

Redescription of the type species of *Odontostilbe* Cope, 1870 (Teleostei: Characidae: Cheirodontinae), and description of three new species from the Amazon basin

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The widespread Neotropical cheirodontine *Odontostilbe fugitiva* is reviewed, and three new species of the genus are described from the Amazon basin. A neotype is designated for *O. fugitiva*, from the mouth of the río Mazán, upper río Amazonas basin, Peru. Three nominal species are herein considered as synonyms of *O. fugitiva*: *O. madeirae*, *O. drepanon*, and *O. caquetae*. The three new species are respectively *O. ecuadorensis* from the río Napo basin, *O. nareuda* from the rio Madeira basin, and *O. parecis* from the rio Guaporé basin (rio Madeira basin). Among other diagnostic characters, gill rakers are especially informative in distinguishing species. Description of gill raker denticulation is provided for the first time for species of the Cheirodontinae. Secondary sexually dimorphic characters are described for all species.

O queirodontíneo neotropical *Odontostilbe fugitiva*, de ampla distribuição, é revisado e três espécies novas são descritas para o gênero na bacia Amazônica. Um neótipo é designado para *O. fugitiva*, da boca do rio Mazán, alto rio Amazonas, Peru. Três espécies nominais são consideradas sinônimas de *O. fugitiva*: *O. madeirae*, *O. drepanon* e *O. caquetae*. As três espécies novas são, respectivamente, *O. ecuadorensis* da bacia do rio Napo, *O. nareuda* da bacia do rio Madeira e *O. parecis* da bacia do rio Guaporé (bacia do rio Madeira). Entre outros caracteres diagnósticos, os rastros branquiais são especialmente informativos para distinguir as espécies. Uma descrição da denticulação dos rastros branquiais é apresentada pela primeira vez para espécies de Cheirodontinae. Caracteres de dimorfismo sexual secundário são descritos para todas as espécies.

Key words: Neotropical, Neotype, Systematics, *Odontostilbe madeirae*, *Odontostilbe drepanon*, *Odontostilbe caquetae*.

Introduction

The Cheirodontinae contains about 15 genera and 47 species of small Neotropical characid fishes, usually attaining 30-40 mm in standard length (Malabarba, 2003; Malabarba *et al.*, 2004). *Odontostilbe* Cope, 1870 was originally defined based on the presence of a complete lateral line, *versus* interrupted in *Cheirodon* Girard, 1855. The genus initially comprised only *Odontostilbe fugitiva* Cope, 1870 from “Pebas, Eastern Equador”. Currently, Pebas is a city in the Departamento de Loreto in Peru, not Ecuador. The taxonomic history of the discussion of the validity of *Odontostilbe* *versus* *Cheirodon* dates back to the work of the danish zoologist Christian F. Lütken. While redescribing *Poecilurichthys pulcher* Gill, 1858, Lütken (1875: 236-237) noted that “technically the species of Trinidad is properly an *Odontostilbe* Cope, but this genus

only differs from the known [*Chirodon*] G. in the lateral line which is not complete ...” [our translation], referring the species as *Chirodon (Odontostilbe) pulcher* (Gill, 1858). Subsequently, Steindachner (1882a, 1882b) described *Chirodon pequirá*, and designated the type species of *Odontostilbe* as *Chirodon (Odontostilbe) fugitiva*. Subsequent works alternated usage of *Odontostilbe* as valid (e.g. Eigenmann & Eigenmann, 1892, in a preliminary list of freshwater fish of South American listed *Odontostilbe fugitiva* and recognized *Odontostilbe pulcher*), or as synonym of *Cheirodon* (e.g. Ulrey, 1895, when examining “Characinidae” collected by Charles F. Hartt in Brazil listed *Cheirodon fugitiva* and *Cheirodon pulcher*, along with five other species of *Cheirodon*).

Retaining the original diagnostic character of lateral line complete, Eigenmann (1915) recognized *Odontostilbe* with eight species, included in his new subfamily Cheirodontinae:

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O. fugitiva, *O. drepanon* Fowler 1913, *O. madeirae* Fowler 1913, *O. microcephala* Eigenmann, 1907, *O. paraguayensis* Eigenmann & Kennedy, 1903, *O. pulchra*, *O. hastata* Eigenmann, 1913, and *O. melandeta* Eigenmann, 1912. Eigenmann (1915), however, further indicated that *O. hastata*, and *O. melandeta* would be probably moved to other genera. In fact, *O. hastata* was afterwards moved into the genus *Saccoderma* (Schultz, 1944), and *O. melandeta* into the genus *Aphyocharacidium* (Géry, 1960). Subsequent alternate views on the validity of *Odontostilbe* versus *Cheirodon* based on the completeness of lateral line were presented by Fink & Weitzman (1974), who considered *Odontostilbe* as a synonym of *Cheirodon*, and by Fowler (1913, 1940, 1943), Böhlke (1954), and Géry (1964, 1972a, 1972b, 1977), who considered *Odontostilbe* as valid. Uj (1987) proposed a new diagnosis for *Odontostilbe* versus *Cheirodon* based on some osteological characters and included a rearrangement of some species of both genera, but his hypothesis was not accepted by subsequent studies (e.g. Malabarba, 1998, 2003).

Since the establishment of the monophyly of Cheirodontinae and the proposal of a phylogenetic diagnosis of all included genera (Malabarba, 1998), *Odontostilbe* is considered valid with *Holoshesthes* Eigenmann, 1903 as a synonym. *Cheirodon* Girard, 1855 was restricted to six species from southern South America, and included in the tribe Cheirodontini. Six new genera were proposed, and a new tribe Compsurini was proposed. However, *Odontostilbe* and four other genera were left *incertae sedis* in Cheirodontinae. More recently, Malabarba (2003) refers ten species to *Odontostilbe*: *O. dialeptura* (Fink & Weitzman, 1974), *O. fugitiva*, *O. gracilis* Géry, 1960, *O. littoris* Géry, 1960, *O. microcephala*, *O. mitoptera* (Fink & Weitzman, 1974), *O. paraguayensis*, *O. pequirá*, and *O. roloffii* Géry, 1972. Two of them from Central America, *O. mitoptera* and *O. dialeptura*, were temporarily referred to *Odontostilbe*, because both were found to be inseminators, thus belonging to the tribe Compsurini (Malabarba & Weitzman, 1999, 2000).

Herein we provide a redescription of the type species of *Odontostilbe*, *O. fugitiva*, including the designation of a neotype, a discussion of its synonyms, and morphological variation of populations across the Amazon basin. In order to present a better diagnosis for the type-species of the genus, we also describe herein three new species putatively related to *O. fugitiva* from major tributaries of the Amazon basin, one from upper río Napo and río Putumayo, in Ecuador, and two from río Madeira basin, in Brazil and Peru. This is part of a major systematic study of *Odontostilbe*.

Material and Methods

Counts and measurements follow Fink & Weitzman (1974), primarily on the left side of the specimen. Head length is the distance between the tip of the snout and the posterior end of subopercle, which is slight posterior to the margin of the opercle. Total vertebrae number includes the four vertebrae of the Webberian apparatus, and the terminal "half centrum"

as outlined by Malabarba & Weitzman (1999). The gill raker at the junction of the ceratobranchial and the epibranchial is referred as the posteriormost gill raker of the lower branch of the arch, and counted jointly with the gill rakers on the lower branch. Specimens were cleared and stained according Taylor & Van Dyke (1985), and/or radiographs were used for counting vertebrae, teeth, and gill rakers. Scanning Electron Microscope (SEM) images were obtained from teeth and denticulation of gill rakers. Values of the holotypes and neotype of *O. fugitiva* are marked in bold in descriptions.

The following institutions provided material for the study: AMNH - American Museum of Natural History, New York, USA; ANSP - Academy of Natural Sciences, Philadelphia, USA; CAS - California Academy of Sciences, San Francisco, USA; CBF - Colección Boliviana de Fauna, La Paz, Bolivia; FMNH - Field Museum of Natural History, Chicago, USA; INHS - Illinois Natural History Survey, Illinois, USA; INPA - Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil; KU - University of Kansas, Kansas, USA; MCP - Museu de Ciências e Tecnologia, Porto Alegre, Brazil; MCNG - Museo de Ciencias Naturales de Guanare, Guanare, Venezuela; MEPN - Museo de la Escuela Politécnica Nacional, Quito, Ecuador; MHNG - Muséum d'histoire naturelle, Geneva, Switzerland; MNHN - Muséum d'histoire naturelle, Paris, French; MPEG - Museu Paraense Emílio Goeldi, Belém, Brazil; MUSM - Museo de Historia Natural de la Universidad Nacional Mayor de San Marcos, Lima, Peru; MZUSP - Museu de Zoologia da Universidade de São Paulo, São Paulo, Brazil; NRM - (Naturhistoriska Riksmuseet) Swedish Museum of Natural History, Stockholm, Switzerland; ROM - Royal Ontario Museum, Toronto, Canada; UF - University of Florida, Gainesville, USA; USNM - National Museum of Natural History, Smithsonian Institution, Washington D.C., USA. Abbreviations given along with the number of specimens are the following: m - morphometrics and meristics; c - only meristics; x - meristics taken from x-rays; c&s - cleared and stained specimens.

As demonstrated by Gonçalves *et al.* (2005) in the characid *Aphyocharax*, sexual dimorphism may start development at different body sizes, according to gonadal maturation, and so, body size itself does not allow assuming a given specimen lacking male sexually dimorphic features is a female. So, males and females are recognized only when dissected, or when showing sexual dimorphism in specimens of similar size in the same collecting lot. Specimens smaller than the smallest specimen showing sexual dimorphism in each lot are termed as unsexed. Specimens of any size belonging to lots where sexual dimorphism is absent are termed as unsexed.

Statistical analyses. Principal component analysis (PCA) was used to check overall variation among samples, looking for differences in morphometrics among species or between sexes, being an input to multiple regressions (Johnson & Wichern, 1998). PCA on covariances of logarithmically transformed measurements were obtained using Past version 1.28 2004, and Sigma Plot version 6.10 2000. The first principal component was partitioned out, considering that it mostly accounts for

size variation (Strauss, 1985).

Multiple linear regressions were applied to describe morphometric differences among species or between sexes. An “overall test for coincidental regressions” as described by Zar (1996: 368,431), and Souza (1998:72-77) was used to determine whether the regressions of two set of data are estimating two species or sexes (H1) or the same population regression (Ho). The test was applied when regression lines showed overlapping in confidence limits. The null hypothesis is that there is a single population underlying all k regressions. The following formulae were used: $F = ((SSR1 - SSR2 / 2) / (SSR2 / n - 4))$, where n = number of x, y cases, and $n - 4$ means the sum of the two residual degrees of freedom. The F value is obtained by calculating sum of squared residuals (SSR) of each linear regression of any two supposed different species (or between males and females) ($SSR_{sp1} + SSR_{sp2} = SSR2$), and the pooled sum of squared residuals (SSR1) obtained of a unique linear regression for the same data. The $SSR2 < SSR1$ indicates two regression lines are better adjusted to the linear model. Considering two separated regression lines would better describe the function between dependent and independent variables of two hypothesized different species than an unique regression line for the same data, the F statistic would be higher than Fisher's F ($\alpha = 0.05$), rejecting Ho. Associated p values were obtained using a F -table.

Results

Odontostilbe fugitiva Cope, 1870

Fig. 1

Odontostilbe fugitiva Cope, 1870: 566 [original description; dentition figured; type locality: “Pebas, Eastern Equador”, actually Pebas, Loreto, Peru, in the Ampiyacu-Amazonas drainage]. -Eigenmann & Eigenmann, 1891: 54 [listed, Pebas, Villa Bella, Santarém]. -Eigenmann, 1910: 429 [listed, habitat: Ecuador (following Cope, 1870; currently Peru)]. -Fowler, 1913: 529, 532 [comparison to *O. madeirae* and *O. drepanon*]. -Eigenmann, 1915: 90 [redescription based on specimens of San Antonio de rio Madeira, Amazon basin; erroneous distribution from Panama and Trinidad to La Plata and Peruvian Amazon; in key]. -Eigenmann & Allen, 1942: 45, 265 [listed for the Amazon basin between lower Marañon, Pongo de Manseriche, to Tabatinga; annotated list in Pebas region, lower Marañon]. -Fowler, 1945a:134 [listed, Pebas, Peru]. -Fowler, 1948: 195 [listed, rio Amazonas, Brazil, Equador (following Cope, 1870; actually Peru)]. -Böhlke, 1954: 137-139 [listed, *Odontostilbe fugitiva* as possible synonym of *Odontostilbe pulchra*]. -Géry, 1972a: 20-21 [*O. caquetae* Fowler, 1943, *O. madeirae* Fowler, 1914 and *O. drepanon* Fowler, 1914 as a probable



Fig. 1. Neotype of *Odontostilbe fugitiva*, MUSM 27501, male 34.6 mm SL (top), and specimen NRM15719, female 35.2 mm SL (bottom).

synonyms of *O. fugitiva*, table with measurements and meristics of type material of *O. madeirae* Fowler and *O. drepanon* Fowler]. -Géry, 1977: 555, 558 [in key, *O. madeirae*, *O. drepanon* and *O. caquetae* as synonyms of *Odontostilbe fugitiva*, compilation of Fowler's drawings of *O. madeirae* and *O. drepanon*]. -Sánchez-Botero & Araújo-Lima, 2001: 440 [listed] - Petry *et al.*, 2003: 562, 565, 575 [habitat, listed].

Chirodon fugitivus. -Lütken, 1875: 237 [listed; Amazon basin, Pebas].

Chirodon (Odontostilbe) fugitiva. -Steindachner, 1882: 39 [redescription based on specimens from Amazon basin, Villa Bella, Santarém].

Cheirodon fugitiva. -Ulrey, 1895: 288-290 [in key; erroneous compilation of distribution in Petras (= Pebas), and Brazil]. -Ortega & Vari, 1986: 8 [listed, Amazon basin, distribution compiled from Géry (1964)].

Odontostilbe madeirae Fowler, 1913: 527-529 [description, type locality: tributary of rio Madeira, near Porto Velho, Brazil; fig. 6, illustrated specimen; holotype ANSP 39193, 16 paratypes ANSP 39194-209: 12 ANSP 39194, 1 ANSP 39206, 1 c&s ANSP 39207, 1 ANSP 39208, now Géry collection, 1 missing ANSP 39209, same data as holotype]. -Fowler, 1948: [in list; 197-198, rio Madeira; compilation of drawing of original description]. -Böhlke, 1954: 138 [in list].

Odontostilbe drepanon Fowler, 1913: 529-532 [description, type locality: tributary of rio Madeira, near Porto Velho, Brazil; fig. 7, illustrated specimen; holotype ANSP 39210, 6 paratypes ANSP 39211-16, same data as holotype]. -Fowler, 1948: 195-196 [in list; rio Madeira; compilation of drawing of original description]. -Böhlke, 1954: 138 [in list].

Odontostilbe caquetae Fowler, 1943: 230-232 [description, type locality: Florencia, rio Ortegusa, Colombia; fig. 13, illustrated specimen; holotype ANSP 70495]. -Fowler, 1948: 194-195 [in list; Alto Amazonas, Colombia; compilation of drawing and original description]. -Böhlke, 1954: 138 [in list].

? *Odontostilbe fugitiva*. -Géry, 1964: 18-19 [incorrect date of Cope's description 1871, description of one specimen near Iquitos].

Neotype [by present designation]. MUSM 27501, 1 (male 34.6 mm SL), Peru, Loreto, Amazon basin, [lower] rio Napo drainage, Yuto cocha on right bank of rio Mazán, 3°30'53"S 73°10'05"W, S. O. Kullander, J. Cruz, N. Sarmiento & A. Hogeboom, 16 Aug 1984.

Type material examined. *Odontostilbe madeirae*. Holotype ANSP 39193, 1m, x (female 32.1 mm SL), Brazil, tributary of rio Madeira, near Porto Velho, E. A. Smith, Jan 1913. Paratypes: ANSP 39194, 8x, c of 12 females (females 25.3-29.2 mm SL), same data as ANSP 39193; ANSP 39206, 1 (female 33.0 mm SL), same data as ANSP 39193; ANSP 39207, 1 (female c&s), same data as ANSP 39193. *Odontostilbe drepanon*. Holotype ANSP 39210, 1m, x (male 30.5 mm SL), Brazil, tributary of rio Madeira, near Porto Velho, E. A. Smith, Jan 1913. Paratypes: ANSP 39211, 6m, x (males 25.2-28.8 mm SL), same data as ANSP 39210. *Odontostilbe caquetae*. Holotype ANSP 70495, 1m, x (unsexed 28.0 mm SL). Colombia, Caquetá, Florencia, rio Ortegusa Basin, Amazon watershed [rio Caquetá-Japurá], N. Maria, 1932.

Non-type material. **Río Ucayali basin, PERU, UCAYALI:** CAS 70915, 8 (unsexed 23.8-27.5 mm SL), lago Cashiboya, cut off lake of rio Ucayali above Contamana, connected to river by narrow channel. MZUSP 26039, 1 (unsexed 23.8 mm SL), Coronel Portillo, Iamiricocha, Masisea, [near mouth of rio Pachitea]. MZUSP 26066, 1 (male 33.1 mm SL, 3 unsexed 31.2-34.9 mm SL), rio Huacamayo, road Pucallpa-Huánuco. MZUSP 26145, 1 (female 34.7 mm SL), Coronel Portillo, Bagazán [Nuevo Bagazán, rio Ucayali]. MZUSP 26151, 16m (11 males, 32.7-37.8 mm SL, 5 females, 34.0-35.9 mm SL), same data as MZUSP 26151. MZUSP 26389, 4 (unsexed 28.8-33.0 mm SL), Pucallpa, Ucayali, rio Ucayali. MZUSP 26473, 6m (females 32.1-40.5 mm SL), rio Neshuya, road Pucallpa-Huánuco. USNM 280627, 2 (unsexed 25.9-26.3 mm SL), Coronel Portillo, main channel and side pools of rio Ucayali, approximately 10 km upstream of Pucallpa, 08°31'S 74°22'W. USNM 324110, 2 (unsexed 20.4-21.3 mm SL), same locality as USNM 280627. PERU, LORETO: NRM 15720, 2m (unsexed 30.3-30.5 mm SL), quebrada Copal at km 15 on road Jenaro Herrera-Colonia Angamos, 04°57'S 73°32'W. MCP 27380, 5m of 18 (unsexed, 28.3-37.1 mm SL), Maynas, Reserva Nacional Pacaya-Samiria, caño Yarina, Pacaya tributary, 5°20'34"S 74°30'01"W. MCP 35585, 1 (unsexed 27.1 mm SL), rio Pacaya, cocha Yanayacu, rio Ucayali drainage. MCP 35586, 5 (unsexed 24.5-27.4 mm SL), same locality as MCP 35585. MCP 27378, 4 (unsexed 26.5-29.9 mm SL), Maynas, rio Pacaya, on the road of lagoons Shauinto and Yanayacu, Reserva Nacional Pacaya-Samiria, 5°16'59"S 74°25'29" W. MCP 35587, 1 (unsexed 28.8 mm SL), rio Pacaya, PV2, caño, lago Yarina, rio Ucayali drainage. PERU, JUNÍN: AMNH 20910, 1 (female 40.8 mm SL), Osherato, either rio Tambo, brook Osherato or brook Onkoneni, [rio Tambo basin or rio Ene-Tambo, upper rio Ucayali]. PERU, PASCO: MCP 14974, 10 (4 males 25.3-27.4 mm SL, 3 females 35.8-38.7 mm SL, 3 unsexed 26.4-29.5 mm SL), Puerto Bermudez, upper rio Pachitea. **Upper rio Ucayali, rio Urubamba basin, PERU, CUSCO, LA CONVENCION, ECHARATE:** USNM 362022, 8m of 34 (15 males 30.2-38.6 mm SL [4m males 32.0-38.6 mm SL], 6 females 33.9-37.2 [4m females 33.9-36.8 mm SL], 13 unsexed 26.1-36.6 mm SL), rio Urubamba, quebrada Pakiria. USNM 362027, 3 (females 35.9-38.3 mm SL), Segakiato, quebrada Prokigiato. USNM 362028, 6 (2 males 36.9-38.0 mm SL, 4 unsexed 28.8-35.9 mm SL), Segakiato, rio Camisea. USNM 362029, 2 (females 35.3-35.8 mm SL), Malvinas, Cocha Nueva. USNM 362034, 4 (1 male 38.9 mm SL, 2 females 38.7-39.5 mm SL, 1 unsexed 28.9 mm SL), Peruanita, cocha, Konkariari. USNM 362035, 1 (unsexed 33.8 mm SL), Segakiato, quebrada Anuintoniato. PERU, UCAYALI, ATALAYA: USNM 362024, 6 (4 males 35.1-40.2 mm SL, 2 unsexed 32.3-38.7 mm SL), Sepahua, quebrada Shamboyacu. USNM 362031, 8 (unsexed 26.1-34.2 mm SL), lower rio Urubamba, Nueva Itálica. USNM 362041, 9 (unsexed 27.9-37.8 mm SL), Sepahua, quebrada Pulija, lower rio Urubamba. USNM 362043, 10 (2 males 29.7 mm SL & 33.7 mm SL, 7 females 31.9-38.5 mm SL), Sepahua, rio Urubamba, quebrada Shambuyacu. **Rio Marañon basin, ECUADOR, PASTAZA:** FMNH 113504, 2 (unsexed 35.9-36.2 mm SL), stream about 100 m from beach called Waama, rio Pastaza drainage, 02°16'56"S 77°11'05"W. MZUSP 87746, 11m (1 male 37.2 mm SL, 8 unsexed 33.4-43.1 mm SL, 2 females 36.2-39.3 mm SL c&s), dead arm of rio Pastaza, 02°17'75"S 77°10'13"W. ECUADOR, MORONA-SANTIAGO: FMNH 113515, 12m of 26 (6 males 36.4-45.1 mm, 6 unsexed 34.2-42.7 mm SL), tributary of rio Pastaza at [Puerto] Pakintsa, 02°15'46"S 77°14'17"W. PERU, LORETO: ASNP 150016, 14m of 24 (7 males 28.1-35.3 mm SL, 7 females 28.8-33.1 mm SL), rio Huallaga, Yurimaguas creek. FMNH 113503, 11 (unsexed 24.0-34.2 mm SL), rio Huitoyacu [rio Pastaza drain-

