessing three irregular series of dark brown dots located on dorsolateral portion of the body whereas *C. gouldingi*, *C. notatus*, *C. plumbeus*, and *C. stilbolepis* lack that pigmentation pattern. Other differences between *S. notograptos* and these *Cyphocharax* species include the number of lateral-line scales to the hypural joint (57 to 65 versus 35 or fewer in *C. gouldingi*, *C. notatus*, and *C. plumbeus*), the lack of dark pigmentation at the tip of the dorsal fin (versus presence of such pigmentation in *C. notatus*), the lack of a large black spot at the base of the caudal fin (versus the presence of such a spot in *C. gouldingi*), the greatest body depth (27.5–33.0 versus 34.0–37.0 of SL in *C. stilbolepis*), the distance from the snout to the anus (64.8–74.0 versus 76.0–80.0 of SL in *C. stilbolepis*), and the total number of vertebrae (29 versus 32 in *C. stilbolepis*).

Etymology.—The specific name, *notograptos*, meaning having markings on the back, is a Greek feminine adjective and alludes to the presence of dark brown dots on the dorsolateral portion of body.

MATERIAL EXAMINED

Steindachnerina amazonica. Brazil, Tocantins, São Salvador, Córrego Queda d'Água, UNT 1661, 50; Tocantins, Paranã, Córrego Taboca, UNT 4005, 11; Goiás, Rio Paina, USNM 298161, 4.
S. argentea. Trinidad and Tobago, Trinidad, Arouca River, north of Churchill to Roosevelt Highway, USNM 285663, 25.
S. atratoensis. Colombia, Choco, Río Pavarando, tributary of Río Salaqui, USNM 220199, 5.
S. bimaculata. Brazil, Amazonas, lake near Manaus, USNM 220349, 10.
S. biornata. Brazil, Rio Grande do Sul, Rio Jacuí, USNM 285194, 12.
S. brevipinna. Brazil, Rio Grande do Sul, Rio Uruguay basin, USNM 287002, 2; USNM 295265, 2.
S. conspersa. Paraguay, Presidente Hayes, 50 km N of Asunción, USNM 232224, 4.
S. dobula. Peru, Ucayali, Río Ucayali, USNM 298378, 5.
S. elegans. Brazil, Bahia, Rio do Braço system, USNM 297909, 61.
S. fasciata. Brazil, Rondônia, Rio Romari (or São Domingo) near Nova União, USNM 270377, 4 (paratypes).
S. guentheri. Venezuela, Delta Amacuro, Caño Fiscal, USNM 235494, 25.
S. gracilis. Brazil, Tocantins, Paraná, Rio Maranhão UNT 3790, 8; Porto Nacional, Rio Tocantins, UNT 4524, 12; Tocantins, Rio Tocantins, near Tucuruí, USNM 293034, 2 (paratypes).
S. hypostoma. Peru, Ucayali, Río Ucayali, USNM 261489, 12.
S. insculpta. Brazil, São Paulo, Rio Mogi-Guaçu, Emas, USNM 295271, 22.
S. leucisca. Brazil, Amazonas, Ilha da Marchantaria, USNM 229186, 1; Brazil, Amazonas, junction of Rio Iaco and Rio Purus, USNM 94655, 4; Brazil, Amazonas, Ilha da Marchantaria, USNM 229188; Peru, Río Ucayali, USNM 261520, 10.
S. notonota. Brazil, Rio Grande do Norte, Rio Jaguaribe, USNM 302059, 10.
S. planiventris. Brazil, Rondônia, Rio Machado, near mouth, USNM 267896, 18 (paratypes).
S. pupula. Venezuela, Delta Amacuro, Río Orinoco, USNM 235462, 2 (paratypes).
S. quasimodoi. Brazil, Amazonas, Rio Javarí, opposite Colonia Angamos, Peru, USNM 293040, 3 (paratypes).
S. varii. Suriname, Brokopondo, Morawijne or Gran Creek, USNM 300000, 10 (paratypes of *S. runa*).

