

NEMATOCHARAX VENUSTUS, A NEW GENUS AND SPECIES
OF FISH FROM THE RIO JEQUITINHONHA,
MINAS GERAIS, BRAZIL
(TELEOSTEI: CHARACIDAE)

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Abstract.—*Nematocharax venustus*, a new genus and species, is described from the lower portion of the Rio Jequitinhonha in Minas Gerais, Brazil. The adult male of this species is distinguished from all known characins by the combination of elongate, filamentous dorsal, anal, and pelvic fins, and a nearly full series of maxillary teeth. The possible relationships of the new genus are briefly discussed but no corroborated hypothesis of relationship is advanced. The status of the knowledge of the fish fauna of the Atlantic forest of eastern Brazil is briefly discussed.

The description given below of a new species of characid from the Rio Jequitinhonha is a small contribution towards increasing the data base for studies of the biogeography of the small and modest-sized littoral streams of eastern and southeastern Brazil. Although the characid fish described herein is probably quite common in at least the middle and lower course of the Rio Jequitinhonha it apparently has been collected only twice, first in 1966 from the Rio Jequitinhonha at Itaobim, Minas Gerais and again in 1985 further east in the same river near Salto da Divisa. It was very common at both collecting sites. That a relatively common, distinctive, easy-to-capture fish of eastern Brazil is now being made known to science is a fact representative of our poor knowledge of the fish fauna of the region. Much future descriptive, phylogenetic, and faunal research must be published before adequate biogeographical studies of this region's fishes can be accomplished.

Methods and materials.—Counts and measurements are those described by Fink and Weitzman (1974:1-2). All measurements other than standard length (SL) are expressed as a percentage of SL except subunits of the head which are expressed as a percentage of head length. Ranges and means

of the meristics and morphometrics are given in the tables, with information for the holotype given separately. Ranges and means for counts in the tables are represented by one set of figures for both sexes combined except in cases of obvious sexual dimorphism where the information is given by sex. Logarithmic and square root transformed data were used in covariance analyses of sexual differences in measurements and counts respectively.

Specimens examined for this study are deposited in the Museu de Zoologia da Universidade de São Paulo (MZUSP), the National Museum of Natural History, Smithsonian Institution (USNM), Museum of Zoology, University of Michigan (UMMZ), the Academy of Natural Sciences of Philadelphia (ANSP), the British Museum (Natural History) (BMNH), Field Museum of Natural History (FMNH), and the Museu Nacional de Rio de Janeiro (MNRJ).

Nematocharax, new genus

Type species.—*Nematocharax venustus*, new species.

Diagnosis.—A "tetragonopterine" characid distinguished from all other genera of American and African characids by having a combination of elongate branched dorsal-,

Table 1.—Morphometrics of *Nematocharax venustus*, Itaobim, Rio Jequitinhonha, holotype MZUSP 5131, paratypes from same locality, MZUSP 28480–28509, 28661–28689, and USNM 232955 and 232956. Standard length expressed in mm. Following 19 measurements are percentages of standard length and last 4 measurements are percentages of head length. Entries including both sexes and juveniles (n = 52 to 75) are for specimens 17.5 to 32.0 mm SL. Entries listed by sex include males (m) between 30.0 and 52.0 mm SL and females (f) between 33.0 and 40.5 mm SL.

	Holotype	n	Low	High	$\bar{x}$
Standard length	50.5	75	17.7	52.0	—
Depth at dorsal-fin origin m	40.6	27	37.5	43.0	41.0
Depth at dorsal-fin origin f	—	30	36.0	40.4	38.6
Snout to dorsal-fin origin	53.7	75	50.8	55.8	53.4
Snout to pectoral-fin origin	26.5	75	24.7	31.5	27.4
Snout to plevic-fin origin	44.2	75	41.3	52.4	45.3
Snout to anal-fin origin	60.4	27	56.9	62.2	59.6
Caudal peduncle depth	13.1	75	10.8	13.5	12.1
Caudal peduncle length	11.3	75	9.9	13.5	11.2
Pectoral-fin length	23.8	74	14.7	26.2	23.2
Pelvic-fin length m	51.5	23	40.2	64.2	54.8
Pelvic-fin length f	—	30	20.0	30.9	23.2
Dorsal-fin base length	14.9	75	13.0	17.0	15.0
Longest dorsal-fin ray length m	73.3	24	59.9	78.8	68.2
Longest dorsal-fin ray length f	—	30	32.9	36.7	34.7
Anal-fin base length m	33.3	27	30.0	34.9	33.1
Anal-fin base length f	—	30	28.1	32.5	30.6
Anal-fin lobe length m	50.3	24	41.0	58.5	50.2
Anal-fin lobe length f	—	29	22.4	34.5	26.3
Bony head length	27.7	75	26.4	31.9	28.4
Horizontal eye diameter	35.9	75	34.8	43.0	38.4
Snout length	27.9	75	22.9	33.1	27.6
Least width interorbital	30.9	74	27.6	36.4	30.8
Upper jaw length	47.9	74	36.4	51.4	44.1

anal-, and pelvic-fin rays, two rows of pre-maxillary teeth in adults, and an almost complete row of teeth along the free ventral maxillary border.

The possible relationships of this genus to other characids are obscure and we recognize the genus *Nematocharax* because we are unable to hypothesize a particular relative of the single known species, *N. venustus* (see “Relationships.”)