age], about 0.5 km upstream from the mouth, 04°11'54"S 76°32'38"W. INHS 54760, 6 (unsexed 21.2-25.4 mm SL), floodplain along south bank of south channel of río Marañon due south of Nauta, 04°30.6'S 73°34.1'W. MCP 14944, 5 (2 males 29.5-30.7 mm SL, 3 females 30.6-33.6 mm SL), same data as ANSP 150016. MZUSP 77834, 5m of 49 (28.1-31.3 mm SL), cocha Huanayo, 4°10'50"S 76°33'5" W. MZUSP 77843, 5m of 147 (23.0-26.1 mm SL), laguna Huayruri, 3°37'32" S 76°24'48" W. NRM 15756, 19 unsexed of 100 (unsexed 14.3-22.7 mm SL), Teniente López, beach and meadows on left bank of río Corrientes, [río Tigre drainage]. NRM 15653, 1 (female 32.5 mm SL), Nuevo Andoas, pools on Isla Yanayacu and right bank sandy beach in río Pastaza. NRM 50321, 13m (3 males 31.4-34.8 mm SL, 4 females 34.2-39.1 mm SL, 6 unsexed 32.3-34.6 mm SL), río Tigre drainage, San Jacinto, quebrada at km 45.5. PERU, MORONA: ANSP 150047, 4 (2 males 34.1-35.6 mm SL, 2 unsexed 21.9-27.7 mm SL), [río Morona basin], Gosulima Cocha. PERU, HUÁNUCO: ANSP 136951, 4 (females 47.0-48.7 mm SL), Huánuco, vicinity of Tingo Maria, main stream of río Tullamayo, near Puerto Nuevo. **Río Yanayacu basin**, PERU, LORETO: ANSP 178383, 2m (unsexed 20.4-21.9 mm SL), Maynas, at mouth of caño Chincana & Emerald Forest Lodge, approximately 25 miles south of Iquitos. **Río Itaya basin**, PERU, LORETO: ANSP 178908, 12m (5 males 31.7-35.5 mm SL, 1 female 36.9 mm SL, 1 female 35.5 mm SL c&s, 5 unsexed 29.8-34.7 mm), Maynas, [lower río Itaya] at bridge on Iquitos-Nauta highway, approximately 25 miles SSW of Iquitos. INHS 40226, 1 (unsexed 22.5 mm SL), quebrada Mazana, around 1 km up from confluence with río Itaya, S of Belém, Iquitos. **Lower río Napo basin, río Mazán**, PERU, LORETO: NRM 15719, 6m (3 males 32.2-34.0 mm SL, 3 unsexed 32.8-35.2 mm SL), same data as neotype. **Río Ampiyacu basin**, PERU, LORETO: ANSP 131535, 1m (unsexed 30.8 mm SL alizarin stained), near Pebas, Chanco caño. CAS 136607, 1m (unsexed 32.8 mm SL), caño Chanco. CAS 136608, 1m (unsexed 35.2 mm SL), caño Chanco [lower río Ampiyacu basin, near Pebas]. USNM 175990, 1m (unsexed 35.8 mm SL), caño [Chanco]. USNM 207666, 1 (unsexed 21.1 mm SL), near [Pevas], río Ampiyacu drainage. **Río Orosa basin**, PERU, LORETO: INHS 39313, 2 (unsexed 20.0-20.7 mm SL), Mayuruna Cocha, around 30 minutes by boat downstream of mouth of caño Tonche, 71.7 miles east Iquitos. INHS 39789, 1 (unsexed 23.8 mm SL), lago Pabellon, around 40 minutes upstream by boat from Paucarillo base camp 57.1 miles east Iquitos. **Río Yavari / Javari basin**, PERU, LORETO: NRM 15671, 3m of (unsexed 26.8-30.6 mm SL), Colonia Angamos, quebrada behind school building. **Upper río Amazonas basin**, PERU, LORETO: ANSP 136955, 6 (unsexed), vicinity Iquitos, río Nanay opposite naval base, backwater pools off coche, 4 miles above Amazon. ANSP 136958, 3 (unsexed), same data as ANSP 136955. ANSP 178239, 1m (unsexed 35.5 mm SL), Maynas, río Amazonas main channel along W bank, ca. 30-45 min. upstream from inlet to Iquitos (=mouth río Itaya). CAS 70897, 1 (unsexed 26.6 mm SL), Iquitos, río Amazonas. INHS 39852, 1 (unsexed 21.2 mm SL), río Amazonas, across from Puebla Gallito, 7.68 miles SE Iquitos. INHS 540237, 1 (unsexed 22.9 mm SL), río Amazonas, ca. 10 & 40 minutes upstream from mouth caño Zapatilla, near town of Yanashi. COLOMBIA, AMAZONAS: FMNH 85346, 27 (unsexed 19.9-25.5 mm), black water river at Yauacaca and first tributary upstream from Leticia on the Colombian side. MCP 14949, 8m of 10 (1 male 33.4 mm SL, 2 females 32.7-34.2mm SL, 5 unsexed 31.9-34.0mm SL), Leticia, backwater (the lakes) area cut off from río Amazonas, formerly ANSP 135937. MCP 35263, 2 (males 32.4-34.0 mm SL), same data as MCP 14949, formerly ANSP 135975. ROM 56384, 6 (unsexed 24.2-31.0 mm SL), 10-60 miles upstream from Leticia, río Amazonas, 4°09'S 69°57'W. ROM 56443, 42 (9 males 31.8-33.4 mm SL, 33 unsexed 31.3-33.9 mm SL), same place as ROM 56384. **Río Putumayo basin**, PERU, LORETO: NRM 26365, 4m (unsexed 21.8-24.4 mm SL), Estrecho, río Putumayo right bank, 02°28'S 72°42'W. COLOMBIA, AMAZONAS: NRM 26430, 3m (unsexed 29.5-32.1 mm SL), río Putumayo drainage, Buenaventura, flooded river margin. **Río Jutai basin**, BRAZIL, AMAZONAS: MZUSP 17585, 8 (unsexed 21.4-28.1 mm SL), río Içapó, mouth of río Jutai. **Río Juruá Basin**, BRAZIL, ACRE: MPEG 1951, 3 (unsexed 21.0-23.8 mm SL), Marechal Taumaturgo, río Juruá, Seringal do Oriente. MPEG 6790, 10m of 30 (unsexed 29.4-32.9 mm SL), Tarauacá, río Tarauacá. MZUSP 30372, 4m (3 unsexed 20.0-24.7 mm SL, 1 female 32.2 mm SL), same locality as MPEG 6790. MZUSP 31820, 1 (unsexed 22.8 mm SL), same locality as MPEG 6790. MZUSP 42842, 21 (unsexed 18.5-22.0 mm SL), same locality as MPEG 6790. MZUSP 87749, 2m (unsexed 21.6-29.7 mm SL), same locality as MPEG 6790. **Río Japurá Basin**, BRAZIL, AMAZONAS: MZUSP 27760, 13 (unsexed 17.9-28.0 mm SL), Tefé, Costa Japão, lower río Japurá. MZUSP 74964, 22 (unsexed 22.0-31.6 mm SL), Serrinha, río Japurá in Serrinha, right margin. MZUSP 77466, 2 (unsexed 34.9-36.4 mm SL), Vila Bitencourt. MZUSP 77535, 9 of 19 (unsexed 24.8-28.7 mm SL), río Japurá in Serrinha. **Río Purus Basin**, BRAZIL, ACRE: MCP 37473, 1 (unsexed 38.5 mm SL), small affluent of río Iaco, road Sena Madureira-Rio Branco, about 8 km of Sena Madureira. MCP 38106, 2 (unsexed 25.6-24.3 mm SL), río Acre, Xapuri. MZUSP 49580, 3 (unsexed 20.8-22.4 mm SL), río Acre. MZUSP 49669, 1 (unsexed 28.2 mm SL), Porto Acre, río Acre, Seringal Bom Destino (1 hour upper Porto Acre), Instituto. MZUSP 49767, 2 (unsexed 23.0-27.3 mm SL), río Acre, between Seringal Paraíso and lago Amapá. MZUSP 87754, 29 (unsexed 23.0-33.4 mm SL), Manoel Urbano, río Purus. BRAZIL, AMAZONAS: MZUSP 49512, 11 of 22 (unsexed 21.4-27.2 mm SL), Boca do Acre, río Acre. **Río Solimões basin**, BRAZIL, AMAZONAS: MCP 38314, 20 (unsexed 22.5-30.9 mm SL), stream in Jacaré, near Fonte Boa. MZUSP 6315, 1 (unsexed 24.7 mm SL), lago Castro, mouth of río Purus. MZUSP 9644, 2 (unsexed 23.4-26.6 mm SL), lago Supiá in front of Codajás. MZUSP 9647, 5 (unsexed 16.2-19.5 mm SL), same data as MZUSP 9644. MZUSP 16690, 1 (unsexed 23.8 mm SL), Benjamin Constant, [río Solimões]. MZUSP 17344, 8 (unsexed 18.8-25.3 mm SL), río Solimões, Ilha Sorubim, above Coari. MZUSP 17415, 10 (unsexed), same data as MCP 38314. MZUSP 17421, 175 (unsexed 17.9-31.6 mm SL), same data as MCP 38314. MZUSP 17438, 3 (unsexed 18.1-24.9 mm SL), igarapé Manduaçu, paraná de Iupia, NW Fonte Boa. MZUSP 17498, 5 (unsexed 18.0-37.9 mm SL), río Solimões, near Ilha de Baruruá, above mouth of río Jutai. MZUSP 17395, 33 (unsexed 16.5-28.1 mm SL), río Solimões. MZUSP 17520, 2 (unsexed 22.1-30.5 mm SL), Santo Antônio do Içá, mouth of río Içá. MZUSP 17632, 4 (unsexed 28.7-31.0 mm SL), Fonte Boa, río Solimões. MZUSP 27751, 13 (unsexed 15.4-24.3 mm SL), Benjamin Constant, paraná do Capacete, río Solimões. MZUSP 78108, 11 of 23 (unsexed 15.5-21.1 mm SL), Costa do Anori, pool, río Solimões, near mouth of río Purus. MZUSP 78109, 3 (unsexed 18.9-21.5 mm SL), same data as MZUSP 78108. USNM 310856, 3 (2 males 34.1-34.4 mm SL, 1 unsexed 33.6 mm SL), muddy igarapé connecting río Solimões and blackwater lake ca. 15 miles west of Coari. BRAZIL, AMAZONAS, municipality of Manaus and proximities (including municipalities of Iranduba or Careiro): INPA 18461, 9 (8 males 32.6 mm SL, 1 female 35.1 mm SL), lago Janauacá, mouth of channel. INPA 18465, 66m of 73 (34 males 33.0-36.5 mm SL, 2 males 34.9-37.2 mm SL c&s, 13 females 32.9-38.1 mm SL, 2 females 34.5-38.4 mm SL c&s, 15 unsexed 29.7-35.9 mm SL), Ilha da Marchantaria. INPA 18467,

25 (7 males 31.7-34.4 mm SL, 18 unsexed 22.5-36.3 mm SL), same locality as INPA 18465. INPA 18506, 10m of 50 (1 male 32.4 mm SL c&s, 1 female 33.9 mm SL c&s, 1 unsexed 23.7 mm SL c&s, 7 unsexed 22.2-24.4 mm SL), paran do Xiborena. INPA 18510, 132 (unsexed 19.1-29.2 mm SL), lago Pirapora, Catalo. INPA 18512, 1m (male 34.9 mm SL c&s), same locality as INPA 18510. MCP 35775, 110 (61 males 30.0-36.2 mm SL, 45 females 30.9-36.9 mm SL, and 4 unsexed 28.8-30.0 mm SL), Januari, lago Terra Preta. MCP 35777, 12m of 36 (6 males 30.6-36.6 mm SL, 6 females 34.5-37.2 mm SL), same locality as MCP 35775. MZUSP 6047, 1 (unsexed 26.9 mm SL), lago do Rei, Ilha do Careiro. MZUSP 18736, 2 (unsexed 26.3-33.7 mm SL), lago Januac, left margin of rio Solimes. MZUSP 18743, 1 (unsexed 33.0 mm SL), lagoon linked to channel of lago Januac, left margin of rio Solimes. USNM 307448, 21 (14 males 32.5-36.7 mm SL, 7 females 37.9 mm SL), So Jos, lago do Castanho, Januac. USNM 308329, 20 (7 males 31.2-34.4 mm SL, 13 unsexed 27.9-34.3 mm SL), lago Terra Preta, Januari. USNM 310851, 2 (males 31.0-31.4 mm SL), lower rio Negro: igarap Xiborena ca. 30 km east Manaus. USNM 315907, 29 (unsexed 20.7-26.9 mm SL), lago Murumuru, cattle enclosure. USNM 332135, 1 (male 32.6 mm SL), near Manaus, lago Januari, lago Terra Preta. USNM 323629, 3 (unsexed 27.0-29.9 mm SL), northwest shoreline of Ilha Pacncia, rio Solimes, southeast of Manaus. **Lower rio Amazonas basin, BRAZIL, AMAZONAS:** MZUSP 76436, 2 (unsexed 34.4-35.4 mm SL), Parintins, So Jos, rio Amazonas, left margin, stream mouth. MZUSP 76437, 1 (unsexed 37.6 mm SL), same as MZUSP 76436. **BRAZIL, PAR:** ANSP 150113, 5 (3 males 35.1-35.3 mm SL, 2 females 35.7-36.9 mm SL), paran-Mirim, lagoa Grande, east of bidos. ANSP 149979, 4 (unsexed 34.6-35.6 mm SL), Centro Comercial, brook into lago Grande [near Santarm]. MCP 14959, 4 (3 males 32.6-36.2 mm SL, 1 female 39.2 mm SL), same as ANSP 150113. MZUSP 9498, 7 (unsexed 18.3-24.2 mm SL), Monte Alegre, rio Amazonas. MZUSP 16565, 2 (unsexed 27.0-27.3 mm SL), Oriximin, Paissandu, [mouth of rio Trombetas]. **Rio Madeira Basin, BRAZIL, RONDNIA, CALAMA:** MCP 38482, 12m (5 males 32.1-33.1 mm SL, 7 unsexed 30.9-35.4 mm SL), paran do Carapar, rio Madeira. MPEG 3211, 1 (female 38.6 mm SL), same locality as MCP 38482. MPEG 3213, 1 (female 36.7 mm SL), paran do Flechal. MZUSP 30212, 1 (unsexed 21.2 mm SL), beach of rio Madeira. MZUSP 30213, 1 (unsexed 24.9 mm SL), same locality as MCP 38482. MZUSP 30216, 1 (female 42.5 mm SL), same data as MPEG 3213. MZUSP 30218, 37 (23 males 29.4-32.8 mm SL, 14 unsexed 29.7-34.3 mm SL), same data as MCP 38482. MZUSP 30219, 1 (unsexed 29.2 mm SL), rio Madeira, mouth of rio Machado. MZUSP 30220, 1m (male 33.0 mm SL). MZUSP 30221, 1 (unsexed 31.4 mm SL), rio Madeira. MZUSP 31784, 1 unsexed 30.9 mm SL, same locality as MCP 38482. MZUSP 35600, 11 (unsexed 21.8-34.2 mm SL). MZUSP 42838, 11 (unsexed 15.1-27.6 mm SL), poo da Anglica, rio Madeira. **BRAZIL, AMAZONAS:** MZUSP 6961, 3 (unsexed 19.7-27.7 mm SL), 25 km below Nova Olinda. MZUSP 18658, 20 (unsexed 19.1-27.2 mm SL), igarap Xicanga, 5 km from Humait, east part of Transamaznica. MZUSP 35591, 3 (unsexed 27.3-29.1 mm SL), mouth of igarap Puruzinho, rio Madeira. MZUSP 35618, 20 (unsexed 21.2-27.9 mm SL), ilha do Puruzinho, rio Madeira. MZUSP 55922, 3 (unsexed 19.2-20.1 mm SL), rio Madeira, 17.3 km below paran do Marac, 34048"S 59530"W. MZUSP 57082, 1 (unsexed 25.6 mm SL), rio Madeira, 15.9 km below paran do Marac, 3436"S 59556"W. USNM 310855, 19 (unsexed 18.6-25.2 mm SL), same data as MZUSP 18658. **BRAZIL, RONDNIA:** FMNH 57880, 3 (unsexed 27.7-33.4 mm SL), Santo Antonio, rio Madeira. MZUSP 31821, 1 (unsexed 19.0 mm SL), rio Madeira, cachoeira de Teotnio.

MZUSP 35605, 2 (unsexed 26.7-31.4 mm SL), rio Madeira, cachoeira de Santo Antnio. MZUSP 35610, 2 (unsexed 23.4-27.7 mm SL), same data as MZUSP 35605. MZUSP 42840, 22 (unsexed 16.3-26.9 mm SL), rio Madeira, cachoeira de Teotnio. MZUSP 74227, 30 of 233 (unsexed 22.0-28.3 mm SL), rio Machado near mouth. MZUSP 74321, 30 of 455 (unsexed 23.2-27.9 mm SL), same data as MZUSP 74227. MZUSP 76551, 1 (unsexed 26.0 mm SL), Santo Antnio, rio Machado, beach. MZUSP 76829, 1 (unsexed 27.5 mm SL), Santo Antnio, rio Machado, beach. MZUSP 80041, 30 of 91 (unsexed 22.6-28.6 mm) SL, same data as MZUSP 74227.

Diagnosis. The combination of the following characters distinguish *Odontostilbe fugitiva* from all the other species of the genus: (1) mouth terminal, mouth slit nearly at horizontal through middle of eye (*vs.* subterminal, mouth slit at horizontal near lower eye edge in *O. euspilura* and *O. microcephala*; or slightly subterminal, mouth slit at horizontal below middle of eye in *O. dierythrura*); (2) in males snout not very protruding, but slightly pointed or blunt (*vs.* very protruded in *O. euspilura*, *O. microcephala*, and *O. dierythrura*); (3) usually 7 large dentary teeth, with seven cusps (*vs.* 4 large dentary teeth with 3 large and compressed central cusps and 2, 3 lateral small cusps in *O. pequir*); (4) elongation of 2nd unbranched dorsal-fin ray (*vs.* no elongation in *O. euspilura*, or very short elongation in *O. pulchra*); (5) pectoral-fin never extending beyond pelvic-fin origin (*vs.* extending beyond in males of *O. pulchra*); (6) branched anal-fin rays 19-24 (mostly 21-22) [*vs.* 16-20 (mostly 17-18 in *O. microcephala*, and 17-20 (mostly 18-19) in *O. euspilura*]; (7) 1st to 9th (mostly 6th-7th) anal-fin branched rays of males with hooks, positioned at distal half-length of fin rays, tiny hooks occasionally present distally up to 19th anal-fin branched ray (*vs.* well-developed hooks on 1st to 22nd anal-fin branched rays at distal half length of fin rays in *O. pulchra*); (8) no hooks found on 1st unbranched pelvic-fin rays (*vs.* 1-2 unpaired hooks per segment on 1st unbranched pelvic-fin ray occasionally present in *O. euspilura* and *O. pulchra*); (9) gill rakers on upper branch usually 6-7, lower branch usually 12-13 (*vs.* usually 10-12 on upper branch and 14-16 on lower branch in *O. microcephala*; 11-12 on lower branch in *O. dierythrura* and *O. pulchra*; 5-6 on upper branch and 9-10 on lower branch in *O. euspilura*; and 7-8 on upper branch and 13-15 on lower branch in *O. pequir*); and (10) 4 separate supraneurals (*vs.* supraneurals partially fused in *O. paraguayensis*). Upper gill raker counts differ *O. fugitiva* (5-6) from *O. ecuadoriensis*, *O. nareuda*, and *O. parecis* (6-7).