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APPENDIX 1

Descriptions of characters and character states in Table 2.

1. Portion of buccopharyngeal complex on roof of oral cavity: 0, three thin flaps; 1, thickened flaps, with or without lobulate bodies; 2, one or more series of lobulate bodies; 3, multiple series of lobulate bodies.
2. Posterior lobulate bodies of buccopharyngeal complex: 0, simple and moderately developed; 1, well developed with relatively large papillae.
3. Margin of anterior posteromedian flaps of buccopharyngeal complex: 0, smooth or slightly crenulated; 1, with fleshy fringe-like processes.
4. Lobulate processes of buccopharyngeal complex on anteroventral surface of first and second gill arches: 0, absent; 1, moderately to well developed and forming longitudinally ovoid mounds.
5. First infrapharyngobranchial: 0, cartilaginous portion smaller that ossified region; 1, cartilaginous portion much larger than ossified.
6. Second infrapharyngobranchial: 0, no depression or dorsal and ventral flanges on medial surface to accommodate anterior portion of third infrapharyngobranchial; 1, moderately to well-developed depression and flanges; 2, well-developed depression and flanges that receives lateral articular surface of anterior portion of third infrapharyngobranchial.
7. Fifth upper pharyngeal tooth-plate: 0, narrow and twisted; 1, moderate to wide with twisting reduced; 2, very wide with twisting absent.
8. Process on third hypobranchial for attachment of ligament between second and third hypobranchials: 0, absent or poorly developed; 1, well developed.
9. Anterior extension of ventral process of third hypobranchial: 0, tip pointed; 1, tip subdivided into two blunt-tipped processes.
10. Basihyal and basihyal tooth-plate: 0, narrow, elongate; 1, distinctly expanded laterally anteriorly.
11. Region of mesopterygoid onto which mesopterygoid-vomer ligament attaches: 0, simple and not thickened; 1, convoluted and notably thickened
12. Mesopterygoid: 0, posterior portion narrow vertically; 1, posterior portion thickened vertically.
13. Anterior portion of metapterygoid: 0, vertically narrow; 1, vertically thickened.
14. Medial margin of metapterygoid: 0, longitudinally straight or only slightly convex; 1, longitudinally concave medially.
15. Third infraorbital: 0, moderately elongate; 1, posteriorly lengthened with expansion of margin along orbit.
16. Fourth infraorbital: 0, moderately developed, somewhat square; 1, reduced, triangular.
17. Fifth infraorbital: 0, with definite anterior and posterior flanges bordering laterosensory canal segment; 1, with flanges reduced and element represented primarily by ossified laterosensory canal segment.
18. Mesethmoid: 0, notched posteriorly to accommodate anterior portion of median fontanel; 1, expanded posteriorly into triangular process.
19. Frontals: 0, well separated anteriorly by median fontanel; 1, slightly separated by fontanel or in contact anteriorly; 2, in contact anteriorly.
20. Dark spot along dorsal midline of body immediately anterior of origin of dorsal fin: 0, absent; 1, present.
21. Dark spot along dorsal midline of body slightly posterior of tip of supraoccipital spine: 0, absent; 1, present.
22. One or more longitudinal series of dark spots along dorsal and dorsolateral surfaces of body: 0, absent; 1, present.
23. Dark pigmentation along lateral line: 0, absent; 1, slightly developed; 2, well developed.
24. Dark spot of pigmentation at base of middle rays of caudal fin: 0, absent; 1, present.
25. Dark spot of pigmentation on basal portions of dorsal fin: 0, absent; 1, present.
26. Position of anus: 0, separated from first anal-fin ray by 1 to 3 scales; 1, separated from first anal-fin ray by 5 to 11 scales.
27. Vertebrae: 0, number not increased; 1, number increased.
28. Number of scales along lateral line: 0, number not increased; 1, number increased.
29. Form of prepelvic region of body: 0, rounded or somewhat obtusely flattened transversely; 1, distinctly flattened transversely.