Etymology.—*Nemato* from the Greek for thread and *charax* from the Greek *characo* meaning a pointed stake, here used in reference to the characid genus *Charax*, hence a characid fish. *Nematocharax* thus means a thread-bearing characid fish in reference to the long threadlike extensions of the dorsal, anal, and pelvic fins.

Nematocharax venustus, new species
Figs. 1–4, Tables 1, 2

Holotype.—MZUSP 5131, male, SL 50.5 mm, Brazil; Minas Gerais, Município Medina, Rio Jequitinhonha at Itaobim, about 16°40'S, 41°23'W, 25 Jun 1966, by Heraldo Britski and Naércio Menezes.

Paratypes.—1, MZUSP 28480, female (photographed), SL 35.4 mm.—29, MZUSP 28481–28509, SL 17.7–52.0 mm.—29, MZUSP 28661–28689, SL 33.0–51.5 mm.—80, MZUSP 28690 (data not taken).—6, USNM 232955, SL 34.0–51.7 mm.—7, USNM 232956, SL 34.7–52.0 mm.—4, UMMZ 213448, SL 34.7–51.9 mm.—2, ANSP 157373, SL 34.3–48.0 mm.—2, BMNH 1985.11.10.1–2, SL 37.5–

Table 2.—Meristics of *Nematocharax venustus*, Itaobim, Rio Jequitinhonha, holotype MZUSP 5131, paratypes from same locality, MZUSP 28480–28509, 28661–18689, and USNM 232955 and 232956.

	Holotype	n	Low	High	$\bar{x}$
Branched dorsal-fin rays	9	73	9	10	9.0
Branched pectoral-fin rays	12	70	11	14	11.8
Branched pelvic-fin rays	6	73	7	7	7.0
Branched anal-fin rays	23	73	22	26	23.7
Branched caudal-fin rays	17	73	17	17	17.0
Horizontal scale rows, between dorsal- and anal-fin origins	13	73	11	13	12.7
Predorsal scales	11	68	10	12	10.8
Perforated lateral-line scales	10	66	8	12	9.7
Lateral series scales	34	66	32	35	33.9
Horizontal scale rows around caudal peduncle	14	52	13	14	14.0
Dorsal limb gill rakers	6	73	5	7	6.2
Ventral limb gill rakers	9	73	8	10	9.4
Outer row premaxillary teeth	4	73	2	4	3.1
Inner row premaxillary teeth	5	73	4	6	5.1
Maxillary teeth m	12	31	7	12	10.8
Maxillary teeth f	—	27	9	12	10.0
Dentary teeth	11	73	9	13	11.0
Vertebrae	—	36	33	34	33.7

50.3 mm.—2, FMNH 96633, SL 42.8–49.4 mm.—4, MNRJ 11.285, SL 33.6–49.6 mm. All preceding paratypes with same collection data as holotype.—15, USNM 270816, 29.5–41.7 mm, Brazil, Minas Gerais, Município Jequitinhonha, Rio Jequitinhonha, near km 205, road between Salto da Divisa and Jacinto, about 16°02'S, 40°00'W, 22 Mar 1985 by Naércio Menezes, Ricardo Castro, Marilyn Weitzman, and Stanley H. Weitzman.—18, MZUSP 28811, SL 23.0–41.5 mm, with same data as USNM 270816.

Diagnosis.—Since *Nematocharax* is monotypic, the species and the generic diagnoses are the same. See also discussion below under “Relationships.”

Description.—See Tables 1 and 2 for morphometric values and counts. Body moderately deep, sides compressed, greatest depth at dorsal-fin origin. Predorsal body profile gently convex in females and juveniles, more steeply arched in males (compare Figs. 1 and 2). Body profile somewhat elevated at dorsal-fin origin, nearly straight along dorsal-fin base and continuing almost

in straight line in females and juveniles to origin of adipose fin. In mature males, profile between posterior dorsal-fin base and adipose-fin origin slightly convex. Dorsal-fin origin about equidistant between caudal-fin base and snout tip. Dorsal-fin origin closer to posterior border of eye than to caudal-fin base. Ventral body profile gently convex to anal-fin origin in both sexes. Body profile along base of anal fin slightly convex to nearly straight in males, almost straight in females. Both dorsal and ventral profiles of body of distal to anal-fin border concave in both sexes.

Head and snout relatively deep. Jaws about equal, mouth terminal or lower jaw slightly included, ventral to upper jaw. Gape nearly horizontal. Maxilla extending posteriorly approximately to point on line drawn vertically at anterior one-third to one-half of pupil of eye.