Description. Morphometric data in Table 1. Largest male 45.1 mm SL, female 48.7 mm SL. Body elongate and compressed. Males with more compressed bodies than females. Greatest body depth at dorsal-fin origin. Snout slightly pointed or blunt in males. Head profile gently convex from snout to posterior tip of supraoccipital bone. Predorsal profile slightly convex to straight between posterior tip of supraoccipital bone and dorsal-fin origin, then straight from dorsal-fin origin to caudal peduncle. Ventral profile convex from mouth tip to anal-fin origin. Anal-fin base straight. Caudal peduncle slightly longer than deep.

Head relatively small. Posterior margin of opercle sinusoidal with upper portion concave and lower portion convex. Mouth terminal, mouth slit nearly at horizontal through middle of eye. Obliquously positioned maxilla ending at vertical near or at anterior border of eye and at horizontal on inferior eye border, not crossing these limits. Dentition (based on 10 c&s specimens and 17 alcohol specimens). Premaxillary teeth 5-6, bearing 6-11 cusps (usually 8, 9, and 10); midcentral cusp longer than others; smaller lateral cusps of each tooth overlap cusps of adjacent teeth, except anteriormost teeth (Fig. 2). Premaxillary teeth juxtaposed external to dentary teeth, leaving premaxillary tooth cusps exposed when mouth closed. Maxilla with 2-3 teeth bearing 1-9 cusps (mostly 7-9), decreasing cusp number toward posterior tip of maxilla. Dentary teeth 8-10 bearing 1-9 cusps, gradually decreasing in size posteriorly, first 6-7 teeth largest with 5-9 cusps (mostly 7), 1 medium-sized tooth with 4-7 cusps and last 1-3 teeth very small, conic or with 2-5 cusps. Smaller cusps of dentary teeth overlapping adjacent tooth cusps, usually not in posteriormost teeth. All dentary tooth cusps upwardly pointed or slightly recurved towards interior of mouth.

Dorsal-fin rays **ii**(259), 8(1), or **9**(258). Dorsal-fin origin slightly posterior to midlength of body, and slightly posterior to pelvic-fin origin. First unbranched dorsal-fin ray in females and immature males about half length of second unbranched dorsal-fin ray. Second unbranched dorsal-fin ray slightly elongate in mature males, extending beyond dorsal-fin distal profile. Anal-fin rays **iv**(14), **v**(241) or **vi**(4), 19(14), 20(57), 21(103), **22**(57), 23(23), or 24(5). Anal-fin distal border concave, anterior 6-7 branched rays longest. Pectoral-fin rays **i**(259), 9(1), 10(11), **11**(135), 12(105), or 13(7). Unbranched pectoral-fin ray reaching or not pelvic-fin origin, never extending beyond that point. Pelvic-fin rays **i**(259), 6(4), 7(244), 7i(7), or 8(4). Unbranched pelvic-fin ray longest in mature males, extending beyond origin of anal fin. Lateral skin border of unbranched pectoral-fin ray and unbranched pelvic-fin ray thickened in mature males, bearing thin laterodorsal projection of hard tissue covered with soft tissue. Principal caudal-fin rays **19**(254), rarely 16(1), 17(1), 18(7) or 20(2). Procurrent caudal-fin rays: dorsal 10(34), **11**(113), 12(96), 13(9), or 14(4); ventral 7(1), 8(14), 9(133), **10**(94), or 11(14). Anterior 1 or 2 ventral procurrent caudal-fin rays sometimes laterally expanded, bifurcated, or S-shaped. Caudal-fin ray flaps ventrally on 2nd-8th (mostly 4th-7th) branched rays of upper lobe, and dorsally on 12th-16th (mostly 13th-15th) branched rays of lower lobe. Adipose-fin at vertical through last anal-fin ray insertion.

Males with acute, elongate, retrorse hooks on posterior margin of pelvic- and anal-fin rays. One or two (rarely 3) paired and unpaired hooks per segment of lepidotrichia, on last unbranched anal-fin ray, and 1st to 8th (mostly 6th-7th) anal-fin branched rays, positioned at distal half-length and not extending to ray tip; tiny hooks can be present distally up to 19th anal-fin branched rays in very developed males (e.g. INPA 18506, ANSP 178908, ANSP 15006, and neotype). One or two (rarely 3) unpaired and long hooks per segment of lepidotrichia along almost all length of 1st to 7th branched pelvic-fin rays,

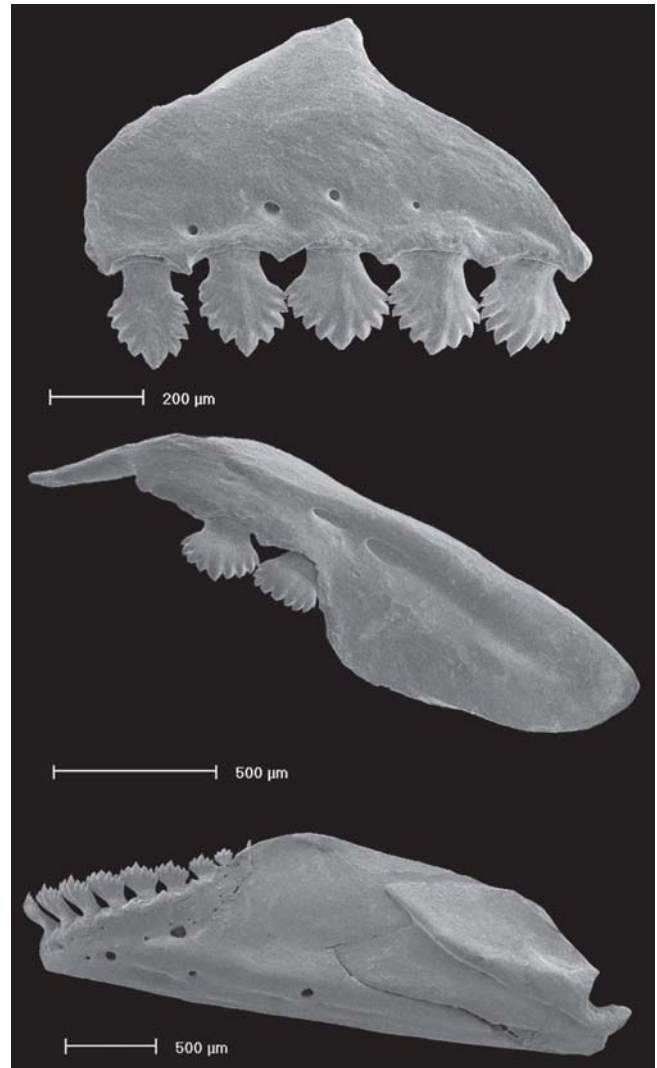


Fig. 2. Dentition of *Odontostilbe fugitiva*, ANSP 178908, female 35.5 mm SL. SEM photograph of left side premaxilla (top), maxilla (middle), and dentary (bottom).

reaching distal tip of fin ray (except on 1st branched pelvic-fin ray, on midlength portion). No hooks found on 1st unbranched pelvic-fin ray. One to 3 unpaired hooks sometimes present on anterior border of anal- and pelvic-fin rays branches.

Scales cycloid; lateral line complete 34(3), 35(21), **36**(90), 37(4), or 38(1); predorsal row 9(4), 10(98), **11**(122), or 12(6); scale rows between lateral line and dorsal-fin origin 5(31), **6**(190), or 7(5); scale rows between lateral line and anal-fin origin **4**(238) or 5(5); scale rows around caudal peduncle **14**(186). Triangular modified scale on pelvic fin base extends posteriorly covering 1-3 scales (mostly 2). Scales on anal-fin base 5, 6, or 7.

Cleared and stained specimens (11): supraneurals 4-5(11); precaudal vertebrae 16(9) or 17(2); caudal vertebrae 18(3), 19(7), or 20(1); gill rakers, upper 6(1) or 7(5), lower 12(6) (2-3 on hypobranchial). Alcohol specimens (174): gill rakers, upper 6(83), 7(89), or 8(2), lower 11(15), 12(119), **13**(36), or 14(4). Upper gill rakers with 1-5 recurved denticles on anterolateral

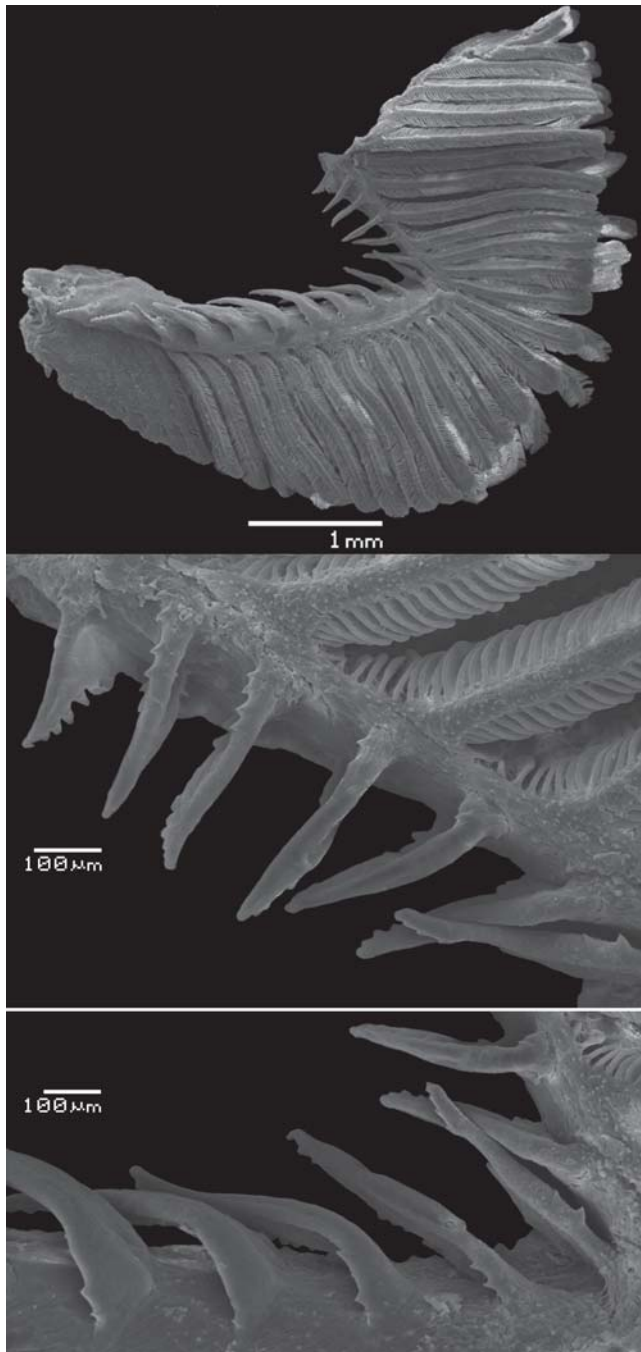


Fig. 3. First gill arch of *Odontostilbe fugitiva*, MCP 35777, male 35.7 mm SL. SEM photographs of the first left side gill arch showing gill gland (top), in detail gill rakers on upper branchial branch (middle), and gill rakers on lower branchial branch (bottom). Lateral view.

border, and anteriormost upper gill rakers with none or 1 similar denticle on posterolateral border; lower gill rakers with 1-4 denticles on anterolateral border, and none or 1 on posterolateral surface; and posteriormost lower gill raker with none or 1 recurved denticle on anterolateral border, and none, 1 or 2 similar denticles on posterolateral border (Fig. 3). Denticulation mainly on basal portion of gill rakers.

Color in alcohol. General ground body color brownish or pale yellow. Dark dorsum pigmentation from head to caudal peduncle, dark chromatophores mostly on border of scales forming reticulated pattern. Pigmented scales extend laterally on body below longitudinal stripe, also on pseudotympanum area or not. Dorsal fin entirely scattered with dark chromatophores along fin rays, densely along 1st-2nd unbranched dorsal-fin rays. Dark chromatophores along 1st-9th dorsal branched fin rays, except almost hyaline 9th branched fin ray. Pectoral and pelvic fins with scattered dark chromatophores, more numerous on anteriormost portions of fins. Fresh specimens only with 7th branched pelvic-fin ray hyaline. Neotype with 1-5th branched pelvic-fin rays pigmented. Pelvic fin mainly hyaline in old-preserved specimens. Anal fin with dark chromatophores spread on all fin rays or on more central branched anal-fin rays, except at tips of last unbranched fin rays and 1st branched fin ray. Adipose fin not pigmented. Caudal fin almost entirely covered with diffuse dark chromatophores along fin rays, except clear areas on base of caudal-fin lobes just behind caudal-fin spot. Rounded black to brown spot on base of caudal fin, reaching upper and lower border of peduncle, or upper border only, sometimes extending little onto proximal portion of 7th to 12th central principal caudal-fin rays.

Numerous dark chromatophores, somewhat contiguous, on snout, upper and lower lips, anteriormost portion of maxilla, and 1st, 2nd, and 6th infraorbitals. Top of head on frontals and parietals pigmented, with deep-lying dark chromatophores over brain membranes below frontals and parietals, and fontanel. Body with faint dark and silver midlateral stripe, sometimes forming black line along middle longitudinal body axis, beginning behind or on pseudotympanum, above lateral line, and reaching caudal spot. Guanine on eye iris, opercle, isthmus, and most of 3rd infraorbital. Below lateral line, belly faint almost without pigmentation, chromatophores above anal-fin base forming 12 to 15 chevron shaped markings.

Color in life. Life color of specimen from lower Ucayali drainage (Fig. 4). One red spot on base of each caudal fin lobe, just posterior to caudal fin black blotch. Red and yellow pigments most on dorsal and anal fins. White pigment on tips of last unbranched and 1st-2nd branched anal-fin rays, and of unbranched and first branched pelvic-fin rays.

Sexual dimorphism. Males with hooks on anal- and pelvic-fin rays, and elongate dorsal- and pelvic-fin rays, in contrast to absence of these features in females. A gill gland (Burns & Weitzman, 1996) present in mature males on first gill arch, covering about 8 to 10 anterior branchial filaments (Fig. 3). Sexual dimorphism in general body shape is also recognized by principal component analysis performed on measurements of males and females (Fig. 5). Principal component 2 (PC2) grouped males and females separately. It was affected strongly and negatively by pelvic-fin length, snout length, and dorsal-fin length; and positively by depth at dorsal-fin origin. Males are particularly distinct from females in all of these characters, having higher values of pelvic-fin length, snout



Fig. 4. *Odontostilbe fugitiva* from lower río Ucayali drainage. Photo by William Crampton (Ucamara Project).

length, and dorsal-fin length than females, while females have higher depth values at dorsal-fin origin than males (Table 1). Principal component 3 (PC3) was affected strongly and positively by snout length and upper jaw length, and negatively by pelvic-fin length and dorsal-fin length. Variation on PC3 seems to be related to the level of development of pelvic- and dorsal-fin rays, snout protusion (snout length, and upper jaw length) in males, because males with higher values for these features are located upper on PC3 axis (Fig. 5).

Remarks on the holotype of *Odontostilbe fugitiva*. The short description of *O. fugitiva* by Cope (1870) makes no reference to type specimens. Most type-specimens of fishes described by Cope were deposited at ANSP, although some at USNM and some are missing (Böhlke, 1984; Vari & Howe, 1991). Henry W. Fowler was the first full-time curator of the fish collection at ANSP, and one of his first tasks was the cataloging of the extensive collection of Edward D. Cope (Böhlke, 1984). During his stay at ANSP, Fowler (1913: 529, 532) described *O. madeirae* and *O. drepanon* and Fowler (1940) *O. dierythrura* and *O. hasemani*, but he did not mention any type specimens for *O. fugitiva*. Finally, when describing *O. caquetae*, Fowler (1943: 232) stated that the type of *O. fugitiva* was lost. Géry (1972a) also affirmed the holotype of *O. fugitiva* was lost after visiting ASNP to study Fowler's type material. Vari & Howe (1991) did not list *O. fugitiva* among characiform type specimens at USNM.

Böhlke (1984: 46) indicated ANSP 8059 as the holotype of *O. fugitiva*, and noticed that "original Cope label and catalog indicate this to be type of *O. fugitiva*". However, in the same publication, Böhlke (1984: 46) remarked the same lot (ANSP 8059) was listed by Fowler (1906) as the holotype of *Aphyocharax filigerus*, valid as *Prionobrama filigera* (Cope, 1870). Examination of ANSP 8059 confirmed this is a specimen of *P. filigera*. Both authors have fruitlessly searched the ANSP and USNM fish collections after the type material of *O. fugitiva* [including the lot ANSP 8073 listed by Fowler (1906) as cotypes of *Aphyocharax filigerus*].

Neotype designation. *Odontostilbe fugitiva* is the type species of *Odontostilbe*, and the designation of a neotype, as well as establishment of the identity of the type species is essential in solving nomenclatural questions among cheirodontines. The neotype was not caught at Pebas, the original type locality of *O. fugitiva*. Pebas is located at the confluence of río Ampyiacu with río Amazonas, Loreto, Peru. The neotype is a mature male from an affluent of lower río Napo basin, río Mazán, upper río Amazonas, Loreto, Peru. Río Mazán is to the west of the type locality, being the nearest site (Fig. 6) with the best preserved mature male (Fig. 1) available, being in conformity with ICZN (1999). Since secondary sexually dimorphic characters are important to distinguish *Odontostilbe* and other Cheirodontinae genera, a mature male is preferred as the neotype. The chosen male has entire elongate 2nd unbranched dorsal-fin ray and unbranched

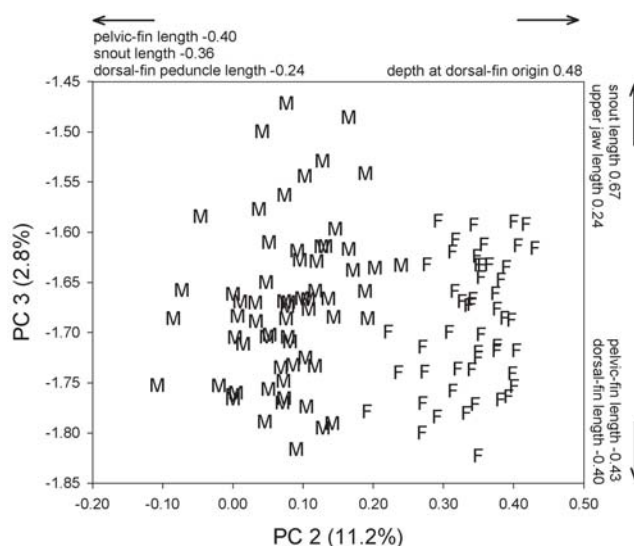


Fig. 5. Principal component analysis of the 18 morphometric data of males (M) and females (F) of *Odontostilbe fugitiva*. Stronger loadings on the second and third principal components (PC2, PC3).

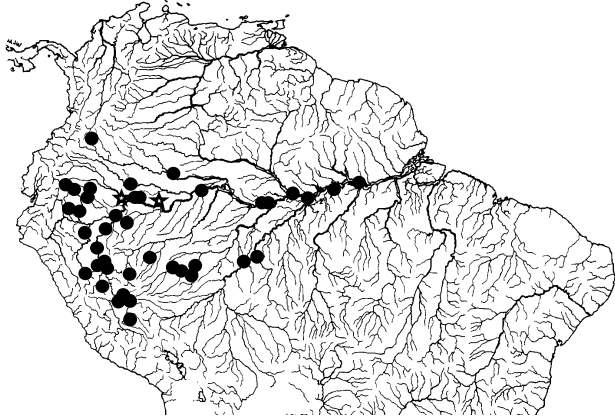


Fig. 6. Distribution of *Odontostilbe fugitiva* in central and northern South America. Circles (material examined, symbols can represent more than one lot, and more than one locality), and stars (type locality of neotype on the right and of the lost holotype on the left).

pelvic-fin rays, well-developed acute retrorse hooks on pelvic- and anal-fin rays, preserved scales, and well-preserved color pattern (Fig. 1). Cope (1870: 566) referred to a “transverse line [of scales] at vent 11; at ventral fins 5-5”. Although distinct from the counts of the neotype, these counts are included in the range found herein for the species (5-7 between lateral line and dorsal-fin origin and 4-5 between lateral line and anal-fin origin).

