

## New Species of *Creagrutus* (Teleostei: Characiformes: Characidae) from the Rio Uaupés Basin, Brazil

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A new species of *Creagrutus* is described from the western portions of the Rio Uaupés basin near the Brazilian-Colombian border region. The species is most closely related to, and most similar externally to, *Creagrutus amoenus* and *Creagrutus kunturus*, but differs from those species in details of pigmentation, meristics, and morphometrics.

Uma nova espécie de *Creagrutus* é descrita da porção ocidental da bacia do rio Uaupés, próximo à fronteira entre o Brasil e a Colômbia. A espécie é mais proximalmente relacionada, e mais similar externamente, à *Creagrutus amoenus* e *Creagrutus kunturus*, mas difere destas espécies em detalhes da pigmentação, dados merísticos e morfométricos.

THE recognized diversity in the Neotropical fish genus *Creagrutus* has been increased dramatically in recent years (Harold and Vari, 1994; Vari and Harold, 2001, and references therein) but with major lacunae in the known distribution of the genus across many regions of South America (Vari and Harold, 2001: fig. 18). In many instances, the distributional gaps are most likely artifacts of the lack of ichthyological collecting efforts in a particular region rather than indicative of the actual absence of species of *Creagrutus* in those areas. Collecting efforts by the second author in the upper Rio Tiquié, an ichthyologically poorly sampled tributary of the Rio Uaupés, in the western portions of the Rio Negro basin along the Brazilian-Colombian border, yielded the first samples of *Creagrutus* from that river basin. These represent a previously unknown species of *Creagrutus* that is described herein.

### MATERIALS AND METHODS

Counts and measurements were taken according to Harold and Vari (1994) with vertebral counts taken from radiographs. Institutional abbreviations follow Leviton et al. (1985). Institutional catalog numbers are followed by the number of specimens in the lot, range in standard lengths, and locality information.

*Creagrutus tuyuka* n. sp.  
Figure 1

*Holotype*.—MZUSP 65679, 1 (65.8 mm SL), Brazil, Amazonas, Rio Tiquié, comunidade de Cachoeira Comprida, beach below the cachoeira (0°15'44.0"N, 70°01'05.2"W). F. C. T. Lima et al., 22 October 2000.

*Paratypes*.—MZUSP 78519, 6 (43.3–68.3 mm SL; 1 specimen, 51.1 mm SL, cleared and counterstained); USNM 369731, 2 (46.9–56.4 mm SL); collected with holotype. MZUSP 64689, 2 (46.9–56.4 mm SL); INPA 18658, 2 (51.8–53.1) mm SL; Brazil, Amazonas, Igarapé Umari, tributary of rio Tiquié, comunidade de São Pedro (0°15'41"N, 69°57'23"W), F. C. T. Lima et al., 25–27 October 2000.

*Diagnosis*.—*Creagrutus tuyuka* is most similar in terms of dentition, head and body form, and other features to *Creagrutus amoenus* and *Creagrutus kunturus* with which it shares two synapomorphies (see discussion under *Phylogenetic relationships* below). *Creagrutus tuyuka* differs from *C. amoenus* and *C. kunturus* in its lack of the series of dark midlateral spots on the body that progressively coalesce ontogenetically to sometimes form a midlateral stripe in adults of the latter two species and in the distance from the snout to the anal fin origin (27.2–30.7 vs 33.8–38.8 and 30.8–34.0, respectively), distance from the snout to the pelvic fin insertion (22.2–25.6 vs 29.0–35.6 and 27.9–31.6, respectively), and the caudal peduncle depth (8.9–9.8 vs 12.2–13.8 and 11.1–12.1, respectively). *Creagrutus tuyuka* further differs from *C. amoenus* in the number of vertebrae (39–41 with 39 in four specimens and 40 or 41 in 10 specimens vs 35 to 39 with 36–38 in 34 specimens and 39 in only one of 36 radiographed specimens, respectively) and from *C. kunturus* in the number of median predorsal scales (9 or 10 vs 12, respectively).

*Description*.—Morphometric and meristic data for the holotype and paratypes presented in Table 1. Head and anterior portion of body mod-

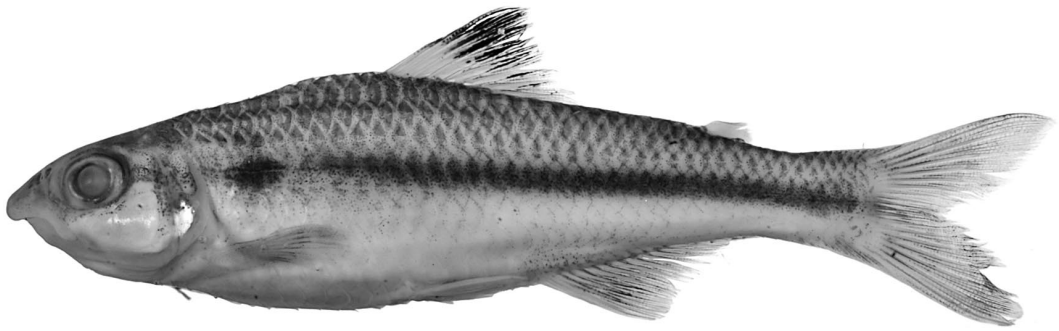


Fig. 1. *Creagrutus tuyuka*, holotype, MZUSP 65679, 65.8 mm SL; Brazil, Amazonas, Rio Tiquié, comunidade de Cachoeira Comprida, beach below cachoeira.