Dorsal fin with last ray not split to its base. First to fourth branched dorsal-fin rays filamentous and much more elongate in males than females (see Table 1), rays ex-

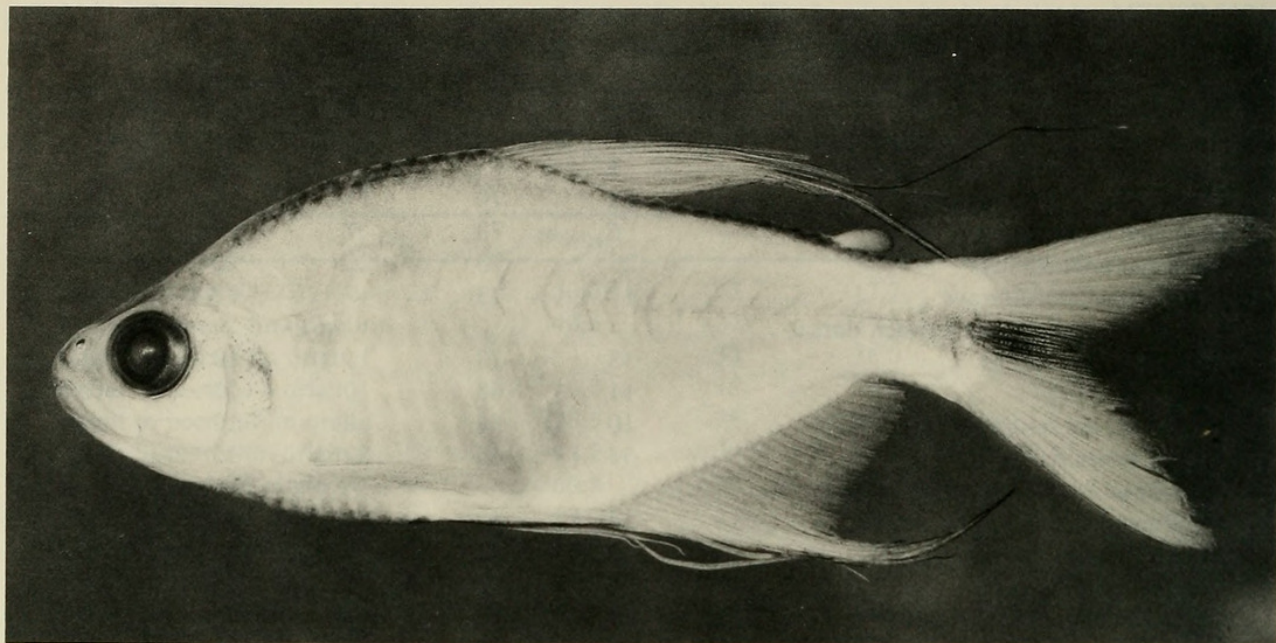


Fig. 1. *Nematocharax venustus*, new species, holotype, MZUSP 5131, male, 50.5 mm SL; Brazil, Minas Gerais, Município Medina, Rio Jequitinhonha at Itaobim.

tending posteriorly beyond caudal-fin base. In females these rays occasionally reaching as far posteriorly as anterior origin of adipose fin. Branched rays two and three usually shorter than branched rays one and four; may occasionally equal rays two and three in length. Dorsal fin with no well-developed hooks but with small bony spinules scattered distally on branched rays two to six. Any given ray with more spinules on posterior borders of posterior branches than on anterior branch. (For example, a cleared and stained male, USNM 232955, 47.6 mm SL with 2 spinules on anterior branch, 10 on posterior branch of ray two; rays three and four damaged; ray five with 2 spinules on anterior branch, 3 on posterior branch; ray six with 2 on anterior branch and 4 on posterior branch; ray seven with 1 on anterior branch and 6 on posterior branch.)

Adipose fin present, situated at position bisected by or slightly anterior to imaginary line drawn vertically from posterior anal-fin base termination.

Posterior anal-fin ray split to its base. Anal fin of both sexes with broad anterior lobe (Figs. 1–3). Anal-fin rays of anterior lobe

much longer in males than in females, reaching posteriorly beyond caudal-fin base. Males with fourth unbranched anal-fin ray and first to about sixth branched anal-fin rays forming major part of anal-fin lobe. Fifth branched anal-fin ray usually longest. See Table 1 and section on sexual dimorphism for comparison of anal-fin lobe lengths of males and females. Males with hooks present on third, fourth and/or fifth unbranched and on first to tenth or eleventh branched rays; see Fig. 3 of anterior unbranched and first six branched rays. Hooks small, 1 to 2 per ray segment. Hooks numerous (more than 10) on unbranched ray four or five and also on branched rays one to six or seven. Rays eight to eleven with 1 to about 3 hooks per ray, with 1 or 2 hooks on hook-bearing segments. Remaining rays may occasionally bear single spinule. Hooks occur near or on those divided, Y-shaped, segments forming initial branching point for each ray. Tiny spinules continuing on branched portions of rays five to six, especially one to four, most common on posterior branch of each ray.