The status of *Odontostilbe madeirae* and *Odontostilbe drepanon*. Both species were described in the same paper by Fowler (1913). The holotype (Fig. 7) and all paratypes but one of *O. drepanon* have the dimorphic characters unique to males of *Odontostilbe*: elongation of 2nd unbranched dorsal-fin ray and 1st unbranched pelvic-fin rays, and presence of hooks on pelvic-fin rays and anal-fin rays. On the other hand, the holotype (Fig. 7) and all paratypes of *O. madeirae* lack these characters, and have higher body depth, the diagnostic features for females (see Table 1 and description under Sexual Dimorphism above). The two species described by Fowler (1913) overall match the *O. fugitiva* diagnosis, and this is a case of misunderstanding dimorphic males and females as two different species. Fowler (1913: 529) remarked that the absence of “the dark-edged silver lateral band” in *O. madeirae* is a character to distinguish it from *O. fugitiva*. The holotype and paratypes of *O. madeirae* actually have a faded longitudinal line of chromatophores posterior to the pseudotympanum.

The holotype of *O. madeirae* has few dentary teeth remaining, but laterally 4 teeth remain, each with 7 cusps. Pre-maxillary teeth 5 with 7-8 cusps and maxillary teeth 2 with 7 cusps. The holotype of *O. drepanon* also lacks most dentary teeth, but on the right side four teeth remain each with about 7 cusps. Pre-maxillary teeth 5 with 7-9 cusps, and maxillary teeth 2 with 7 cusps. The 2nd unbranched dorsal-fin ray is broken.

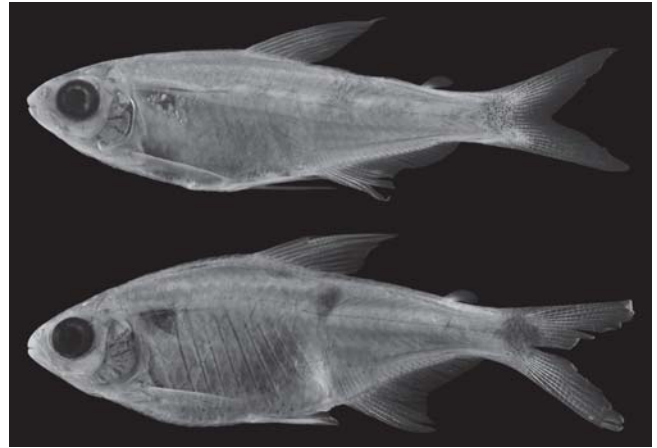


Fig. 7. Holotypes of *Odontostilbe madeirae*, ANSP 39193, female 32.1 mm SL (top), and *Odontostilbe drepanon*, ANSP 39210, male 30.5 mm SL (bottom - The darkened area below dorsal fin is a preservation artifact).

The status of *Odontostilbe caquetae*. *Odontostilbe caquetae* was described from a single immature specimen (28.0 mm SL). Fowler diagnosed *O. caquetae* comparing the holotype with data available in the short redescription of *O. fugitiva* by Eigenmann (1915:93), which was based on four specimens examined from “San Antonio de Rio Madeira”, measuring “largest 41 mm”. Following Fowler’s diagnosis, *O. caquetae* would have a smaller head, smaller eye and larger snout than *O. fugitiva*. However, measurements and counts of the holotype of *O. caquetae* overlap those of *O. fugitiva* (Table 1), not supporting any of Fowler’s diagnostic characters. For that reason, we consider *O. caquetae* as a synonym of *O. fugitiva*.

The holotype is now dark colored and damaged with most dorsal-fin rays and caudal-fin rays broken (Fig. 8). Infraorbitals 2-5 are lacking on the left side. Premaxilla probably would have five teeth, but just two of them remain on each left and right sides, bearing 8-7 cusps. Right maxilla with 2 teeth bearing 8-9 cusps, and left maxilla with only one tooth with 8 cusps. Four dentary teeth remain on each side bearing 5-6 cusps. This dentition is similar to that found in smaller specimens of *O. fugitiva*, *O. pulchra*, *O. euspilura* or *O. ecuadorensis*. The type locality of *O. caquetae* is Florencia, rio Portuguesa, rio Caqueta drainage, where *O. euspilura* occurs (Fowler, 1945b). The main reason for not considering *O.*



Fig. 8. Holotype of *Odontostilbe caquetae*, ANSP 70495, unsexed 28.0 mm SL.

caquetae as synonym of *O. euspilura* is the terminal mouth in the former, against the inferior mouth in the latter.

The first right gill arch of the holotype was found cut off from branchial apparatus, but kept under the operculum. Both first gill arches have 6 gill rakers on upper branch and 11 on lower branch. Fowler (1943: 232) described 7+11 gill rakers and it is possible the first gill raker was lost in the damaged upper branches of both gill arches. Specimens of *Odontostilbe* examined from rio Japurá, the Brazilian name for mid and lower rio Caqueta, match *O. fugitiva* in measurements and counts, including 6, 7 gill rakers on upper gill arch and 12 on lower (one among 10 examined specimens of rio Japurá has 6+11 gill rakers as the holotype of *O. caquetae*). Therefore we consider *O. caquetae* as synonym of *O. fugitiva*. However, we consider this synonym provisional since no mature males of *Odontostilbe* were available from upper rio Caqueta or rio Japurá.

Distribution and geographical variation. *Odontostilbe fugitiva* is the most widespread *Odontostilbe* species in the Amazon basin, occurring from the major western tributaries to the lower rio Amazonas (Fig. 6). More extensive records are from the rio Ucayali, rio Marañon, rio Amazonas and rio Madeira basins. Records from western major tributaries of the Amazon, Purus and Juruá systems, are relatively scarce. Predominantly, the species occurs in major whitewater rivers of the Amazon basin, being not so far identified from the rio Negro, rio Trombetas, rio Tapajós, rio Xingu, rio Tocantins-Araguaia. The well-sampled fish fauna of the rio Negro did not reveal *O. fugitiva* (Goulding *et al.*, 1988), though they listed 12 specimens of “*Cheirodon* sp.” (not found at INPA collection). Chao (2001) also did not include *O. fugitiva* in a list of fishes of rio Negro basin and lower rio Branco caught by Project Piaba. Personal searches [CMB] at INPA and Project Piaba fish collections failed in finding *O. fugitiva* in rio Negro

material. Lowe McConnell (1991) listed *O. cf. fugitiva* from a tributary of the rio Araguaia, the rio das Mortes. However, the examination of material from the rio Araguaia basin failed to reveal any *O. fugitiva*.

Specimens from upper rio Marañon, upper rio Ucayali drainages, and middle rio Amazonas (rio Solimões) showed some variation in morphometry. This seems to be related to some exceptionally developed males and females in samples from upper portions of Marañon and Ucayali. Indeed, the largest mature specimens of *O. fugitiva* come from upper rio Pastaza, Ecuador (FMNH 113515), and upper rio Huallaga, Peru (ANSP 136951), both upper affluents of Marañon, with some comparable size specimens only from rio Urubamba, upper Ucayali. Noteworthy, males from rio Marañon basin (rio Pastaza, rio Tigre, and rio Huallaga) show a tendency to have longer snout lengths and upper jaw lengths than males of most populations of upper rio Amazonas basin (rio Putumayo, rio Itaya, rio Mazán, rio Ampyiacu, rio Yavari, and the rio Amazonas). However, no additional differences were found to support the recognition of a separate species for rio Marañon basin. Some specimens from the upper rio Pastaza (FMNH 113515) show a somewhat subterminal mouth similar to *O. dierythrura* and other undescribed species from rio Madre de Dios, upper rio Madeira basin. *Odontostilbe dierythrura* and this undescribed species, however, possess larger upper jaw length (Fig. 9), and more pronounced snouts than *O. fugitiva*, including the Marañon population.

Males of rio Ucayali basin also had differences in snout and upper jaw length when contrasted with males from the main rio Amazonas basin, having snout length difference statistically significant in the coincidental regression test ($F_{(2, 74)} = 11.8, p < 0.00$) (Fig. 10). When compared to *O. fugitiva*, *O. dierythrura* and *Odontostilbe* n. sp. from Madre de Dios, the upper jaw length of the population from rio Urubamba, upper Ucayali, remains at an intermediate range between *O. fugitiva* and the other two species (Fig. 11). Again, considering there

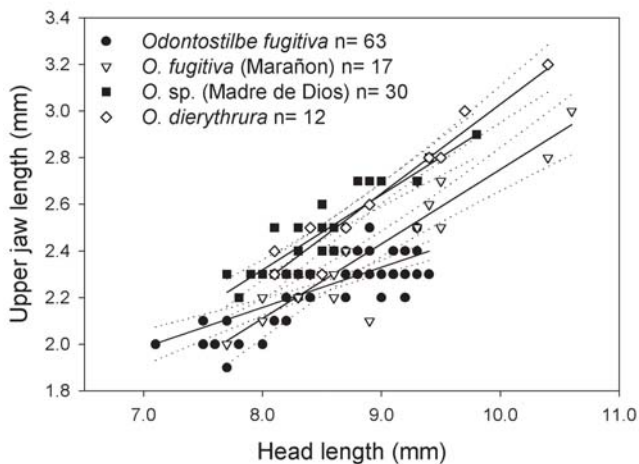


Fig 9. Upper jaw length as a function of head length for males of *Odontostilbe fugitiva*, specimens widely distributed on rio Amazonas, and upper and middle rio Marañon basin, against *O. dierythrura* and *Odontostilbe* sp. of rio Madre de Dios basin.

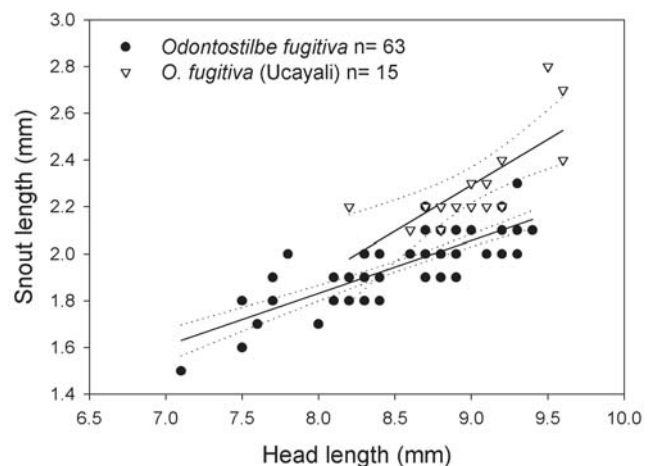


Fig 10. Snout length as a function of head length for males of *Odontostilbe fugitiva*, specimens widely distributed on rio Amazonas basin against specimens of rio Ucayali basin.

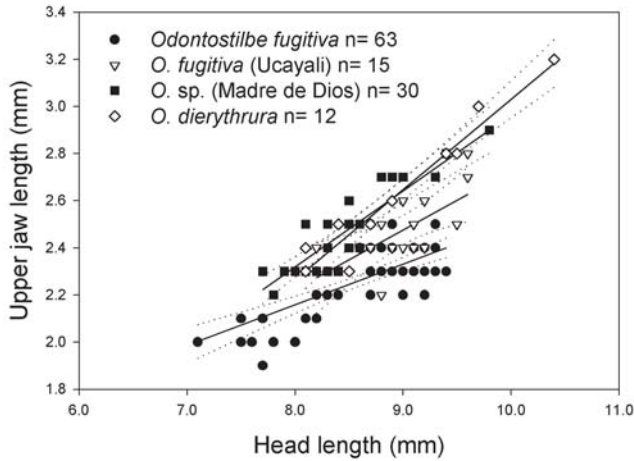


Fig 11. Upper jaw length as a function of head length for males of *Odontostilbe fugitiva*, specimens widely distributed on río Amazonas basin, and specimens of río Ucayali basin, against *O. dierythrura* and *Odontostilbe* sp. of río Madre de Dios basin.

were no additional characters differing these populations, and the overlaps in statistics for snout length and upper jaw length, the Ucayali population is considered to be *O. fugitiva*.

A significant statistical difference in measurements was also found when comparing río Solimões samplings from the region near Manaus to overall *O. fugitiva* material from upper río Amazonas basin, including río Ucayali and río Marañon systems. Not only males, but females and unsexed specimens jointly, show differences in snout to pectoral-fin length ($F_{(2,200)} = 85.6, p < 0.00$) (Fig. 12). This difference is also considered a variation among *O. fugitiva* populations. However, there is a lack of mature males and females among specimens available from an extensive portion of the río Solimões between

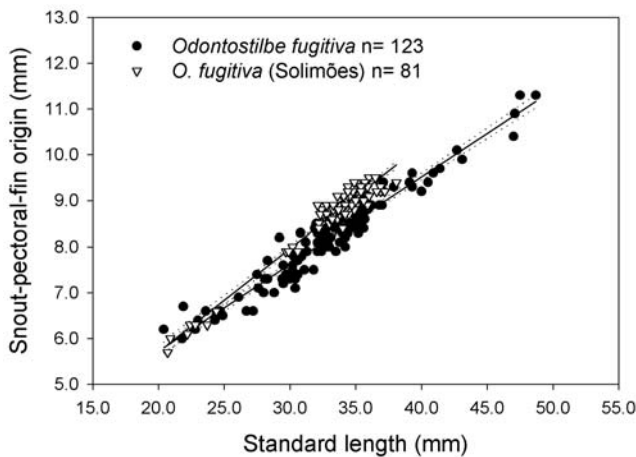


Fig 12. Snout to pectoral-fin length as a function of standard length for males, females, and unsexed specimens of *Odontostilbe fugitiva*, specimens widely distributed in río Amazonas basin against specimens of río Solimões basin (middle río Amazonas).

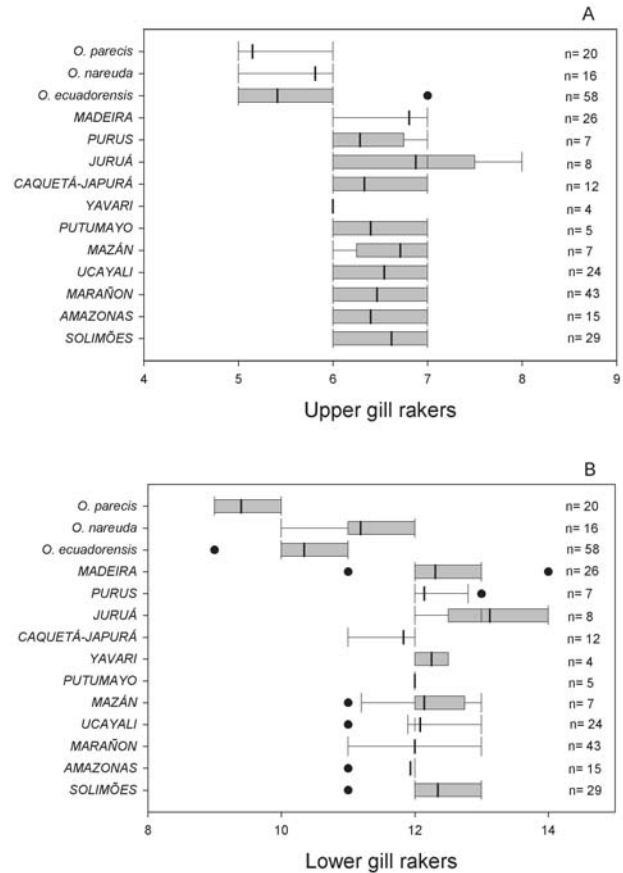


Fig. 13. Upper and lower gill rakers counts of *Odontostilbe fugitiva* populations, and three new species *Odontostilbe ecuadorensis*, *Odontostilbe nareuda*, and *Odontostilbe parecis*.

Leticia, Colombia, and Manaus, Brazil. Most samples from Solimões consisted of material caught near Manaus by Peter Bayley in 1970s or more recently by INPA researchers.

Examined specimens from río Juruá basin are unsexed, probably juveniles. Exceptionally, two specimens among 8, have 8 upper gill rakers, and 3 specimens have 14 lower gill rakers (Fig. 13a). Higher gill raker counts occur in *O. dierythrura* and in an undescribed species from Madre de Dios. However, the upper jaw lengths of the available specimens of Juruá fit that of *O. fugitiva*. One specimen of *O. fugitiva* from the río Madeira also has 14 lower gill rakers (Fig. 13b). Similarly, specimens examined from río Purus contain only unsexed specimens. In the lack of fully developed, mature specimens, we tentatively assign Juruá and Purus specimens to *O. fugitiva*.

Ecological notes. Recorded mainly from whitewaters; black-water as “black-muddy” is cited only for FMNH 85346, a stream near Leticia, Colombia. Sánchez-Botero & Araújo-Lima (2001) referred to *Odontostilbe piaba*, *Odontostilbe* sp. and *Odontostilbe fugitiva* in a list of species associated with roots of aquatic macrophytes during high water period at three floodplain lakes of río Solimões. Sánchez-Botero *et al.* (2003)

Table 1. Morphometrics of *Odontostilbe fugitiva*, upper rio Amazonas basin (rio Ucayali, rio Marañon, rio Putumayo, rio Itaya, rio Mazán, rio Ampyiacu, rio Amazonas, rio Yavari, rio Juruá, rio Madeira, rio Solimões). Neotype MUSM 27501 of rio Mazán, affluent of mouth of rio Napo. Separately, the holotype ANSP 70495 of *Odontostilbe caquetae* syn. from the rio Caquetá basin, the holotype ANSP 39193 of *O. madeirae* syn., and holotype ANSP 39210 of *O. drepanon* syn., plus six paratypes ANSP 39211 from the rio Madeira basin.

	Males				Females				Unsexed				<i>O. caquetae</i>	<i>O. madeirae</i>	<i>O. drepanon</i>					
	Neotype	n	Low	High	Mean	n	Low	High	Mean	n	Low	High	Mean	Holotype	Holotype	Holotype	n	Low	High	Mean
Standard length	34.6	88	28.1	45.1	34.3	60	28.8	48.7	35.5	102	20.4	43.1	31.1	28.0	32.1	30.5	6	25.2	28.8	27.2
Percents of standard length																				
head length	24.3	88	23.1	27.5	25.8	60	22.1	27.2	25.0	101	22.7	30.1	25.6	24.3	24.6	25.6	6	25.9	28.4	27.0
snout-anal fin origin	63.6	88	60.6	66.9	63.8	60	62.9	70.2	66.2	102	60.9	68.1	64.8	63.6	65.7	63.0	6	62.8	64.3	63.6
snout-dorsal fin origin	48.0	88	47.1	51.4	49.0	60	47.4	52.8	50.7	102	48.3	53.6	50.4	49.6	48.9	46.6	6	47.2	50.7	49.2
snout-pelvic fin origin	45.4	88	43.7	49.6	46.3	60	45.3	51.3	48.0	102	44.4	49.3	47.1	45.0	47.7	44.9	6	44.8	47.1	46.3
dorsal-fin base	13.6	88	13.2	15.7	14.2	60	13.1	15.4	14.5	102	12.9	16.6	14.4	13.2	14.6	13.8	6	13.5	15.9	14.5
anal-fin base	27.5	88	23.5	28.9	26.7	60	24.3	28.9	26.6	101	24.0	29.4	26.7	24.3	26.2	26.9	6	25.3	27.6	26.4
caudal peduncle length	13.6	88	11.3	15.3	13.3	60	10.9	13.9	12.4	102	10.8	14.4	12.5	14.3	13.1	12.5	6	13.1	14.0	13.6
caudal peduncle depth	10.4	88	9.0	12.5	11.1	60	10.1	13.0	11.5	102	9.0	12.7	10.9	10.4	10.9	11.1	6	9.9	11.8	11.1
depth at dorsal-fin origin	28.3	88	26.6	35.5	31.7	60	29.6	41.3	35.9	102	28.6	37.6	32.2	29.6	35.5	30.8	6	29.0	33.1	30.1
dorsal-fin length	29.8	71	27.6	37.1	31.5	50	27.4	32.3	30.0	91	27.7	32.8	30.0	21.4	30.8	31.8	6	28.5	37.2	33.5
pelvic-fin length	20.2	88	16.9	26.8	21.2	60	16.9	19.5	18.2	102	15.4	23.4	17.9	17.5	18.4	24.3	6	18.2	25.7	22.6
pectoral-fin length	21.7	88	19.3	24.2	22.2	60	18.8	22.8	21.2	102	19.3	24.3	21.1	17.5	21.2	21.6	6	22.1	23.5	22.5
snout-pectoral-fin origin	24.0	88	23.1	27.1	25.6	60	22.1	26.8	24.8	102	23.0	30.6	25.6	25.0	25.9	24.6	6	25.0	27.9	26.1
Percents of head length																				
snout length	22.6	88	21.3	29.5	23.6	60	19.1	24.7	22.0	101	18.0	25.6	21.4	20.6	22.8	25.6	6	19.4	24.7	22.1
upper jaw length	26.2	88	23.6	29.3	26.6	60	24.0	30.0	26.7	101	23.4	29.9	26.7	27.9	27.8	28.2	6	25.3	28.2	26.5
horizontal eye diameter	36.9	88	32.3	38.6	35.3	60	34.0	41.3	36.9	101	33.7	41.8	37.8	41.2	34.2	34.6	6	28.9	35.8	33.6
least interorbital width	32.1	88	29.3	35.8	32.7	60	30.0	36.5	32.9	101	28.8	37.0	32.7	32.4	32.9	32.1	6	29.8	32.0	30.8

listed *Odontostilbe aff. piaba* caught under macrophytes *Eichhornia azurea* and *Eichhornia crassipes* in lago Cama-leão, considering *Odontostilbe* among the typical fish genera associated to *Eichhornia* spp., along with *Ctenobrycon*, *Synbranchus*, *Hemigrammus*, *Moenkhausia*, *Mylossoma*, and *Hoplias*. Some of the fish collected by Sánchez-Botero & Araújo-Lima (2001) were examined at INPA. Three distinct species of Cheirodontinae were identified by those authors as "*O. fugitiva*", including two *Serrapinnus* species, plus *O. fugitiva*. That is not surprising, since *O. piaba* [actually *Serrapinnus piaba*] for example is used in the literature as a misidentification of several *Serrapinnus* spp. In any case, Sánchez-Botero & Araújo-Lima (2001) results pointed out a high abundance of the cheirodontine *O. fugitiva* and at least three *Serrapinnus* spp. (*Serrapinnus micropterus*, *Serrapinnus* gr. *microdon*, and *Serrapinnus* n. sp., our identifications) in lakes from the rio Solimões floodplain. Peter Bayley fish collections undertaken during the late 1970's from the same lakes were also extensively examined (material at ANSP, MCP, and USNM), confirming that *O. fugitiva* is very common in these floodplain lakes. At the same localities, Marchantaria Isle (lago Camaleão), Janauacá, and Januari, *O. fugitiva* was caught associated with macrophytes *Echinochloa polystachya*, *E. crassipes*, *Paspalum repens*, *Panicum* sp., or unvegetated places, and considered as omnivorous (Petry et al., 2003).

Two new cheirodontine species provisionally treated as "*Odontostilbe*", but not described herein, are sympatric and have been found mixed with *O. fugitiva* in some jars. One of these new species mostly occurs in the rio Ucayali basin and the second in the rio Marañon basin.

Odontostilbe ecuadorensis, new species

Fig. 14

Holotype. ANSP 170608, 1 (male 45.7 mm SL), Ecuador, Napo, Santa Cecilia, rio Aguarico, 00°06'N 76°51'W; W. G. Saul & F. B. Cross, 14 Jun 1968.

Paratypes. ECUADOR, SUCUMBÍOS: ANSP 130574, 12m (1 male 45.6 mm SL, 9 females 42.7-46.7 mm SL, 1 female 49.1 mm SL c&s, 1 unsexed 35.1 mm SL), backwater of rio Aguarico at Santa Cecilia, 00°06'N 76°51'W, W. G. Saul, 30 Jun 1967. MCP 38419, 12m (5 males 32.7-38.6 mm SL, 1 female 40.1 mm SL, 6 unsexed 24.1-36.2 mm SL), rio Napo, beach on south bank, 2.7 km upstream from bridge at Coca, 00°29'S 77°24'W, D. Stewart, M. Ibarra, R. Barriga & Uquillas, 2 Oct 1981. FMNH 113512, 74 unsexed (4 males 32.4-33.4 mm SL, 70 unsexed 28.6-35.0 mm SL), same data as MCP 38419. KU 13524, 15m of 32 (7 males 36.3-45.8mm SL, 2 males 43.3 mm SL and 43.5 mm SL c&s, 2 females 41.7 mm SL and 45.2 mm SL, 1 female 45.2 mm SL c&s, 3 unsexed 33.6-34.8 mm SL), Aguarico, isolated pool at backwater of rio Aguarico at Santa Cecilia, W. G. Saul, 27 Jun 1968. KU 13526, 3m (1 male 44.0 mm SL, 2 females, 47.7-50.2 mm SL), rio Aguarico at Santa Cecilia, W. G. Saul, 13 Mar 1967. MEPN 1517, 2m (1 female 45.2 mm SL, 1 female 43.6 mm SL c&s), Sucumbíos, rio Duguno, 2 km on south of indian group Cofán del Duguno, Aguarico [drainage], 00°08'15"N 76°45'18"W, R. Barriga & S. Criollo, 1 May 1995. ECUADOR, NAPO: FMNH 113511, 1m (7 males, 38.2-45.5 mm SL), rio Napo, cocha of mainstream, at and 1.2 km downstream from mouth of rio Suyunoyacu (ca. 16 km from Coca), 00°32'36"S 77°04'54"W, 22 Sep 1981. FMNH 113513, 11m (unsexed 29.6-32.5 mm SL), rio San Miguel at Tipishca, km 54.5, [upper rio Putumayo], 00°12'30"S 76°13' W, D. Stewart, M. Ibarra & R. Barriga., 4 Oct 1983. FMNH 113514, 5m (4 males 40.6-43.2 mm, 1 male 43.5 mm SL c&s, 1 female 40.3 mm SL), Napo, quebrada Capihuara, tributary of rio Payamino, [rio Coca, rio Napo drain-

age], 00°30'S 76°14'30"W, D. Stewart, M. Ibarra & R. Barriga., 13 Nov 1983.

Non-type material. **Río Napo basin**, ECUADOR, SUCUMBÍOS: ANSP 141496, 2m (unsexed 27.8-28.8 mm SL), [río Pañayacu], 00°25'S 76°07'W. ANSP 141506, 12m (unsexed 27.0-31.2 mm SL), Napo, near mouth of río Cuyabeno, 00°16'S 75°53'W. ECUADOR, NAPO: ANSP 141508, 1m (female 36.0 mm SL), mouth of río Shushu Fundi, 00°18'S 76°21'W. PERU, LORETO, MAYNAS, ARCADIA: USNM 379440, 1 (unsexed 28.5 mm SL), middle río Napo, Padre Isla, cocha Chica. USNM 379469, 1 (unsexed 21.2 mm SL), middle río Napo quebrada Negra 1, en la quebrada Norte. USNM 384420, 1 (unsexed 22.3 mm SL), same data as USNM 379440. USNM 384822, 1 (unsexed 18.0 mm SL), río Napo, cocha de Conchas. PERU, LORETO, MAYNAS, CASTANA: USNM 328553, 5 (unsexed 17.0-18.1 mm SL), middle río Aguarico, quebrada Castana Negra. **Lower río Napo**, PERU, LORETO: ANSP 178148, 2m (unsexed 33.7-40.9 mm SL), Maynas, beach & backwater along right bank just upstream from mouth río Mazán, near town of Mazán, 03°29'10"S 73°06'24"W. INHS 36600, 2m (unsexed 30.4-32.0 mm SL), mouth of río Mazán, near town of Mazán. INHS 36658, 1m (unsexed 37.6 mm SL), 1 km upstream mouth of río Mazán, 3 km west town of Mazán. INHS 36668, 1m (unsexed 30.6 mm SL), 1 km upstream mouth of río Mazán, 3 km west town of Mazán.

Diagnosis. Characters that diagnose *Odontostilbe ecuadorensis* are: (1) upper gill rakers 5-6, lower 9-11, mostly 10-11 (*vs.* upper gill rakers 6-8, mostly 6-7, and lower 11-14, usually 12 in *O. fugitiva* (Fig. 13a-b)); (2) denticulation of gill rakers more numerous in *O. ecuadorensis* than in *O. fugitiva* (in specimens larger than 32.5 mm SL), mainly on posteriormost gill raker of lower arch (5-6 denticles on basal portions of gill raker in *O. ecuadorensis vs.* 0-2 in *O. fugitiva* (Figs. 3, 16)); (3) elongate 2nd unbranched dorsal-fin ray (*vs.* not elongate in *O. euspilura* and very short elongate in *O. pulchra*); (4) no hooks on unbranched pelvic-fin ray (*vs.* 1-2 unpaired hooks per segment on 1st unbranched pelvic-fin ray occasionally present in *O. euspilura* and *O. pulchra*); (5) 1-3 paired or unpaired hooks per segment on last unbranched anal-fin ray, and 1st to 16th anal-fin branched rays (small hooks like knots on anal-fin ray branches, usually on 10th branched fin ray and following rays) (*vs.* well-developed hooks on 1st to 22nd anal-fin branched rays at distal half length of fin rays in *O. pulchra*); and (6) usually seven large dentary teeth, with seven cusps (*vs.* 4 large dentary teeth with 3 large and compressed central cusps and 2, 3 lateral small cusps in *O. pequiria*). *Odontostilbe ecuadorensis* differs from sympatric *O. euspilura* by its terminal mouth (*vs.* subterminal mouth).

Description. Morphometric data given in Table 2. Slender and large *Odontostilbe* species, largest male (holotype) 45.7 mm SL, largest female 47.7 mm SL. Body elongate and compressed, more compressed in males than females. Greatest body depth at dorsal-fin origin. Snout pointed in males, rounded in females. Head profile slightly convex from snout to dorsal-fin origin; profile descends from that point almost straight to caudal peduncle. Ventral profile convex from lower jaw to caudal peduncle. Anal-fin base straight. Caudal peduncle slightly longer than deep.

Head relatively small. Posterior margin of opercle sinusoidal with upper portion concave and lower portion convex. Mouth terminal. Maxilla short terminates at vertical near or at anterior eye border, horizontal to lower eye border. Dentition (based on 6 c&s specimens and 28 alcohol specimens). Pre-maxillary teeth 4, 5, or 6, bearing 5-9 cusps (usually 7, 8, or 9); midcentral cusp longest, lateral cusps overlap cusps of adjacent teeth (Fig. 15). Premaxillary teeth juxtaposed external to dentary teeth, leaving premaxillary tooth cusps exposed when mouth closed. Maxilla with 2 or 3 teeth bearing 1-9 (usually 7) cusps, decreasing cusp number toward posterior tip of maxilla. Dentary teeth 8-9 gradually decreasing in size posteriorly, anterior 6 teeth large bearing 5-7 cusps (usually 7), and posterior teeth small, conic or with 2-5 cusps. Smaller cusps of dentary teeth overlap cusps of adjacent teeth, usually not in posteriormost teeth.

Dorsal-fin rays **ii**(89), **9**(89). Dorsal fin slightly posterior to mid body length, and slightly posterior to pelvic-fin origin. First unbranched dorsal-fin ray in females and immature males about half length of second unbranched dorsal-fin ray. Second unbranched dorsal-fin ray elongate in mature males, extending beyond dorsal-fin distal profile. Anal-fin rays **iii**(1), **iv**(8), **v**(78), **vi**(2); 18(3), 19(15), 20(34), 21(31), or **22**(6). Anal-fin distal border concave, anterior 6-7 branched rays longest. Pectoral-fin rays **i**(89), 10(8), **11**(55), or 12(26). Unbranched pectoral-fin ray reaching or not pelvic-fin origin, never extending beyond pelvic-fin origin. Pelvic-fin rays **i**(89), 6(1), 7(87), or 8(1). Unbranched pelvic-fin rays longest in mature males, extending beyond origin of anal fin. Lateral skin border of unbranched pectoral-fin rays and unbranched pelvic-fin rays thickened in mature males, bearing thin laterodorsal projection of hard tissue covered with soft tissue. Principal caudal-fin rays **19**(89). Procurrent caudal-fin rays: dorsal 8(1), 9(3), 10(5), 11(31), 12(44), or **13**(5); ventral 8(5), 9(33), 10(41), **11**(9), or 12(1). Sometimes 1-2 anterior ventral procurrent caudal-fin rays laterally expanded, bifurcated, or S-shaped. Caudal-fin ray flaps ventrally on 3rd-8th rays of upper lobe, dorsally on 12th-16th rays of lower lobe. Adipose-fin at vertical through to last anal-fin ray insertion.

Males with robust, elongate, retrorse hooks on posterior border of pelvic- and anal-fin rays. One to 3 paired or unpaired hooks per segment on last unbranched anal-fin ray, and 1st to 16th branched anal-fin rays, more developed from 1st to usually 7th rays and very small like knots usually on 10th branched fin ray and following rays. Hooks on middle portion of anterior rays and on distal portion after 3rd branched anal-fin ray. One to 3 unpaired acute, elongate hooks per segment of lepidotrichia along almost entire length of 1st to 7th branched pelvic-fin rays, and reaching tip of fin rays (except on 1st branched pelvic-fin ray, on midlength portion). No hooks found on 1st unbranched pelvic-fin ray. One or two hooks on anterior border of branches of anal-fin rays. One or two hooks on anterior border of branches of pelvic-fin rays.

Scales cycloid; lateral line complete 35(6), 36(42), 37(11), or **38**(2); predorsal row 10(37), **11**(48), or 12(2); upper trans-



Fig. 14. Holotype of *Odontostilbe ecuadorensis*, ANSP 170608, male 45.7 mm SL (top), and paratypes MEPN 1517, 1 female 45.2 mm SL (middle) with exceptionally developed ovaries, ANSP 130574, female 46.6 mm SL (bottom).

verse rows 5(9), 6(76), or 7(2); lower transverse rows 4(87) or 5(1); scale rows around caudal peduncle 14(73). Triangular modified scale on pelvic fin base extends posteriorly covering 2, 3 scales. Scales on anal-fin base 6-8.

Cleared and stained specimens (5): supraneurals 4; precaudal vertebrae, 16(4) or 17(1); caudal vertebrae 18(1), 19(2), or 20(2); gill rakers, upper 5(2) or 6(3), lower 10(2) or 11(3) (2 on hypobranchial). Alcohol specimens (58): gill rakers, upper 5(35), 6(22), or 7(1), lower 9(1), 10(36), or 11(21).

Upper gill rakers with 1-6 recurved denticles on anterolateral border, and 1-3 similar denticles on posterolateral border; lower gill rakers with 1-6 recurved denticles on anterolateral border (1-4 anteriormost lower gill rakers with opposing 1-3 denticles); excepting posteriormost lower gill raker with 3-6 recurved denticles irregularly placed on anterior border, and 4-6 similar denticles on posterior border (Fig. 16a-d). Less numerous in small specimens (one specimen 27.1 mm SL, with none to 3 denticles on lateral border of upper gill rakers, and

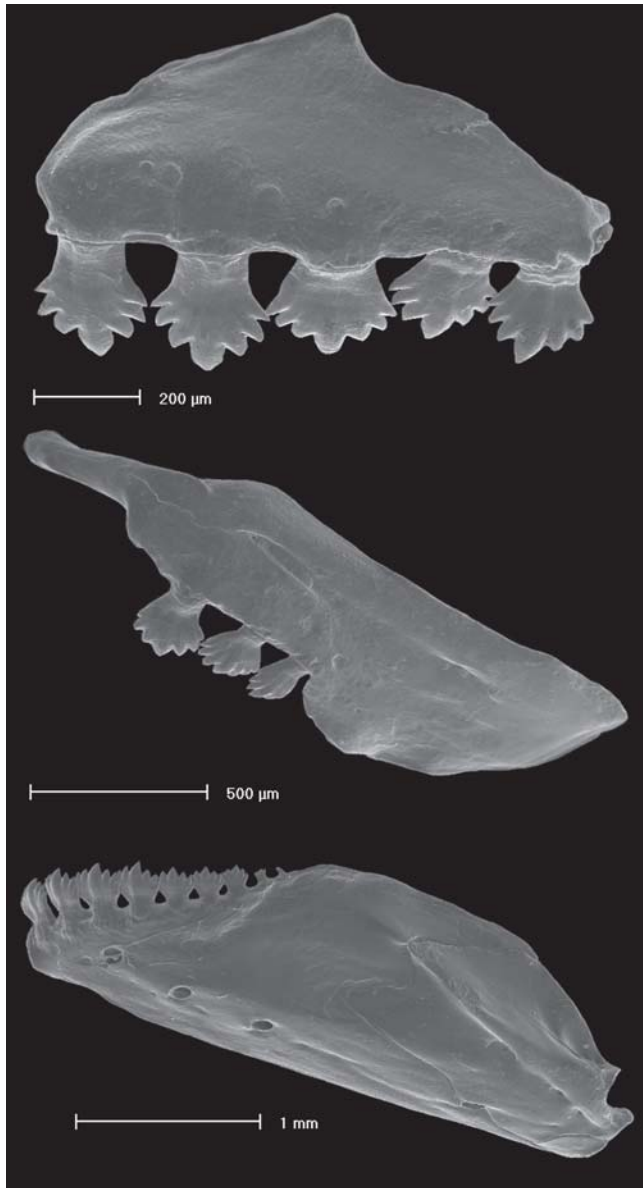


Fig. 15. Dentition of *Odontostilbe ecuadorensis*, KU 13524, male 43.5 mm SL. SEM photograph of left side premaxilla (top), maxilla (middle), and dentary (bottom).

none to 3 on lateral border of lower gill rakers). All denticulation mostly on basal portion of gill rakers.

Color in alcohol. General ground body color brownish yellow. Dark dorsum pigmentation from head to caudal peduncle, chromatophores mostly on border of scales. Pigmented scales extend laterally on body above longitudinal stripe, sometimes on pseudotympanum area in well-pigmented specimens. Dark chromatophores on all dorsal-fin rays, along 1st and 2nd unbranched fin rays and faint on 1st-8th branched dorsal-fin rays, almost hyaline on 9th branched ray. Dark chromatophores on 1st unbranched pectoral-fin ray, less numerous on 1st and 2nd branched fin rays, following branched rays practically hyaline. Pelvic fins usually hyaline, with some dark chromato-

phores on unbranched pelvic-fin ray. Anal fin mostly clear with few dark chromatophores. Some specimens bearing dark chromatophores on distal portion of middle branched anal-fin rays. Adipose fin not pigmented. Caudal fin almost entirely covered with diffuse dark chromatophores along fin rays, except light areas on base of caudal-fin lobes just behind caudal-fin spot. Somewhat rounded brownish caudal spot on base of caudal fin, reaching upper border of peduncle, but never reaching lower border, sometimes extending on proximal portion of 7th to 12th central caudal-fin rays (specimens from río Cuyabeno). Holotype is not well-pigmented, with pelvic and anal fins hyaline.

Black chromatophores on snout, upper lip, sometimes on lower lip, anteriormost portion of maxilla, and 1st, 2nd, and 6th infraorbitals. Pigmentation on top of head on frontals, and parietals with deep-lying dark chromatophores over brain membranes below frontals and parietals, and fontanel. Body with faint dark and silver midlateral stripe, sometimes reduced to one or two parallel lines, along middle longitudinal body axis, beginning above pseudotympanum, above lateral line, and reaching caudal spot. Guanine on eye iris, opercle, isthmus, and most of 3rd, 4th, and 5th infraorbitals. Below lateral line, belly faint, chromatophores just above anal fin-base forming 6 to 10 chevron shaped markings.

Sexual dimorphism. Males with hooks on anal- and pelvic-fin rays, elongate dorsal- and pelvic-fin rays, in contrast to absence of these features in females (see description). Gill gland (Burns & Weitzman, 1996) presents on first gill arch in mature males, covering about 8 to 12 anterior branchial filaments (Fig. 16). Principal component analysis of morphometric data of males and females denotes sexual dimorphism in general body shape (Fig. 17). Principal component 2 (PC2) grouped males and females separately, being affected strongly and negatively by snout length, pelvic-fin length, and caudal peduncle length; and positively by depth at dorsal-fin origin. Males are distinguished from females in all these characters, showing higher values of snout length, pelvic-fin length, and caudal peduncle length than females, while females have higher values of body depth at dorsal-fin origin than males (Table 2). Principal component 3 (PC3) was affected strongly and positively by snout length and upper jaw length, and negatively by pelvic-fin length and dorsal-fin length. Some males have well-developed dorsal and pelvic-fin rays, and protruding snouts (greater snout length, and upper jaw length). This correlates with their heaviest loadings in PC3 forming a group on upper left corner of the graph (Fig. 17).

Distribution. Río Napo, río Putumayo, and río Pastaza basins (a single lot known for the latter) (Fig. 18). Nearly all material from Ecuador, and some lots from Peru on border with Ecuador. The species is also recorded on lower río Napo basin in sympatry with *O. fugitiva*.

Etymology. The epithet *ecuadorensis* refers to the country where the species was first discovered.