Distal tips of pectoral-fin rays of males

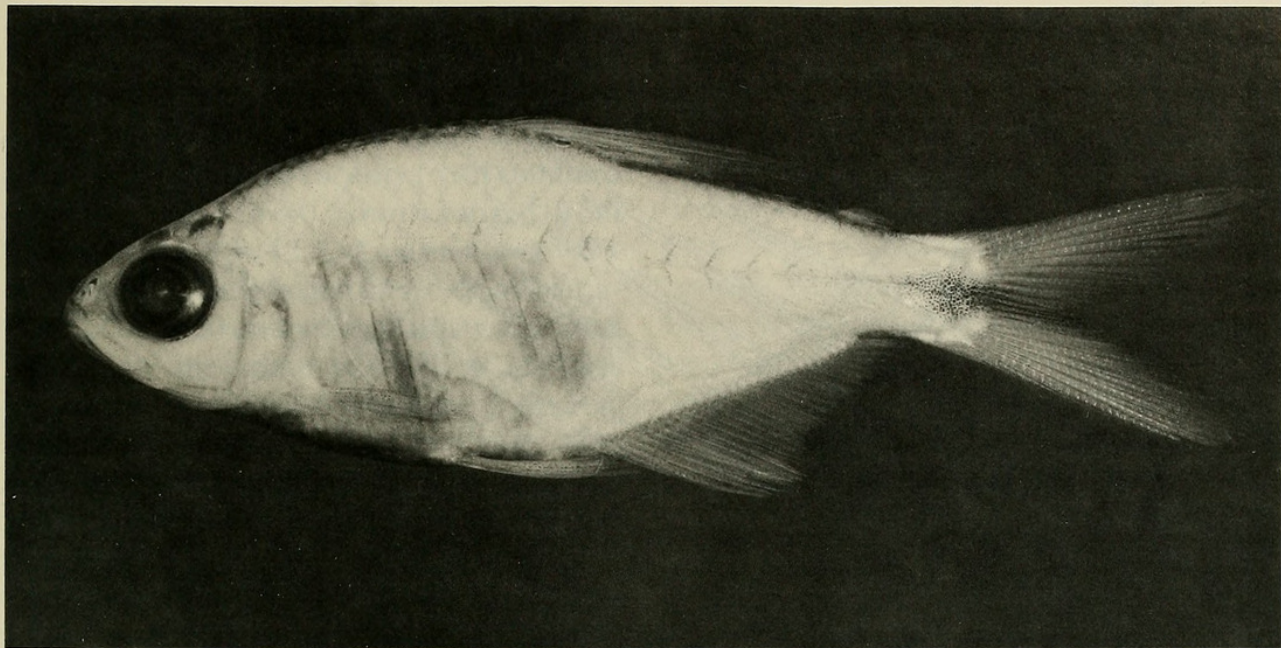


Fig. 2. *Nematocharax venustus*, new species, paratype, MZUSP 28480, female, 35.4 mm SL; Brazil, Minas Gerais, Município Medina, Rio Jequitinhonha at Itaobim.

and females extending posteriorly beyond pelvic-fin origin. Pelvic fin sexually dimorphic, with first unbranched ray greatly elongate in males. See discussion on sexual dimorphism below. Pelvic fin with about 1 to 5 spinules present distally on most branches of rays two to five. Principal caudal-fin rays 10/9 in all counted specimens (73). Hooks and spinules absent on caudal-fin rays.

Scales cycloid, lateral line complete. Predorsal scale series complete. See Table 2 for scale counts.

Premaxillary teeth in two distinct rows (Fig. 4). Two to four, usually three, teeth in outer row (see Table 2); first to fourth teeth of outer row cusped, with lateral most tooth having one to two cusps, and medial tooth up to four cusps. Four to six, usually five, teeth in inner row; inner row teeth with five or six, usually six, cusps. Outer row teeth circular in cross section, not compressed. Inner-row teeth compressed, especially distally along cusps. Maxillary teeth five to twelve, $\bar{x} = 9.5$ in 73 specimens 17.7 to 52.0 mm SL. Adult specimens over 33.0 mm SL, with seven to twelve teeth, $\bar{x} = 10.5$. Larger specimens usually having more teeth. See

also discussion on sexual dimorphism. Anterodorsal four to five maxillary teeth with three or four cusps, remaining posteroventral teeth large, strong, and unicuspid. Dentary teeth nine to thirteen, in single row. Anterior six to eight teeth large, with three to five cusps; posterior five to seven teeth usually unicuspid and noticeably smaller than anterior teeth. See Figure 4 of jaws and teeth.

Color in alcohol.—See Figs. 1 and 2 for preserved color pattern of males and females respectively. Entire body pale yellowish brown (muscle tissue color) in specimens with guanine destroyed by formalin. Body silvery in specimens with guanine preserved. Series of small chevron-shaped marks occurring along horizontal junction of dorsal and ventral myomeres. These marks especially distinct in region posterior to middle of body cavity and anterior to dark shield-shaped caudal spot. Caudal spot extending posteriorly and terminating at distal tips of three or four middle caudal-fin rays. Caudal spot tapering anteriorly to narrow stripe and then terminating anterior to imaginary vertical line through posterior