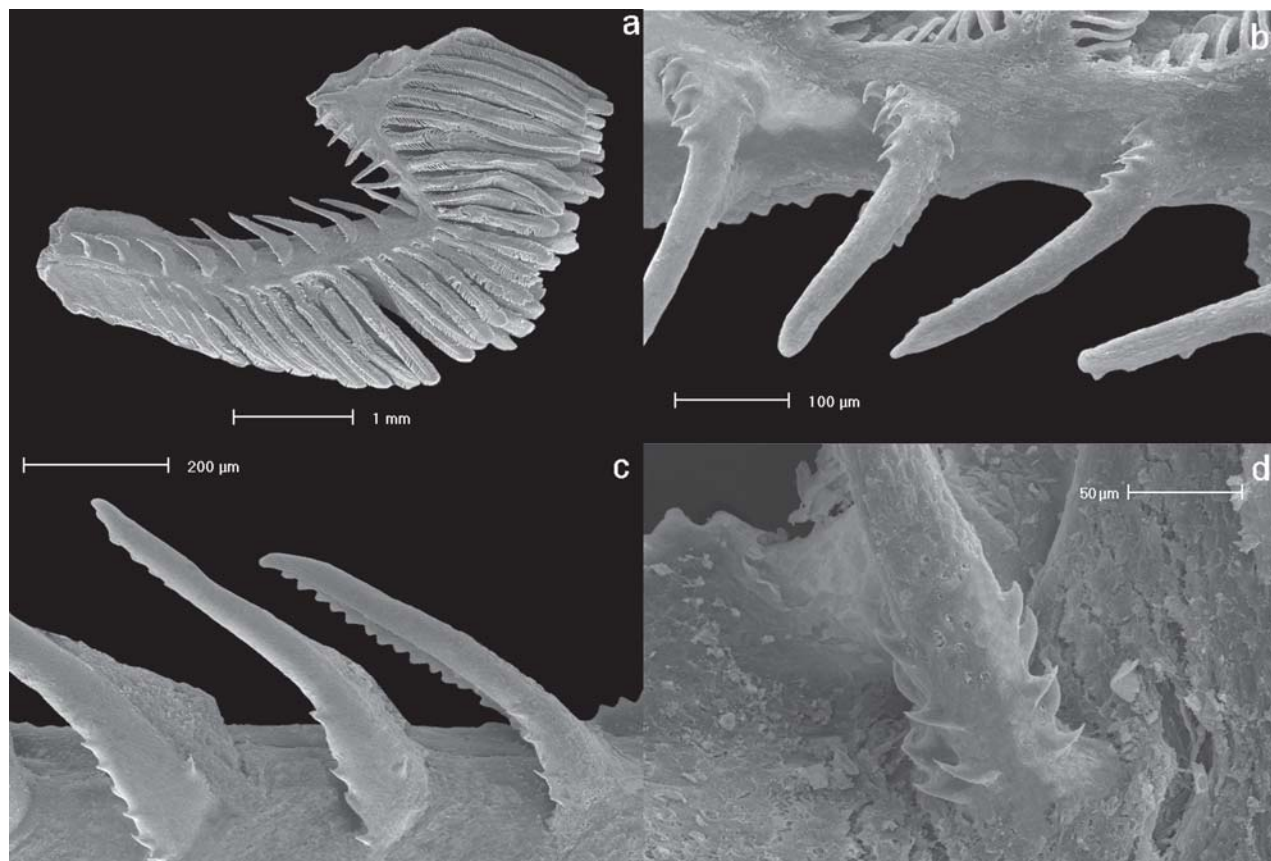


Fig. 16. First gill arch of *Odontostilbe ecuadorensis*, FMNH 113514, male 40.6 mm SL (photos a, b, d). SEM photographs of the left side gill arch showing gill gland (a), in detail gill rakers on upper branchial branch (b), gill rakers on lower branchial branch (FMNH 113513, unsexed 32.5 mm SL) (c), and the posteriormost gill raker on the lower branch in detail (d). Lateral view.

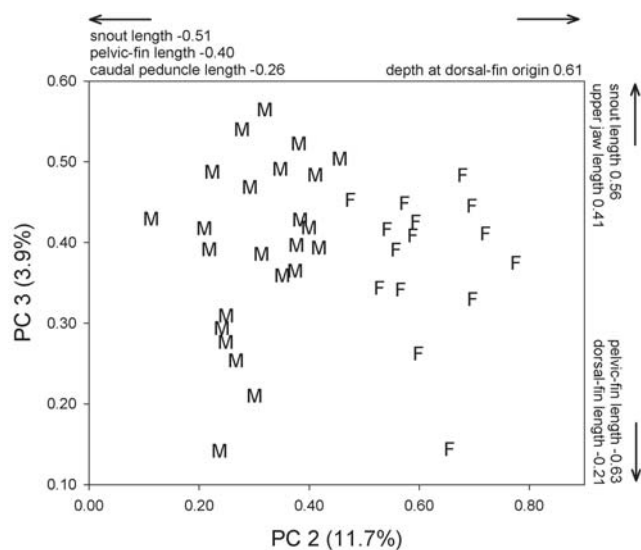


Fig. 17. Principal component analysis of the 18 morphometric data of males (M) and females (F) of *Odontostilbe ecuadorensis*. Stronger loadings on the second and third principal components (PC2, PC3).

Ecological notes. Saul (1975) identified *Odontostilbe cf. madeirae* Fowler, 1913, and *Holoshesthes heterodon* Eigenmann, 1915 as two cheirodontine species commonly taken together in the río Aguarico, the former primarily feeding on algae and plant material, and the latter on insects and insect larvae. However, examination of Saul's (1975) material proved the species named *O. cf. madeirae* to be a mix of *O. ecuadorensis* described herein and *O. euspilura*. The material he named *H. heterodon* consist of an undescribed cheirodontine. Part of the specimens caught by W. Saul was selected herein as type material for *O. ecuadorensis*. These Ecuadorian species are reported to occur in clearwater, blackwater or turbid waters, riverine sandy-beaches (Stewart *et al.*, 2002), or lagoons and associated tributaries (Galacatos *et al.*, 1996). All the material examined for this study came from altitudes between 200-500 m. Galacatos *et al.* (1996) recognized two altitudinal regions in Ecuadorian Amazon, lowland between 200 m and 220 m, and piedmont between 235 m and 295 m, where most *Odontostilbe* species were caught, preferentially in lagoons rather than streams.

Table 2. Morphometrics of *Odontostilbe ecuadorensis* n. sp. (holotype ANSP 170608, 12 of ANSP 130574, 2 of MEPN 001517, 15 of KU 13524, 3 of KU 13526, 7 of FMNH 113511, 11 of FMNH 113513, 5 of FMNH 113514).

	Males					Females				Unsexed			
	Holotype	n	Low	High	Mean	n	Low	High	Mean	n	Low	High	Mean
Standard length	45.7	27	32.7	45.8	41.4	18	31.2	50.2	43.8	43	24.1	46.6	32.5
Percents of standard length													
head length	23.9	27	23.2	26.0	24.3	18	22.2	25.3	23.2	43	22.7	27.5	25.3
snout-anal fin origin	63.2	27	62.0	67.1	64.7	18	64.5	70.8	66.8	43	62.9	68.3	65.8
snout-dorsal fin origin	47.3	27	46.9	50.5	48.6	18	48.9	52.2	50.4	43	48.6	52.4	50.5
snout-pelvic fin origin	45.7	27	44.2	49.0	46.5	18	45.8	51.8	47.8	43	46.0	49.7	47.7
dorsal-fin base	14.0	27	13.2	14.5	13.9	18	13.2	14.9	14.1	43	12.6	15.6	14.3
anal-fin base	26.7	27	23.4	27.1	25.6	18	24.8	26.7	25.6	43	23.4	27.3	25.4
caudal peduncle length	14.2	27	12.3	14.8	13.6	18	11.4	13.8	12.6	43	10.9	14.0	12.8
caudal peduncle depth	11.8	27	9.6	12.5	11.0	18	10.6	12.5	11.5	43	9.7	12.1	11.0
depth at dorsal-fin origin	30.6	27	27.0	34.1	29.7	18	32.1	43.8	36.1	43	27.0	36.7	31.8
dorsal-fin length	32.8	23	27.7	34.9	30.3	15	28.1	32.1	29.7	40	27.6	31.9	29.7
pelvic-fin length	23.0	27	17.1	24.8	19.9	18	17.0	19.0	18.1	43	16.6	19.7	17.9
pectoral-fin length	21.7	27	20.1	23.5	21.7	18	20.1	23.0	21.2	43	19.1	22.5	21.1
snout-pectoral-fin origin	23.2	27	23.0	25.7	24.2	18	22.1	25.3	23.4	43	23.3	27.7	25.2
Percents of head length													
snout length	25.7	27	22.8	28.6	25.0	18	19.0	23.9	21.6	43	19.4	24.1	22.1
upper jaw length	24.8	27	23.1	28.3	26.4	18	23.0	28.0	26.0	43	23.5	29.2	27.0
horizontal eye diameter	32.1	27	33.3	38.1	35.6	18	33.9	39.1	36.9	43	35.8	40.7	37.8
least interorbital width	33.9	27	30.6	35.6	32.9	18	30.9	36.5	34.0	43	29.6	36.3	32.1

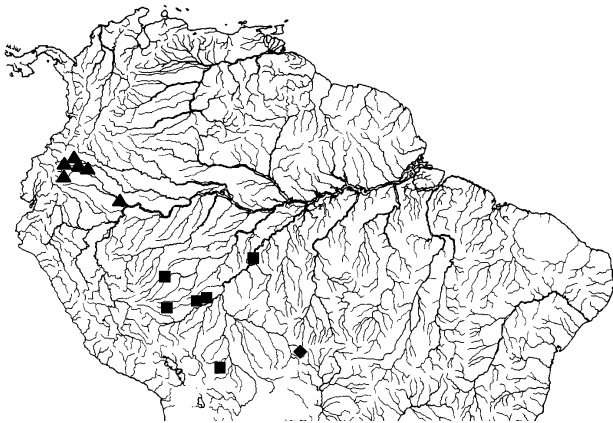
**Figs. 18.** Distribution of *Odontostilbe ecuadorensis* (triangles), *Odontostilbe nareuda* (squares), and *Odontostilbe parecis* (losangles). Symbols can represent more than one lot, and more than one locality.***Odontostilbe nareuda*, new species**

Fig. 19

Holotype. CBF 09621, 1 (male 33.1 mm), Bolivia, Pando, [rio Orthon - rio Madeira basin], lake on right bank of rio Nareuda, around 3-4 km above mouth of rio Tahuamanu, H. Ortega *et al.*, 10 Sep 1996.

Paratypes. BOLIVIA, PANDO: FMNH 106433, 4m of 17 (2 males 29.4-31.4 mm SL, 1 male 31.6 mm SL c&s, 1 female? 32.3 mm SL, 13 unsexed 19.5-27.1 mm SL not measured), same data as holotype. FMNH 106428, 1m (unsexed 30.9 mm SL), rio Madeira basin, lake on the right bank of rio Nareuda, ca. 3-4 km above mouth of rio Tahuamanu, H. Ortega *et al.*, 10 Sep 1996. FMNH 106430,

1m (unsexed 38.0 mm SL), rio Madeira basin, lake on the right bank of rio Nareuda, ca. 5 km from mouth of rio Tahuamanu, J. Sarmiento & S. Barrera, 11 Sep 1996. BRAZIL, RONDÔNIA: MCP 38417, 20 (1 male 28.8 mm SL, 19 unsexed 24.0-28.6 mm SL), [Calama], poço da Angélica, rio Madeira, M. Goulding, 12 Dec 1980, formerly MZUSP 42837. MZUSP 87759, 1m (female 35.3 mm SL), Calama, M. Goulding, 2 Feb 1981. MZUSP 87760, 5m (4 unsexed 27.0-34.5 mm SL, and 1 unsexed c&s 27.5 mm SL), same data as MCP 38417.

Non-type material. **Rio Madeira basin, BRAZIL, AMAZONAS:** MZUSP 42837, 200 (unsexed 21.5-28.3 mm SL), [Calama], poço da Angélica, rio Madeira. **Rio Mamoré basin, BOLIVIA, MOTACUSAL:** MNHN 1989-1465, 10 of 112 (7 unsexed 21.5-25.7 mm SL, 3m unsexed-26.7-28.7 mm SL), rio Isiboro, rio Mamoré basin. **Rio Purus basin, BRAZIL, ACRE:** MZUSP 87752, 2 (unsexed 26.3-26.8 mm SL), rio Acre, between Seringal Paraíso and lago Amapá. MZUSP 87753, 1 (unsexed 33.1 mm SL), Manoel Urbano, rio Purus. **Rio Orthon - lower Rio Beni basin, BOLIVIA, PANDO:** FMNH 106429, 1 (unsexed 20.0 mm SL), lake on the right bank of rio Nareuda, around 3-4 km above mouth of rio Tahuamanu. FMNH 106432, 3 (unsexed 21.9-30.9 m SL), approx. 2-3 km above mouth of rio Muyumanu. FMNH 106434, 2 (unsexed 29.2-29.2 mm SL), right bank of stream Filadelfia, approx. 10 km from mouth of rio Nareuda. FMNH 106435, 2 (unsexed 21.0-21.5 mm SL), hidden lake on right bank of rio Tahuamanu, approx. 500 m from mouth of rio Nareuda. FMNH 106436, 1 (unsexed 23.2 mm SL), rio Tahuamanu at rocks and island archipelago and rapids, 68 km below mouth of rio Nareuda. FMNH 106462, 1m (unsexed 28.3 mm SL), rio Nareuda at camp, altitude 250 m.

Diagnosis. *Odontostilbe nareuda* basically differs from all other species by larger anal-fin base length, 30.6-32.8% SL (e.g. vs. 23.5-29.4% SL in *O. fugitiva*, Fig. 20, or 23.1-28.5% SL in *O. dierythra*), and higher anal-fin counts, 24-26 (vs. 16-24



Fig. 19. Holotype of *Odontostilbe nareuda*, CBF 09621, male 33.1 mm (top), and paratype FMNH 106433, possibly a female 32.3 mm SL, not showing dimorphic characters of males (bottom).

for all other species). Additionally, gill raker counts on upper branch 5-6 and lower branch 11-12 of *O. nareuda* differ from sympatric species *O. fugitiva* with mostly 6-7 on upper and 12-13 on lower (Figs. 13a-b).

Description. Morphometric data given in Table 3. Largest male 33.1 mm SL; female 32.3 mm SL. Body elongate and compressed. Greatest body depth at dorsal-fin origin. Snout usually pointed; not protuded in males. Dorsal profile ascends slightly convex from snout to dorsal-fin origin, and descends straight from that point to caudal peduncle. Ventral profile convex from lower jaw to anal-fin origin, and straight along anal-fin base. Caudal peduncle slightly longer than deep.

Head relatively small. Posterior margin of opercle sinusoidal with upper portion concave and lower portion convex. Mouth terminal. Maxilla short, oblique; posterior tip reaching near or to vertical at anterior eye border, and ending at level of inferior eye border. Cleared and stained specimens (2). Pre-maxillary teeth 5, bearing 7-9 cusps; midcentral cusp longer than lateral cusps; smaller lateral cusps of each tooth overlap cusps of adjacent teeth, except anteriormost teeth (Fig. 21).

Premaxillary teeth juxtaposed externally to dentary teeth, leaving premaxillary tooth cusps exposed when mouth closed.

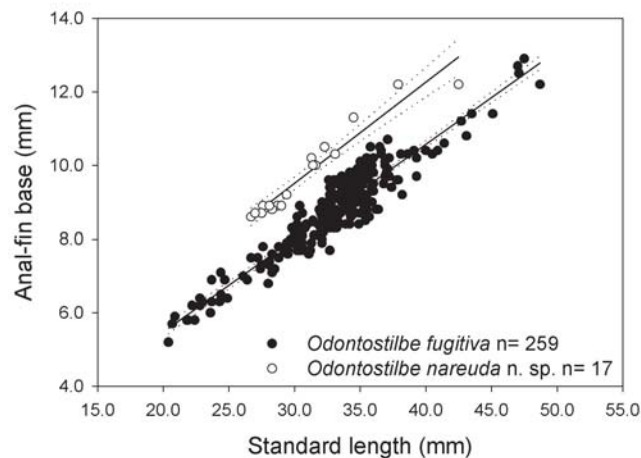


Fig. 20. Anal-fin base as a function of standard length for males, females and unsexed specimens of *Odontostilbe fugitiva* against *Odontostilbe nareuda*.

Maxilla with 2 teeth bearing 2-8 cusps, usually decreasing cusp number to posterior tip of maxilla. Dentary teeth 8-11 bearing 1-7 cusps, gradually decreasing in size posteriorly; anterior 6 teeth large with 5-7 cusps, and remainder small with 1-4 cusps. Smaller cusps of dentary teeth overlapping adjacent tooth cusps, usually not in posteriormost teeth. All dentary tooth cusps slightly recurved towards interior of mouth.

Dorsal-fin rays ii(17) or 9(17). Dorsal-fin origin slightly posterior to midlength of body, and slightly posterior to vertical through pelvic-fin origin. Anal-fin rays v(16), vi(1), 23(3), 24(9), 25(4), or 26(1). Anal-fin distal border concave, about 7

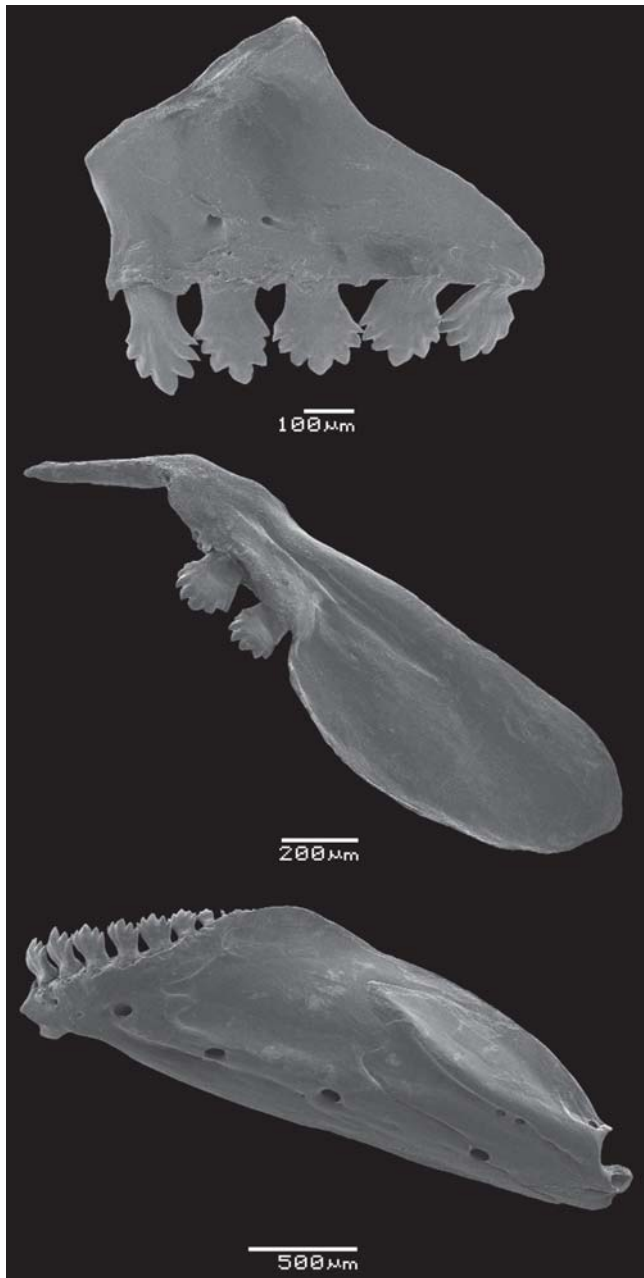


Fig 21. Dentition of *Odontostilbe nareuda*, FMNH 106433, male 31.6 mm SL. SEM photograph of left side premaxilla (top), maxilla (middle), and dentary (bottom).