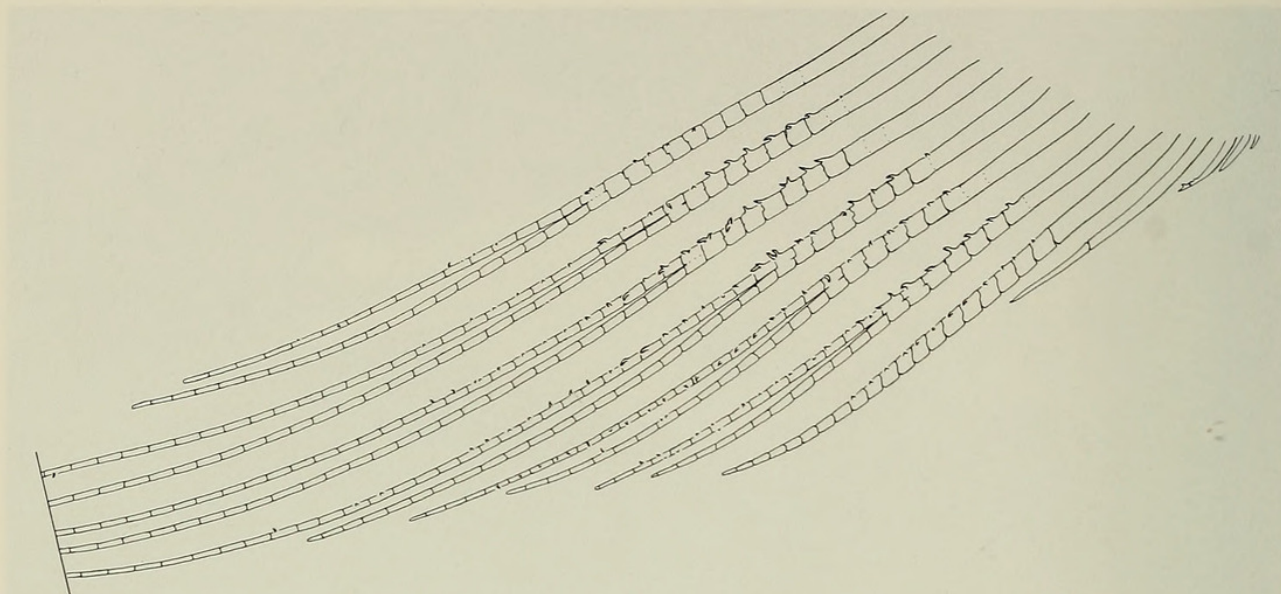


Fig. 3. *Nematocharax venustus*, USNM 232955, male, 47.6 mm SL, cleared and stained. Anal fin, lateral view, right side.

end of anal-fin insertion. Dorsal body surface dusky in area of predorsal scales, along base of dorsal fin, and along median part of back to base of dorsal caudal-fin lobe. Head dusky brown dorsally, pale ventrally, no dark markings. Dark crescent-shape mark on opercle in Figs. 1 and 2 formed by shadow within gill chamber, not from pigment. Belly pale, without dark marks.

Dorsal fin dusky in both sexes, with filamentous rays of males especially dark. Caudal fin dusky with pale brown chromatophores on fin rays. Anal fin dusky in both sexes with filamentous rays of males especially dark. Pelvic and pectoral fins slightly dusky, brown chromatophores few, scattered over rays.

Color in life.—Specimens taken from near Salto da Divisa in silty waters with very little visibility had body silvery with dark chevron-shaped marks pale, partly obscured by guanine pigment on body. Body with pale pink and greenish reflections on silvery sides. Back pale brown, top of head dark brown. Dorsal fin with same dark pattern as preserved specimens but with pale rosy color in fin rays. Adipose fin pale rosy. Dorsal caudal-fin lobe pale yellow distally

and pale rosy proximally. Ventral caudal-fin lobe with similar color but somewhat yellowish throughout. Anterior lobe of anal fin in both sexes pale rosy, posterior part of anal fin pale yellow. Pectoral fin hyaline, pelvic fin pale rosy. Belly, sides, and side of head bright silvery flushed with small amount of rose color. Iris of eye silvery with rosy dark spot dorsally. In clear waters or in dark tea-colored waters which may have once been common in the tributaries of the lower regions of the Rio Jequitinhonha, the colors of this fish may have been darker and/or more intense.

Sexual dimorphism.—*Nematocharax venustus* is obviously sexually dimorphic in three characters. Table 1 shows gaps in ranges of ratios between males and females for the length of the longest dorsal-fin ray (measured between the origin of the fin and the distal tip of the longest ray), anal-fin lobe length, and pelvic-fin length. Measurements were taken from adult specimens between 33.3 to 52.0 mm SL for males and 33.3 to 40.5 mm SL for females.

Inspection of upper jaw length relative to head length in adult specimens shows a greater jaw length in males than in females.

The percent of upper jaw length relative to head length in 30 males (standard length 33.3 to 52.0 mm) from Itaobim ranged from 45.5 to 51.4, $\bar{x} = 47.7$. Twenty-seven females from the same locality (with standard lengths of 33.3 to 40.5 mm) ranged from 39.0 to 45.9, $\bar{x} = 42.5$. Analysis of covariance by sex using logarithmic transformations of original data for upper jaw and head lengths of the same population samples showed no significant difference in regression coefficients (slopes), $t = 0.696$, $P > 0.05$, determined in a two-tailed test but did show significant differences in the Y-intercepts (elevations), $t = 2.600$, $P < 0.001$, also determined in a two-tailed test. The upper jaw length differences in adult males and females may be due to a growth rate difference during sexual maturation since specimens of shorter standard length were not separable into two groups on the basis of upper jaw length.

Inspection of the population sample of *Nematocharax venustus* from Itaobim showed that ten juvenile specimens between 17.7 and 32.8 mm SL had 5 to 7 maxillary teeth, and a mean of 5.8. Twenty-seven adult males had 7 to 12, and a mean of 10.8 maxillary teeth. Thirty-one adult females between 33.3 and 40.5 mm SL had 9 to 12, and a mean of 10.0 maxillary teeth. Covariance analysis of the same two adult samples by sex using logarithmic transformations of upper jaw length measurements and square root transformations of maxillary tooth numbers showed a difference in regression coefficients (slope), $t = 2.117$, $P < 0.05$ and in the Y-intercept (elevations), $t = 2.003$, $P < 0.05$, both determined in a two-tailed test. In *Nematocharax venustus* there does seem to be some sexual dimorphism in maxillary tooth numbers.

Sexual dimorphism in maxillary (or other) tooth number is apparently rare in tetragonopterine characids, especially in those species with one to three or so teeth in each maxilla. When the count is higher, maxillary tooth count differences might be ex-

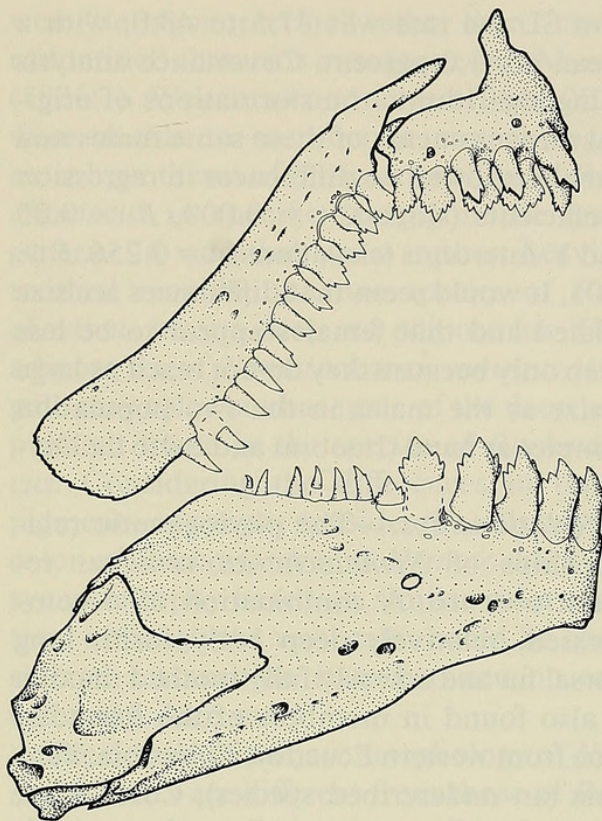


Fig. 4. *Nematocharax venustus*, USNM 232955, male, 47.6 mm SL, cleared and stained. Lateral view, right side of premaxillary, maxillary, and dentary bones.

pected to display sexual dimorphism, especially if the maxilla is longer in males than in females. At some stage in the development of all tetragonopterines with maxillary teeth there are fewer teeth (or none) in the young than in older specimens. In species with many maxillary teeth and long maxillae the increase in tooth numbers and in maxillary length may continue evenly over a relatively long interval of growth and then differentiate during sexual maturation.

Body depth in *Nematocharax venustus* increases at a greater rate relative to body length during growth. Males and females are evidently sexually dimorphic in the ratio of body depth to standard length. In the population from Itaobim, ten juveniles 17.7 to 32.0 mm SL had a body depth ratio of 33.0 to 37.3 percent of the standard length with a mean of 34.8 percent. In thirty-one females of 33.3 to 40.5 mm SL the rate was 36.0 to 40.4, with a mean of 38.6 percent while in twenty-seven males of 33.3 to 52.0

mm SL the rate was 37.5 to 43.0, with a mean of 41.0 percent. Covariance analysis using logarithmic transformations of original measurements of these same males and females showed no differences in regression coefficients (slopes), $t = 0.000$, $P > 0.05$ and Y-intercepts (elevations), $t = 0.256$, $P > 0.05$. It would seem that differences are size related and that females appear to be less deep only because they do not reach as large a size as the males in the two population samples at hand (Itaobim and Salto da Divisa).

Relationships. — The phylogenetic relationships of *Nematocharax venustus* remain obscure. A combination of a compressed, relatively deep body form, long dorsal fin and a nearly fully toothed maxilla is also found in members of the Rhoadsiinae from western Ecuador, Colombia, Panama (an undescribed species), Costa Rica, and Lake Nicaragua in Nicaragua; see Eigenmann and Myers (1929:457), Dahl (1960:472), and Fink and Weitzman (1974:26). These fishes, geographically distant from *Nematocharax*, lack the derived, elongate anal- and pelvic-fin rays of *Nematocharax*. Also, *Nematocharax* with a vertebral count of 33–34 differs from the higher vertebral count, 36–38, of species of the Rhoadsiinae [based on specimens of *Rhoadsia altipinna* Fowler (FMNH 83870), *Parastremma sadina* Eigenmann (FMNH 56023), *Carlana eigenmanni* (Meek) (USNM 272646) and specimens of an undescribed species of *Carlana* collected recently in Panama (USNM uncatalogued)]. Furthermore, *Nematocharax venustus* does not have the “cheirodontine” teeth (flattened and with a single series of several more or less subequal cusps) found in young specimens and as at least partly present in adults of the Rhoadsiinae, Eigenmann and Myers (1929:457), Fink and Weitzman (1974:25). Small specimens, down to 17.7 mm SL, of *Nematocharax venustus* have teeth similar to those of adults, relatively elongate, rather flattened and with

cusps of different sizes on each tooth. The geographical distance between *Nematocharax* and members of the Rhoadsiinae make it unlikely that *Nematocharax venustus* is most closely related to members of Rhoadsiinae, but the possibility cannot be ignored.