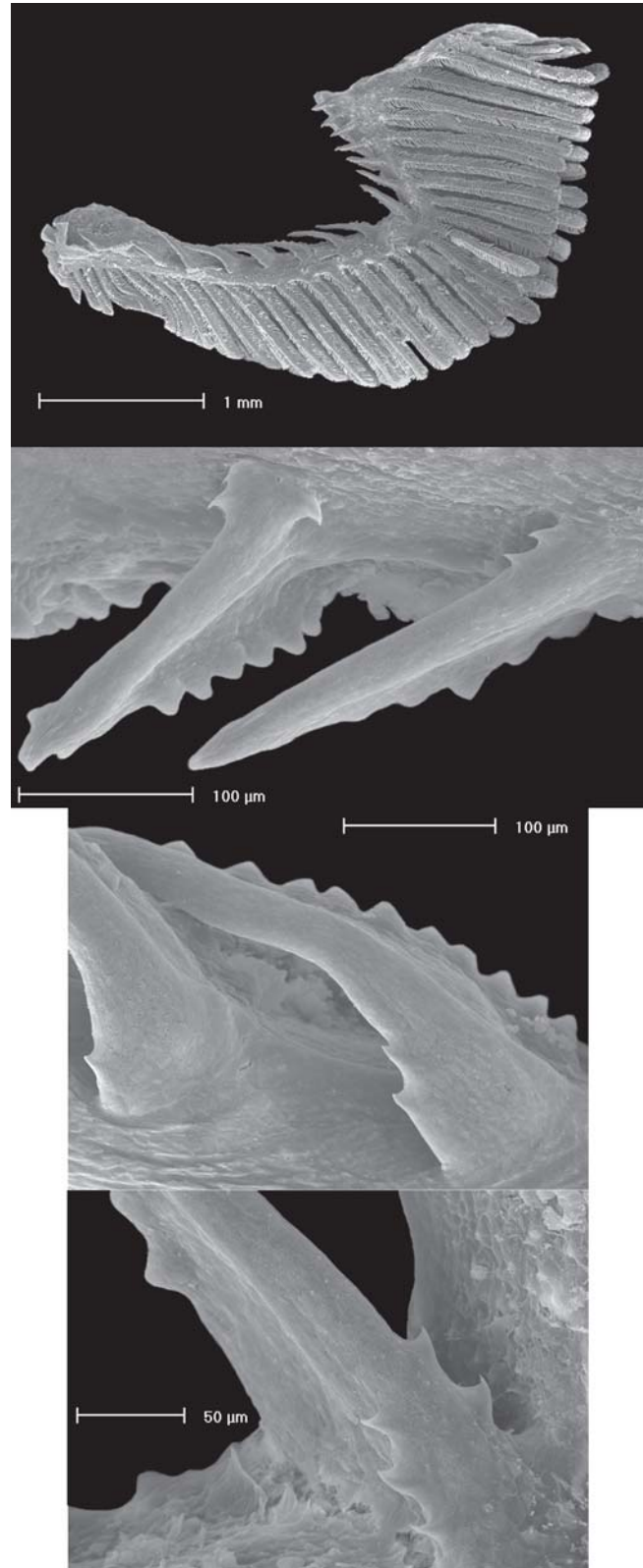


Fig. 22. First gill arch of *Odontostilbe nareuda*, FMNH 106433, unsexed 29.2 mm SL. SEM photographs of the left side gill arch (top), in detail gill rakers on upper branchial branch (middle), and gill rakers on lower branchial branch (bottom). Lateral view.

Table 3. Morphometrics of *Odontostilbe nareuda* n. sp. (holotype CBF 09621, paratypes 5 of FMNH 106433, 1 of MZUSP 87759, 5 of MZUSP 87760, non-paratypes 3 of MNHN 1989–1465, 1 of FMNH 106428, 1 of FMNH 106430, and 1 FMNH 116462).

	Males					Unsexed			
	Holotype	n	Low	High	Mean	n	Low	High	Mean
Standard length	33.1	3	29.4	31.6	30.8	13	26.7	37.9	30.3
Percents of standard length									
head length	25.1	3	25.0	25.9	25.3	13	24.1	26.1	25.4
snout-anal fin origin	59.5	3	58.9	60.8	60.0	13	59.9	62.0	60.7
snout-dorsal fin origin	49.5	3	50.0	51.0	50.5	13	49.1	52.2	50.6
snout-pelvic fin origin	43.5	3	43.9	44.9	44.3	13	42.8	45.9	44.2
dorsal-fin base	13.6	3	13.6	15.0	14.2	13	13.5	15.6	14.2
anal-fin base	31.1	3	31.3	31.8	31.6	13	30.6	32.8	31.8
caudal peduncle length	13.0	3	12.4	13.0	12.7	13	11.3	13.1	12.3
caudal peduncle depth	11.2	3	10.2	10.9	10.6	13	9.4	11.5	10.5
depth at dorsal-fin origin	30.5	3	30.4	31.3	31.0	13	30.3	34.8	31.9
dorsal-fin length	30.8	2	30.9	33.0	31.9	7	30.4	32.4	31.4
pelvic-fin length	18.1	3	17.8	18.4	18.1	13	16.5	18.0	17.2
pectoral-fin length	22.1	3	21.3	22.4	22.0	13	18.7	21.1	20.4
snout-pectoral-fin origin	25.1	3	25.3	25.9	25.5	13	24.1	26.1	25.7
Percents of head length									
snout length	22.9	3	22.8	23.7	23.1	13	19.8	21.6	20.6
upper jaw length	27.7	3	27.8	29.1	28.6	13	25.7	29.6	27.1
horizontal eye diameter	38.6	3	40.5	42.1	41.0	13	37.6	41.4	39.7
least interorbital width	31.3	3	31.6	31.6	31.6	13	29.6	33.3	31.1

anterior branched rays longer than posterior rays. Pectoral-fin rays **i**(17), 9(1), 10(9), or **11**(7). Unbranched pectoral-fin ray reaching or not reaching pelvic-fin origin, extending beyond pelvic-fin origin in mature males. Pelvic-fin rays **i**(20), 6(1), or 7(19). No evident elongation of unbranched dorsal or pelvic-fin rays in males. Lateral skin border of unbranched pectoral-fin rays and unbranched pelvic-fin rays thickened in mature males, bearing thin laterodorsal projection of hard tissue covered with soft tissue. Principal caudal-fin rays **19**(20). Procurent caudal-fin rays: dorsal **11**(7), 12(8), or 13(2); ventral 9(7) or **10**(10). Sometimes anterior ventral procurent caudal-fin rays modified, distally bifurcated. Caudal-fin ray flaps ventrally on 4th-7th rays of upper lobe, and dorsally on 14th-15th rays of lower lobe. Adipose-fin at vertical through last anal-fin ray insertion.

Holotype and paratype males of FMNH 106433 are unique, all having not totally developed hooks. Males with acute, retrorse hooks on posterior margin of pelvic and anal-fin rays. One or two paired or unpaired hooks per segment of lepidotrichia on last unbranched anal-fin ray, and 1st to 9th anal-fin branched rays, positioned at middistal length of rays. One or two unpaired hooks per segment of lepidotrichia along almost entire length of 1st to 7th branched pelvic-fin rays, and reaching tip of fin rays (except on 1st branched pelvic-fin ray, on midlength portion).

Scales cycloid; lateral line complete 35(1) or **36**(6); predorsal row 10(6) or **11**(10); scale rows between lateral line and dorsal-fin origin **5**(7) or 6(6); scale rows between lateral line and anal-fin origin **4**(15), scale near pelvic-fin origin usually smaller than others); scale rows around caudal peduncle **14**(7). Triangular modified scale on pelvic-fin base extends posteriorly covering 1-3 scales. Scales on anal-fin base 6-7.

Cleared and stained specimens (2): supraneurals 4(1) or

5(1); precaudal vertebrae, 16(2); caudal vertebrae 19(2). Gill rakers (counted in 15 alcohol specimens, and 2 c&s), upper 5(3) or **6**(13); lower 10(3), 11(7), or **12**(6) (1-2 on hypobranchial). Upper gill rakers with 1-3 recurved denticles on anterolateral border, and none or 1 similar denticle on posterolateral border; lower gill rakers with none to 3 recurved denticles on anterolateral border (1-4 anteriormost lower gill rakers with none or 1 denticle on posterolateral border); posteriormost lower gill raker with 3 denticles on anterolateral border, and 1-2 similar denticles on posterolateral border (Fig. 22). All denticulation mainly on basal portion of gill rakers.

Color in alcohol. General ground body color brownish or pale yellow. Dorsal portion of body dark from head to caudal peduncle; dark chromatophores mostly on scale borders, forming reticulated pattern. Pigmented scales not extending laterally on body, no distinct dark chromatophores on pseudotympanum area. Dorsal fin entirely with dark chromatophores scattered along all fin rays, more densely along 1st and 2nd unbranched dorsal-fin rays. Pectoral and pelvic fins with scattered dark chromatophores, more numerous on anteriormost portions of fins. Holotype with pelvic fins hyaline. Anal fin mostly pigmented, dark chromatophores spread on all fin rays, except at tips of last unbranched fin ray and 1st branched fin ray. Adipose fin hyaline. Caudal fin almost entirely covered with diffuse dark chromatophores along fin rays, clear areas on base of caudal-fin lobes just behind caudal-fin spot. Rounded black to brown spot on base of caudal fin, reaching upper and lower border of peduncle, usually lighter near ventral border, sometimes extending little on proximal portion of 7th to 12th central caudal-fin rays.

Numerous chromatophores on snout, as well as upper and lower lips (on lower lip these almost form line). Numerous

dark chromatophores on anteriormost portion of maxilla, and 1st infraorbital. Pigmentation on top of head on frontals and parietals, and deep-lying dark chromatophores cover brain membranes below frontals, parietals, and fontanel. Body with faint dark midlateral stripe, sometimes reduced to line along longitudinal body axis, beginning below dorsal fin, above lateral line, and extending to caudal spot. Belly pale, almost without chromatophores below lateral line, except above anal-fin base with 7 to 12 chevron shaped markings. Guanine on eye iris, interopercle, opercle, subopercle, isthmus, 2nd to 4th infraorbitals, lateral portion of parietals just behind eye, and belly. Guanine more evident in MCP 38417, and MZUSP 87760 specimens. Holotype with some guanine.

Odontostilbe nareuda seems to have fewer dark chromatophores than similar species such as *O. fugitiva*, *O. dierythrura*, and *O. parecis*, and another new species from rio Madre de Dios (in manuscript), all of these occur in the rio Madeira basin. Except for *O. parecis* from rio Guaporé basin, the other three species were found to be sympatric with *O. nareuda*.

Sexual dimorphism. Only three males available, holotype and two paratypes, but these are not fully mature, without completely developed hooks. These males have longer pectoral-fin rays in contrast with specimens with undetermined sex, statistically significant in test for coincidental regressions ($F_{(2,276)} = 28.5, p < 0.00$) (Fig. 23). The snout profile of holotype is slightly protruded in comparison with the unsexed paratype FMNH 106433 (Fig. 19). Gill gland not found in males of *O. nareuda*. Absence of this gill gland probably explained by lack of mature males among examined specimens.

Distribution. *Odontostilbe nareuda* is known from the lower rio Beni basin, in the ríos Nareuda and Muyumanu, of the ríos Tahuamanu-Orthon drainage that runs parallel to the rio Madre de Dios, and the middle rio Madeira (Fig. 18). However, it may be widespread in the rio Madeira basin. Some specimens from the upper rio Mamoré basin were tentatively identified as *O. nareuda*. Also, three specimens from the rio Purus match the

larger anal-fin base diagnostic of *O. nareuda*. A somewhat similar distribution was observed for *Creagrutus occidaneus* that occurs in rio Madre de Dios and upper rio Purus (Vari & Harold, 2001). Further samples of these regions including mature males and females are needed to assure these distributions.

Etymology. In allusion to the type-locality, in the rio Nareuda.

Ecological notes. FMNH field notes for *O. nareuda* indicate that it occurs in oxbow lakes, river or small river habitats in forest, having whitewater or turbid-white water. The bottom was sandy or muddy substrate with sticks, logs, and leaves. Nevertheless the rio Nareuda is mostly a blackwater river as noted by Machado-Allison *et al.* (1999a), all the locality notes of FMNH lots refer to whitewater, except FMNH 106430 which mentions clearwater of brown color. The lower rio Nareuda seems to be influenced by whitewaters of the rio Tahuamanu - rio Orthon basin. The FMNH specimens all came from the AquaRAP expedition in the upper rio Orthon basin, Bolivia. These specimens were originally identified as *Cheirodon fugitiva*, *Odontostilbe fugitiva* or *Odontostilbe* sp. (Chernoff *et al.*, 1999; Sarmiento *et al.*, 1999). Specimens identified for the AquaRAP expedition as *O. paraguayensis*, and listed as that species by Willink *et al.* (1999) as “believed to be” a new record for the Bolivian Amazon, actually are *O. nareuda* or an undescribed species of cheirodontine. Both species were collected together, being probably syntopic. Machado-Allison *et al.* (1999b) detailed the abundance of species regarding the field station that corresponds to FMNH lots of the holotype and some paratypes (FMNH 106433) and cited “*O. paraguayensis*” as the most abundant species, and “*Cheirodon fugitiva*” the fifth ranked, being “typically from cochas or flooded lakes”.

Odontostilbe parecis, new species

Fig. 24

Holotype. INPA 24885, 1 (male 33.0 mm SL), Brazil, Mato Grosso, BR 174, Corredeira Papagaio, [near BR 364, rio Galera, upper rio Guaporé basin], Equipe Rose, V. Py-Daniel *et al.*, 3 Oct 1984.

Paratypes. BRAZIL, MATO GROSSO: INPA 21424, 4m of 8 (1 male 35.0 mm SL, 3 unsexed 29.8-36.2 mm SL), same data as holotype. INPA 21425, 1m of 23 (male 30.6 mm SL), rio Novo, BR 174, [near BR 364, rio Novo, rio Galera, upper rio Guaporé basin], Equipe Rose, V. Py-Daniel *et al.*, 2 Oct 1984. MCP 37318, 129 (unsexed 16.7-38.0 mm SL), Nova Lacerda, rio Galera, affluent of rio Guaporé in Balneário Galera, V. Bertaco *et al.*, 14°28'59"S 59°35'07"W, 12 Jul 2004. MCP 37319, 14m of 82 (5 males 30.3-39.0 mm SL, 1 male 32.8 mm SL c&s, 4 females 33.6-41.6 mm SL, 1 female 36.8 mm SL c&s, 3 unsexed 31.3-34.4 mm SL), Pontes e Lacerda, affluent of rio Galera about 71 km north of rio Guaporé, 14°39'12"S 59°26'46"W, R. Reis *et al.*, 12 Jul 2004.

Non-type material. Rio Madeira - Rio Guaporé basin, BRASIL, MATO GROSSO: MCP 38493, 45 (2 males 31.8-32.3 mm SL, 43 unsexed 15.6-38.7 mm SL), Comodoro, stream affluent of rio Novo on the road BR 174, 14°13'25"S 59°41'27"W.

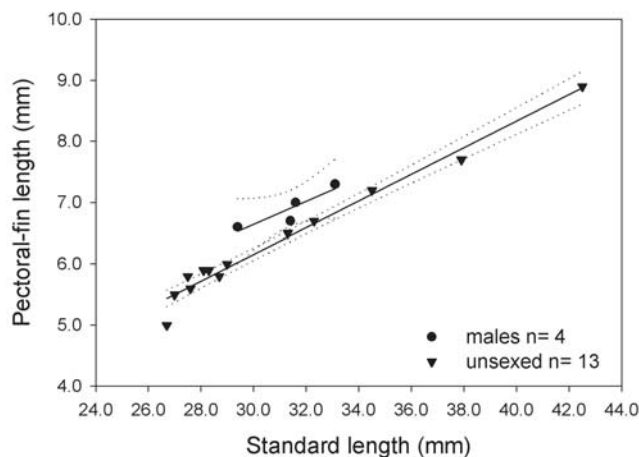


Fig. 23. Pectoral-fin length as a function of standard length for males versus unsexed specimens of *Odontostilbe nareuda*.



Fig. 24. Holotype of *Odontostilbe parecis*, INPA 24885, male 33.0 mm SL (top), and paratypes MCP 37319, male 33.0 mm SL (middle), female 41.6 mm SL (bottom).

Diagnosis. Differs from Amazonian species of *Odontostilbe* by: (1) number of lower gill rakers 9-10 (vs. 11-14 in *Odontostilbe fugitiva* and *O. dierythrura*, 10-11 in *O. ecuadorensis*, and 10-12 in *O. nareuda*) (Fig. 13a-b); (2) number of branched anal-fin rays (20-21, vs. 23-26 in *O. nareuda*); (3) terminal mouth (vs. conspicuous subterminal mouth in *O. euspilura*); (4) longer upper jaw length 28.8-32.9% HL (vs. 23.4-30.0% HL in *O. fugitiva*, Fig. 25, or vs. 23.0-29.2% HL in *O. ecuadorensis*); and (5) larger eye in males 38.9-40.8% HL

diameter (vs. 28.9-38.6% HL in *O. fugitiva*, Fig. 26, or vs. 33.3-38.1% HL in *O. ecuadorensis*). The combination of the characters listed above distinguishes *O. parecis* from all other *Odontostilbe* species.

Description. Morphometric data given in Table 4. Largest male reaching 35.0 mm SL, and female 41.6 mm SL. Body elongate and compressed. Males with more elongate and compressed bodies than females. Greatest body depth at dorsal-

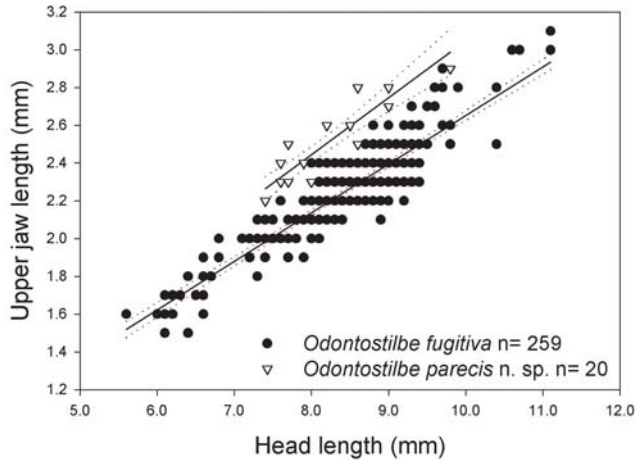


Fig. 25. Upper jaw length as a function of head length for males, females, and unsexed specimens of *Odontostilbe fugitiva* and *Odontostilbe parecis*.

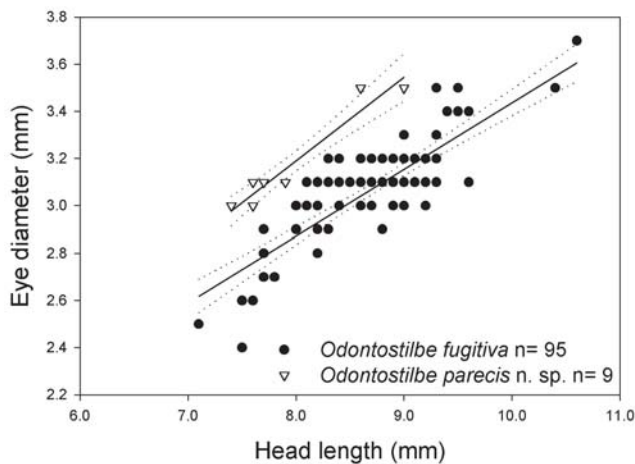


Fig. 26. Eye diameter as a function of head length for males of *Odontostilbe fugitiva* and *Odontostilbe parecis*.

fin origin. Snout blunt, larger in males. Head profile pointed, gently convex from snout to posterior tip of supraoccipital bone. Dorsal profile ascends almost straight from that point to dorsal-fin origin, sometimes with slight depression at posterior tip of supraoccipital; from dorsal-fin origin descends almost straight to caudal peduncle. Ventral profile convex from lower jaw to anal-fin origin, and straight along anal-fin base. Caudal peduncle slightly longer than deep.

Head relatively small. Posterior margin of opercle sinusoidal with upper portion concave and lower portion convex. Mouth terminal. Maxilla short, terminating posteriorly at vertical near anterior eye border, and ending at level equal to inferior eye border, positioned at 45 degrees angle relative to longitudinal body axis. Cleared and stained specimens (2). Premaxillary teeth 5, bearing 8-10 cusps; midcentral cusp longer than lateral cusps; smaller lateral cusps of each tooth overlap cusps of adjacent teeth (Fig. 27). Premaxillary teeth juxtaposed externally to dentary teeth, leaving premaxillary tooth cusps exposed when mouth closed. Maxilla with 2-3 teeth bearing 7-9 cusps, usually decreasing cusp number to

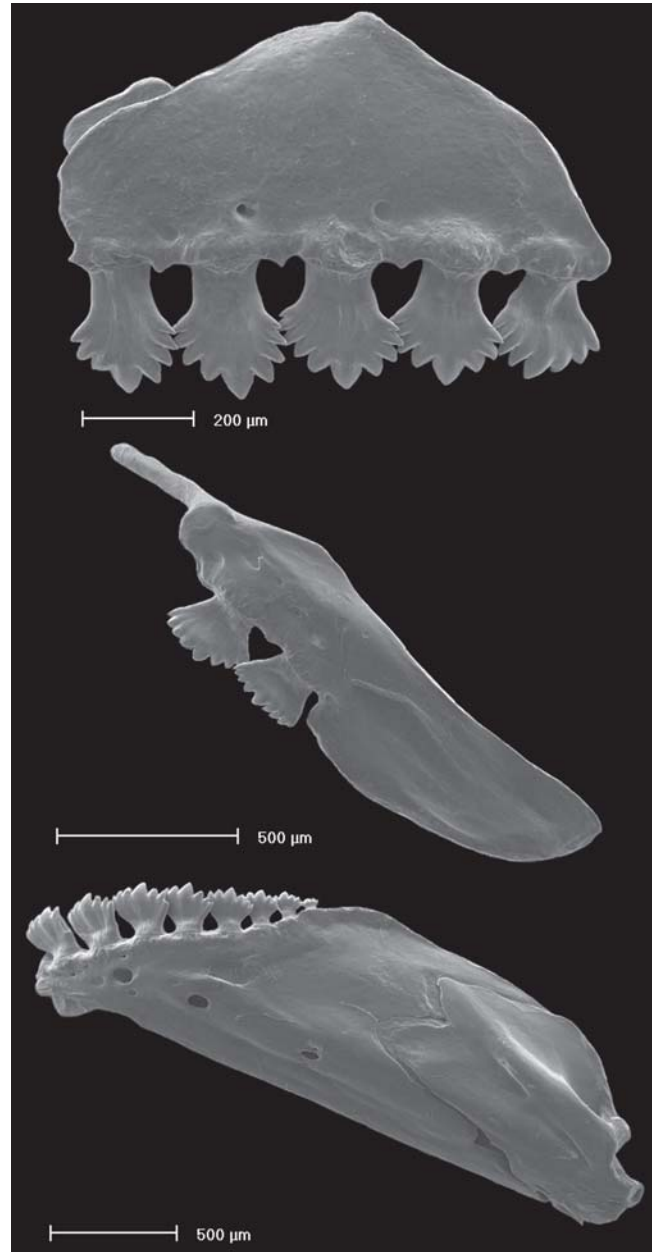


Fig. 27. Dentition of *Odontostilbe parecis*, MCP 37319, male 32.8 mm SL. SEM photograph of left side premaxilla (top), maxilla (middle), and dentary (bottom).

posterior tip of maxilla. Dentary teeth 8-9 bearing 2-7 cusps, gradually decreasing in size posteriorly, first 6-7 teeth large with 6-7 cusps, following 2 small teeth with 2-5 cusps. Smaller cusps of all dentary teeth overlapping adjacent teeth cusps, usually not in posteriormost teeth. All dentary tooth cusps slightly recurved towards interior of mouth.