If *Nematocharax* is most closely related to the Rhoadsiinae it is less derived in having fewer conical teeth in the maxilla than members of the Rhoadsiinae, having no “cheirodontine”-like teeth at any life history stage, and possibly in vertebral numbers as described above. *Nematocharax* does have its own derived features relative to the Rhoadsiinae. These are the elongate anal and pelvic fins.

The color pattern of *Nematocharax* appears less derived, having a caudal spot and chevron-shaped marks along the midsides similar to those of many tetragonopterine characids. It lacks the bright red color of some (all?) of the Rhoadsiinae and the large midside blotch (posterior humeral spot?) in life of some of the Rhoadsiinae. At this time, little phylogenetic information can be gathered from the color patterns of characid fishes since so little of that system has been cladistically analyzed. Only in those cases where a species or a group of species have a unique (not found in any other taxa) color pattern as in *Paracheirodon* (see Weitzman and Fink 1983:354) can color pattern currently be used in a cladistic analysis of characids.

Another fish, *Hyphessobrycon elachys* M. Weitzman (1985) from Paraguay, has elongate dorsal- and pelvic-fin rays. This fish differs from *Nematocharax venustus* in having a different color pattern, derived anterior jaw teeth in which the central cusp extends in an opposite plane from the lateral cusps, and a small adult standard length of nearly 20.0 mm. The only evidence suggesting a possible relationship with *N. venustus* are the elongate dorsal and pelvic fins, a character we suspect is convergent. Again,

phylogenetic studies are necessary to examine possible relationships between the two species.

Other "tetragonopterine characids" have long fins. The glandulocaudine characid *Gephyrocharax martae* Dahl (1942:4) from northern Colombia has an elongate anterior anal-fin lobe that becomes filamentous. Other species of glandulocaudines such as *Corynopoma riisei* and *Pseudocorynopoma doriae* tend to have fin rays produced or to have entire fins elongate. There is no evidence that *Nematocharax venustus* is a glandulocaudine characid since it lacks the glandular tail structure of these fishes. Some species of "rosy" tetras in the genera *Megalymphodus* Eigenmann (1915:50), and *Hyphessobrycon*, Weitzman (1977:335) have relatively elongate dorsal and anal fins which are not, however, filamentous as in *Nematocharax venustus*. Sometimes specimens of *Hyphessobrycon bifasciatus* also have a somewhat elongate dorsal fin and somewhat filamentous anterior pelvic-fin rays, but these are never as long as in *Nematocharax venustus*. It is our opinion that elongate fins in characids probably evolved independently several times and that for such fins to be utilized as synapomorphies relating species and genera, the morphological similarity of the fins should involve homologous rays. Such characters would be best used when they are congruent with other synapomorphies indicating the monophyletic relationships of particular taxa.

Two genera, *Hollandichthys* Eigenmann (1910) and *Rachoviscus* Myers (1926) have species which, like *Nematocharax venustus*, bear well-toothed maxillae. Since these species are part of the Atlantic forest fish fauna, relatively close geographically to the known localities for *N. venustus*, they should be considered as possible candidates for relationships with *Nematocharax*.

Weitzman and Cruz (1981:999) briefly discussed some possible relationships of *Rachoviscus* and concluded that the species

were "tetragonopterine" rather than "cheirodontine" characids as suggested by Myers (1926:1). Weitzman and Cruz (1981:1003) were unable to corroborate any phylogenetic hypotheses of the relationships of *Rachoviscus* to specific "tetragonopterine" genera. In addition to a rather heavily toothed maxilla, the two species of *Rachoviscus* have a deep red adipose fin. The adipose fin of *Nematocharax venustus* is a pale rosy color but has none of the deep red pigment found in the species of *Rachoviscus*. Considering the differences in these pigments we cannot consider the adipose fin color of *Rachoviscus* and *Nematocharax* a synapomorphy based on similar color pattern, although the rosy color could be considered a transition state between no red color and deep red.

The details of the jaw morphology of *Nematocharax* are different from those of *Rachoviscus*. *Nematocharax venustus* has the mouth horizontal, not angled. Both species of *Rachoviscus* have somewhat upturned mouths with the gape angled posteroventrally (Weitzman and Cruz 1981:1005, 1009). The condition in *Rachoviscus* is probably more derived and may represent a synapomorphy for the species of that genus, although it must be kept in mind that an angled jaw is not uncommon in other "tetragonopterine" characids. The maxilla of *Nematocharax venustus* is well toothed ($\bar{x}$ = 10 teeth) (Fig. 3 and Table 2), while *Rachoviscus graciliceps* Weitzman and Cruz has 3 to 8 teeth and *Rachoviscus crassiceps* Myers has 8 to 14 teeth. Evolution of a well-toothed maxilla may have taken place within *Rachoviscus crassiceps* and *Nematocharax* independently. We have at present no way of evaluating the cladistic significance of maxillary teeth in these genera since the character appears in several other "tetragonopterine" genera and we have found no other synapomorphies possibly indicative of a close relationship between *Nematocharax* and *Rachoviscus*.

The monotypic *Hollandichthys multifasciatus* Eigenmann and Norris (1900:358) might be related to *Nematocharax venustus*, both having well-toothed maxillae. Because of its nearly fully toothed maxillae *Hollandichthys multifasciatus* was considered a species of *Pseudochalceus* by Schultz (1966:26) and Géry (1972:30). The relationships of *Hollandichthys* and putatively related characids assigned to *Pseudochalceus* were reviewed by Schultz (1966:26), and Géry (1972a:24–25; 1972b:933–942). We here make no comment on these reviews pending a cladistic treatment of these and other, possibly related fishes. *Hollandichthys multifasciatus*, apparently confined to Atlantic coastal streams between and including the states of São Paulo and Santa Catarina, has a maxilla with up to 17 teeth. There are several differences between *Hollandichthys* and the other species assigned to *Pseudochalceus*, Géry (1972a:37; 1972b:942; 1977:414). Considering these differences and the geographical isolation of *Hollandichthys* (southeastern Brazil) from other species assigned to *Pseudochalceus* (western Ecuador and Colombia) we propose to retain the name *Hollandichthys* until a cladistic phylogenetic study demonstrates monophyly of these geographically disparate genera. At present we see no more reason to relate *Nematocharax venustus* to *Hollandichthys multifasciatus* or to any species of *Pseudochalceus* than to relate *Nematocharax* to the species of *Rachoviscus*. The only possible synapomorphy found by us relating these genera and species is a high maxillary tooth count. For some taxa, a high maxillary tooth count is undoubtedly a synapomorphy indicating monophyly of a group formed by these taxa; for example, the species of *Pseudochalceus* from Ecuador recorded by Géry (1972). But high maxillary tooth counts have appeared a number of times in characids, for example in *Rachoviscus* Weitzman and Cruz (1981:1000) and xenobryconin characids subgroup C, Weitzman and Fink (1985:55). Because of the possibility that

Nematocharax may have evolved its maxillary teeth independently and especially because we have been unable to find any other synapomorphies common to *Nematocharax* and other characid genera with high maxillary tooth counts we are unable to accept a hypothesis that *Nematocharax* forms a sister group with any of them.

Without extensive and detailed morphological and phylogenetic research, we have no fully tested hypotheses concerning the relationships of *Nematocharax venustus*. It appears to be a "tetragonopterine" characid but that group itself is not currently defined by synapomorphies (see Weitzman and W. Fink (1983:342) and Weitzman and S. Fink (1986) for our opinions about the monophyly of the Tetragonopterinae).

Etymology.—The name *venustus* is from the Latin Venus, meaning like Venus, hence beautiful, elegant, or graceful. The name is given in reference to the graceful flowing shape of the dorsal, anal, and pelvic fins of this fish.

Remarks.—The yet-to-be-accomplished studies of fish biogeography and fish species composition of the streams in areas formerly occupied by the Atlantic forests of eastern and southeastern Brazil have now been made more difficult by inadequate sampling in the past and by much habitat alteration within the last eighty years and especially within the last thirty years. It is no surprise that new species of fishes have been collected and described from many of the Atlantic forest areas in recent years. For example, see Britski and Ortega (1983), Buckup (1981), Garavello (1977), Nijssen and Isbrücker (1976, 1980), and Weitzman and Cruz (1981).

The Rio Jequitinhonha, a relatively large coastal river, has been very little explored ichthyologically, and unfortunately for systematic and biogeographic ichthyological research, in part has been long subject to habitat alteration by man's agricultural activities. Arising in the cerrado area of the Serra do Espinhaço of Minas Gerais, the

Rio Jequitinhonha flows north then east through Minas Gerais and Bahia to the Atlantic Ocean. In parts of Minas Gerais and in Bahia this river originally traversed the Atlantic forest. Only about two percent of the forest area remains, the rest is now essentially replaced by agriculturally developed land. A combination of cattle grazing, farming, and pulpwood plantations of pine and eucalyptus trees constitute most of the land use along the coastal plain. The ecology of the middle and lower Rio Jequitinhonha drainage is greatly altered from its preagricultural condition and this has undoubtedly greatly affected the composition of the fish fauna. At the present time this river bears a heavy silt load, at least during the rainy season. Furthermore, in 1985 two of us (Menezes and Weitzman) observed an introduced species of the African cichlid genus *Tilapia* to be common in the vicinity of Salto da Divisa and we suspect this fish is common in most parts of the river. *Tilapia*, just as other factors influencing the altered ecology, undoubtedly has affected the relative composition of the fish fauna in the Rio Jequitinhonha. We will never know the preagricultural composition of the fish fauna of this river. Some species, less adaptable to the altered ecology of the river, may have become rare or extinct. Other species, not impacted by *Tilapia*, adaptable to a heavy silt load, increased sunlight and probably to higher water temperatures, and to a non-forest water chemistry, especially in the small tributaries in the lower courses of the river, may now be far more common than formerly. Eventually some presumptive measure of the original fish fauna of middle and lower parts of the Rio Jequitinhonha and its tributaries may be discerned by sampling the shorter coastal rivers in adjacent areas where some forest remains, such as those flowing within and from the Parque Nacional de Monte Pasqual just to the south. However, the shorter coastal rivers now have and probably formerly had a poorer fish fauna than the Rio Jequitinhonha because they

lacked access by stream capture to the richer ichthyofauna of more interior water courses such as the Rio São Francisco drainage further to the west. Furthermore, the larger Rio Jequitinhonha may have had a longer geological history than the shorter coastal rivers, allowing the evolution of more endemic species. Thus the fish faunas of the short adjacent coastal rivers that drain only the Atlantic forest are unlikely to represent fully the original fauna of the Rio Jequitinhonha.

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