Dorsal-fin rays **ii**(20) or **9**(20). Dorsal-fin origin slightly posterior to midlength of body, and slightly posterior to vertical through pelvic-fin origin. Anal-fin rays **v**(20), **19**(5), **20**(8), or **21**(7). Anal-fin distal border concave, anterior 6-7 branched rays longest. Pectoral-fin rays: **i**(20), **9**(1), **10**(7), **11**(10), or **12**(2). Unbranched pectoral-fin ray short of reaching or reach-

ing pelvic-fin origin, slightly extending beyond pelvic-fin origin in males. Pelvic-fin rays **i**(20), 6(1), or 7(19). Unbranched dorsal or pelvic-fin rays not elongate in males. Lateral skin border of unbranched pectoral-fin rays and unbranched pelvic-fin rays thickened in mature males, bearing thin laterodorsal projection of hard tissue covered with soft tissue. Principal caudal-fin rays **19**(20). Procurrent caudal-fin rays: dorsal 10(2), **11**(9), or 12(9); ventral 8(3), **9**(15), or 10(2). Anterior ventral procurrent caudal-fin rays distally bifurcated or not. Caudal-fin ray flaps ventrally on 2nd-8th (mostly 4th-7th)

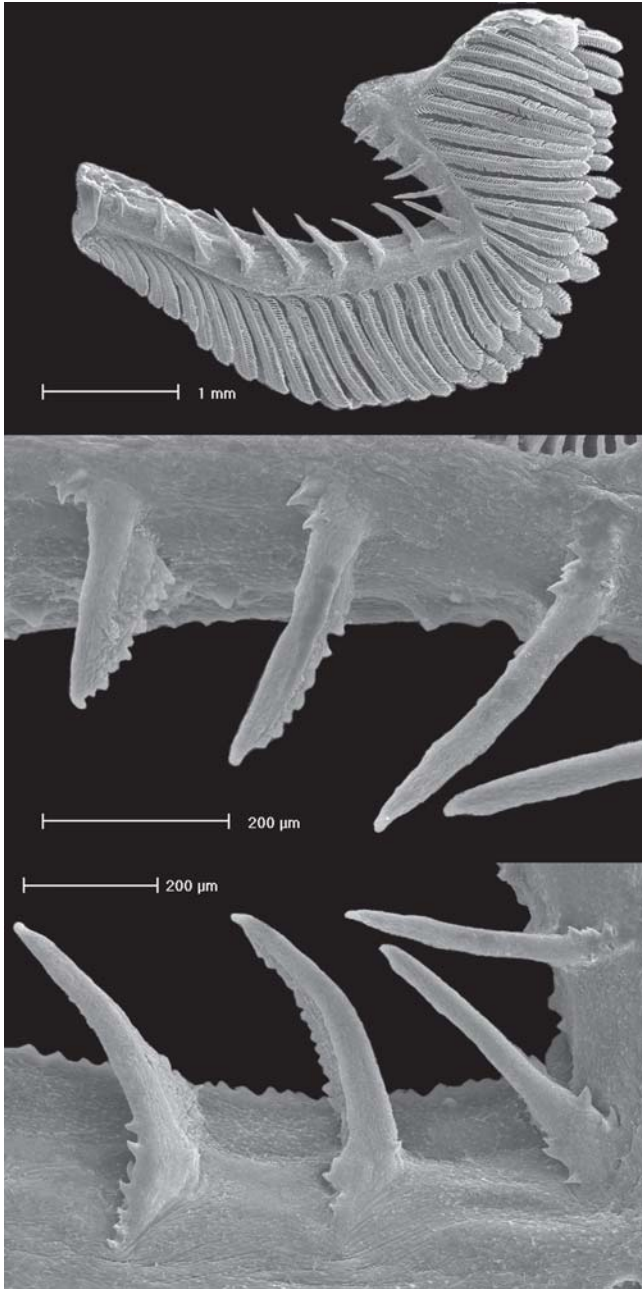


Fig. 28. First gill arch of *Odontostilbe parecis*, INPA 21425, male 30.6 mm SL. SEM photographs of the left side gill arch (top), in detail gill rakers on upper branchial branch (middle), and gill raker on lower branchial branch (bottom). Lateral view.

rays of upper lobe, and dorsally on 12th-16th (mostly 13th-15th) rays of lower lobe. Adipose fin at vertical through last anal-fin ray insertion.

Males with acute, retrorse hooks on posterior margin of pelvic and anal-fin rays. One or two paired and unpaired hooks per segment of lepidotrichia, on last unbranched anal-fin ray, and 1st to 8th branched anal-fin rays, positioned at middistal length of rays and usually not extending to ray tip; tiny hooks can be present up to 16th anal-fin branched ray, occurring distally on branches (up to 17th anal-fin branched ray in holotype). One or two unpaired hooks per segment of lepidotrichia on 1st to 7th branched pelvic-fin rays, extending almost entirely to distal ray tip (along midlength of 1st branched pelvic-fin ray). Few mature males available for description of hooks. Type material from INPA contains males with more developed hooks. Holotype with hooks on 2nd to 5th branched pelvic-fin rays. Because available males are not fully mature, this species could have typical elongation of unbranched dorsal and pelvic-fin rays present in of *Odontostilbe* species.

Scales cycloid; lateral line complete 35(7) or 37(1); predorsal row 9(2), **10**(12), or 11(3); scale rows between lateral line and dorsal-fin origin 5(10) or 6(8); scale rows between lateral line and anal-fin origin 4(18); scale rows around caudal peduncle 14(10). Triangular modified scale on pelvic fin base extends posteriorly covering 1-2 scales (mostly 2). Scales on anal-fin base 5-7 (partially missing in holotype).

Cleared and stained specimens (2): supraneurals 4(2); precaudal vertebrae, 15(1) or 16(1); caudal vertebrae 19(2). Gill rakers (18 in alcohol, 2 c&s), upper **5**(17) or 6(3), lower 9(12) or **10**(8) (2 on hypobranchial). Upper gill rakers with none or 1-3 recurved denticles along anterolateral border, and none to 2 similar denticles on posterolateral border; lower gill rakers with none to 5 recurved denticles on anterolateral border (1-4 anteriormost lower gill rakers with none to 2 denticles on posterolateral border); excepting posteriormost lower gill raker with 4 recurved denticles irregularly placed on lateral surface (Fig. 28). All denticulation mostly on basal portion of gill rakers.

Color in alcohol. General ground body color brownish or pale yellow. Dorsum dark from head to caudal peduncle, chromatophores mostly on scale borders forming reticulated pattern. Pigmented scales extend laterally on body below longitudinal stripe, also on pseudotympanum area. Dorsal fin with scattered chromatophores along all fin rays, more densely pigmented along 1st and 2nd unbranched dorsal-fin rays. Pectoral and pelvic fins with scattered dark chromatophores, more numerous on anteriormost portions of fins. Holotype with pelvic fin hyaline. Anal fin mostly pigmented with chromatophores spread on all fin rays, except at distal tips of last unbranched fin ray and 1st branched fin ray. Adipose fin hyaline. Caudal fin almost entirely covered with diffuse chromatophores along fin rays, clear areas on base of caudal-fin lobes just posterior to caudal-fin spot. Rounded black to brown spot on base of caudal fin, usually light near lower border, sometimes extending little onto proximal portion of 7th to 12th central caudal-fin rays.

Numerous chromatophores on snout, upper and lower lips, anteriormost portion of maxilla and lower jaw, and 1st-2nd infraorbitals. Pigmentation on dorsal surface of head on frontals and parietals, and deep-lying dark chromatophores over brain membranes below frontals and parietals, and fontanel. Body with faint dark midlateral stripe, sometimes reduced to line, along midlongitudinal body axis, beginning posterior to or on pseudotympanum, above lateral line, reaching caudal spot. Below lateral line, ventral body faint almost without chromatophores. Pigmented area above anal-fin base forming 10 to 11 chevron-shaped markings. Guanine surrounds eye iris, interopercle, opercle, ishtmus, and most 3rd infraorbital. Holotype with some remaining guanine, but fresher specimens of MCP without any guanine.

Sexual dimorphism. Males with anal- and pelvic-fin hooks on rays as previously described, such hooks absent in females. Gill gland (Burns & Weitzman, 1996) present in three mature males of *Odontostilbe parecis*, holotype, and two paratypes (Fig. 28). Holotype of *O. parecis* with gill gland present on first gill arch, covering about 9 anterior branchial filaments. Paratype INPA 21425, a male 30.6 mm SL with a gland including about 7 anterior branchial filaments and paratype MCP 37319, 39.0 mm SL with gland including about 6 anterior branchial filaments. Principal component analysis of morphometric data of males and females plus unsexed specimens shows sexual dimorphism in general body shape (Fig. 29). Principal component 2 (PC2) grouped males and females separately. This affected strongly and negatively by caudal peduncle length, pectoral-fin length, pelvic-fin length, and snout length; and positively by depth at dorsal-fin origin. Principal component 3 (PC3) affected strongly and positively by snout length and caudal peduncle length, negatively by anal-fin base and pectoral-fin length. Males differed

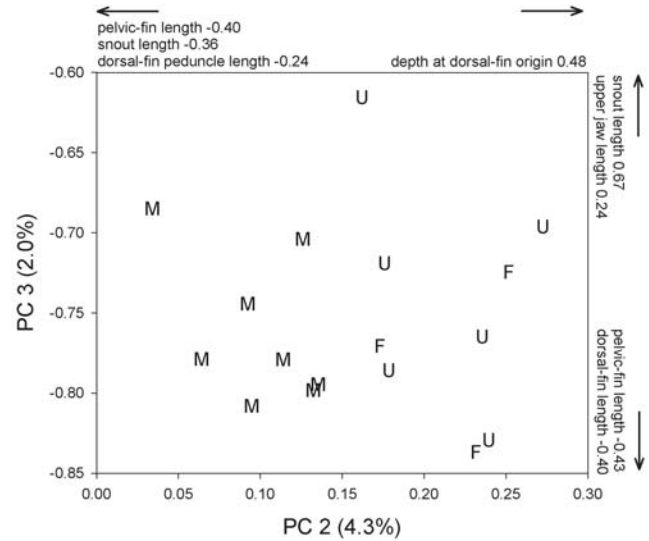


Fig. 29. Principal component analysis of the 18 morphometric data of males (M), females (F), and unsexed specimens (U) of *Odontostilbe parecis*. Stronger loadings on the second and third principal components (PC2, PC3).

from females in all of these characters. Usually males with higher mean values for peduncle length, pectoral-fin length, pelvic-fin length, and snout length, while females and unsexed specimens have higher depth at dorsal-fin origin than males (Table 3). Unsexed specimens were not assumed to be females, because they probably also include immature males. All examined males are probably not fully mature as mentioned in description. Additional material may reinforce sexual morphometric characters described here.

Table 4. Morphometrics of *Odontostilbe parecis* n. sp. (holotype INPA 24885, paratypes INPA 21424, and MCP 37319).

	Males				Females				Unsexed				
	Holotype	n	Low	High	Mean	n	Low	High	Mean	n	Low	High	Mean
Standard length	33.0	8	30.3	39.0	32.8	3	36.8	41.6	38.9	8	29.8	36.2	33.3
Percents of standard length													
head length	23.9	8	23.1	24.9	24.2	3	23.4	23.6	23.5	8	23.3	24.8	24.0
snout-anal fin origin	64.5	8	60.4	66.3	63.0	3	63.0	64.3	63.7	8	63.1	66.1	64.7
snout-dorsal fin origin	47.9	8	46.4	48.9	47.7	3	46.9	49.0	47.9	8	47.8	50.7	49.3
snout-pelvic fin origin	45.8	8	43.3	48.0	45.0	3	44.2	45.3	44.6	8	45.1	47.7	46.0
dorsal-fin base	15.2	8	13.7	15.2	14.6	3	14.7	16.1	15.2	8	14.1	15.1	14.7
anal-fin base	28.2	8	25.9	29.0	27.2	3	27.7	28.6	28.1	8	25.5	28.6	26.8
caudal peduncle length	13.0	8	12.8	14.9	13.8	3	12.5	13.9	13.3	8	12.5	14.1	13.0
caudal peduncle depth	10.9	8	10.1	11.2	10.5	3	10.9	11.5	11.2	8	9.9	11.3	10.7
depth at dorsal-fin origin	31.2	8	29.5	33.3	31.3	3	31.5	35.7	33.8	8	29.9	37.1	33.1
dorsal-fin length	32.7	8	31.0	33.1	31.8	3	30.5	31.3	31.0	8	29.8	33.6	31.2
pelvic-fin length	19.4	8	18.0	20.6	19.4	3	17.7	18.3	18.1	8	18.0	19.8	18.5
pectoral-fin length	23.0	8	20.3	23.8	22.3	3	20.3	21.5	20.7	8	20.1	21.5	21.0
snout-pectoral-fin origin	24.2	8	23.5	25.5	24.5	3	23.7	23.9	23.8	8	23.5	25.5	24.5
Percents of head length													
snout length	26.6	8	22.1	26.0	24.4	3	21.4	23.3	22.7	8	22.5	25.9	23.9
upper jaw length	30.4	8	29.1	32.9	30.3	3	29.6	32.6	31.1	8	28.8	32.5	30.8
horizontal eye diameter	39.2	8	38.9	40.8	40.0	3	39.8	41.1	40.5	8	40.0	42.5	41.2
least interorbital width	35.4	8	31.6	34.4	33.4	3	31.4	34.4	33.2	8	31.7	35.3	33.7

Distribution. Upper rio Guaporé drainage, rio Galera and rio Novo.

Etymology. The epithet *parecis* refers to the Chapada dos Parecis, a plateau situated on the east of Guaporé tributaries where the species was discovered.

Ecological notes. The Guaporé-Iténez is a clearwater right-bank tributary of the major rio Madeira (Goulding *et al.*, 2003). Field notes record of MCP material: translucent water of quiet to medium flow, sandy bottom with pebbles, and a depth of 1–1.2 m. This was species collected along with *Serrapinnus* sp.

Discussion

Previous phylogenetic diagnosis for the genus *Odontostilbe* among cheirodontines was based on two synapomorphies described in Malabarba (1998), and related to the elongation of the second unbranched dorsal-fin ray and the unbranched pelvic-fin ray of males. These characters were found homoplastic in “*Odontostilbe*” *mitoptera* of the Compsurini. Recognition of *Odontostilbe* separately from genera assigned to the tribes Cheirodontini and Compsurini was also supported by the lack in *Odontostilbe* species of the several synapomorphies diagnosing those tribes and their included genera. These synapomorphies consist of primary and secondary sexual characters. The genera *Pseudocheirodon*, *Prodontocharax*, *Aphyocheirodon*, and *Cheirodontops* also lack specialized sexually dimorphic features present in the Compsurini and Cheirodontini and were diagnosed based on jaws and teeth modifications, absent in *Odontostilbe*.

The diagnosis of *Odontostilbe* in the present contribution follows that of Malabarba (1998), based on the analysis of two *Odontostilbe* species only, *O. fugitiva* and *O. pequirá*, respectively the type species of the genera *Odontostilbe* and *Holoshesthes*. *Holoshesthes* was placed in the synonym of *Odontostilbe*. We found morphological diversity in *Odontostilbe* much larger than previously known. We recognize in *Odontostilbe* six species of the ten species referred to the genus by Malabarba (2003): *O. fugitiva*, *O. dierythrura* Fowler, 1940, *O. microcephala* Eigenmann, 1907, *O. paraguayensis* Eigenmann & Kennedy, 1903, *O. pequirá* (Steindachner, 1882), and *O. roloffii* Géry, 1972 (actually a synonym of *O. euspilura*, see below). This excludes the two species of Central American compsurins provisionally kept in *Odontostilbe*: “*O.*” *dialeptura* and “*O.*” *mitoptera*. Also, the generic assignment of the two nominal species described by Géry (1960) as *Cheirodon* (*C. gracilis* and *C. gracilis littoris*) and latter transferred to *Odontostilbe* by Planquette *et al.* (1996), deserve a separate revision and are not included in *Odontostilbe*.

In a comprehensive taxonomic revision of *Odontostilbe* in progress by the first author, 10 additional species of cheirodontines were found related to this genus, in addition to the six species listed above and the three new species

described herein. Among these 10 species, 8 are undescribed, one is *Odontostilbe pulchra* (Gill, 1858) [left as *species inquirenda* among Cheirodontinae by Malabarba (2003)], and the last one is *Cheirodontops geayi* Schultz, 1944, type species of *Cheirodontops*. *Cheirodontops geayi* was not previously hypothesized as related to *Odontostilbe*, although Böhlke (1954) pointed out that *Cheirodontops* Schultz, 1944 was solely distinguished from *Holoshesthes* Eigenmann, 1903 by the absence of teeth on the maxillary. The examination of type material of *C. geayi*, and an extensive revision of the species, showed that the teeth are present on the maxilla. Also it was found that the elongation of dorsal- and pelvic-fin rays in mature males that diagnoses *Odontostilbe* is present in *Cheirodontops*. Schultz (1944) observed the resemblance of teeth between *Cheirodontops* and *Holoshesthes*. Malabarba (1998) based on the phylogenetic analysis of Cheirodontinae placed *Holoshesthes* in synonym of *Odontostilbe*, arguing that the character of the presence of dentary teeth with at least five cusps, with the three central cusps larger, compressed and in a row forming a sharp cutting edge, was found to be ambiguous, and independently acquired in four cheirodontine lineages. Eigenmann (1915), and Géry (1977) used this character alone to distinguish *Holoshesthes* of *Odontostilbe*. Additional phylogenetic analysis of *Odontostilbe* is needed to clarify the relationships and taxonomic status of *Holoshesthes* and *Cheirodontops*.

Malabarba (2003) listed *Deuterodon* (*Lobodeuterodon*) *euspilurus* Fowler, 1945, described from upper rio Caquetá basin, Colombia, as a junior synonym of *O. fugitiva*. According to work in progress by the senior author, *O. euspilura* (Fowler, 1945) is a valid species, and a senior synonym of *O. roloffii* Géry, 1972 described from upper rio Napo, Ecuador. A full redescription of this species will be provided in a forthcoming paper.

Almost all the mature males of the examined *Odontostilbe* related species share both elongations of the unbranched dorsal- and pelvic-fin rays, excepting *Odontostilbe euspilura* and an undescribed species from rio Uruguay basin that lack the elongation of the second unbranched dorsal-fin ray. Two other undescribed species from upper rio Paraná basin lack both elongations, of unbranched dorsal- and pelvic-fin rays, but there are few mature males available of them. *Odontostilbe pulchra* has a slight elongation of the second unbranched dorsal-fin ray only in some specimens, but has the unbranched pelvic-fin ray elongate.

A reevaluation of the diagnosis of *Odontostilbe* is still needed because the discovery of several new species not previously used in a phylogenetic analysis of the genus by Malabarba (1998). The discovery of new data regarding *Cheirodontops geayi* indicating that it shares characters diagnosing *Odontostilbe* (elongation of the dorsal- and pelvic-fin rays) requires a reanalysis of the phylogeny of these genera of the Cheirodontinae. Also, such an analysis should include *Lobodeuterodon* (its type species) and *Holoshesthes*, apparent junior synonyms of *Odontostilbe*.

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