erately robust; region of body posterior of vertical through anal-fin origin more slender. Greatest body depth situated slightly anterior of vertical through dorsal-fin origin. Dorsal profile of head distinctly convex from tip of snout to

vertical through anterior nares, slightly convex or straight from that point to vertical through middle of orbit, and straight from that point to rear of supraoccipital spine. Interorbital region somewhat convex overall transversely, albeit flat-

TABLE 1. MORPHOMETRIC AND MERISTIC CHARACTERS OF HOLOTYPE OF *Creagrutus tuyuka*, NEW SPECIES. (A) Holotype of *C. tuyuka*, MZUSP 65679; and (B) 13 paratypes of *C. tuyuka*. Standard length is expressed in millimeters; measurements 1–14 are percentages of standard length; 15–18 are percentages of head length.

	(A)	(B)
Morphometrics		
Standard length	65.8	43.3–68.3
1. Snout to anal-fin origin	61.2	59.5–63.3
2. Snout to pelvic-fin insertion	47.9	45.5–49.0
3. Snout to pectoral-fin insertion	24.2	22.8–25.2
4. Snout to dorsal-fin origin	45.7	44.6–47.2
5. Dorsal-fin origin to hypural joint	57.9	55.6–58.9
6. Dorsal-fin origin to anal-fin origin	30.1	27.2–30.7
7. Dorsal-fin origin to pelvic-fin insertion	25.5	22.2–25.6
8. Dorsal-fin origin to pectoral-fin insertion	30.5	29.5–31.1
9. Caudal peduncle depth	9.7	8.9–9.8
10. Pectoral-fin length	16.3	16.9–18.8
11. Pelvic-fin length	13.8	12.4–13.7
12. Dorsal-fin length	19.0	17.4–20.6
13. Anal-fin length	15.5	14.4–16.8
14. Head length	25.4	24.1–26.4
15. Postorbital head length	40.7	34.8–42.4
16. Snout length	26.9	23.9–29.8
17. Bony orbital diameter	34.1	33.5–38.9
18. Interorbital width	28.1	25.2–29.4
Meristics		
Lateral-line scales	39	39–41
Scale rows between dorsal-fin origin and lateral line	4	4–5
Scale rows between anal-fin origin and lateral line	3	3–4
Predorsal median scales	10	9–10
Branched dorsal-fin rays	8	8
Branched anal-fin rays	12	11–12
Branched pelvic-fin rays	7	7
Pectoral-fin rays	13	12–14
Vertebrae	39	39–41

tened medially. Predorsal profile of body slightly convex. Ventral profile of head in many individuals with variably obvious obtuse angle at anteroventral corner of dentary, profile straight to gently curved from that region to isthmus. Ventral profile of body convex to anal-fin origin and slightly concave from anal-fin insertion to caudal fin.

Head pointed in lateral view and distinctly pointed in dorsal view. Upper jaw distinctly longer than, and overhanging, lower jaw. Anterior portion of snout fleshy, with scattered papillae. Papillae more concentrated along ventral margin of overhanging upper lip and on fleshy folds and plicae that extend between outer and medial premaxillary teeth. Lower lip fleshy anteriorly with scattered papillae along dorsal margin; papillae more concentrated proximate to dentary teeth.

Infraorbital series moderately developed. Central portion of ventral margin of third infraorbital horizontally straight and in contact with horizontal limb of preopercle for distance equal to, or slightly greater than, one-half of horizontal length of third infraorbital. Posterior margins of third through fifth infraorbitals distinctly separated from vertical limb of preopercle, extent of gap decreasing gradually dorsally.

Premaxillary dentition in three series: primary row slightly curved, typically with six teeth, five teeth present on one premaxilla in one specimen, without pronounced gap between first and second tooth of series but with antero-medial tooth separated from contralateral equivalent by distinct gap filled by fleshy folds; triangular cluster of three larger teeth lying medial to primary row; and single tooth of form similar to that of primary series situated lateral to fourth tooth of primary premaxillary row. Maxilla with two, or more commonly three, tricuspidate teeth. Dentary with five tricuspidate teeth. First and second dentary teeth robust and distinctly larger than remaining teeth in series, with second tooth about one-third longer than first two teeth and twice as long as third tooth; fourth and fifth teeth distinctly smaller than anterior teeth and compressed.

Dorsal-fin rays ii,8. Dorsal-fin origin located slightly anterior of vertical through pelvic-fin insertion. Profile of distal margin of dorsal fin very slightly concave. Anal-fin rays iii,11–12. Profile of distal margin of anal fin ranges from straight to slightly convex. Hooks typically present on anal-fin rays in mature males of many species of *Creagrutus* not found in examined specimens. Pectoral-fin rays i,11–13. Tip of pectoral fin falls 2 or 3 scales short of vertical through pelvic-fin insertion. Pelvic-fin rays i,6,i

or i,7. Tip of pelvic fin extends posteriorly to, or falls slightly short of, anal-fin origin. Gill-rakers 6–7+8–9.

*Coloration in alcohol.*—Overall ground coloration of relatively freshly collected specimens light tan. Dorsal surface of head with dense field of small to midsize dark chromatophores giving region distinctly dusky appearance. Intensity of dark pigmentation more noticeable in region over brain, presumably as consequence of deeplying pigmentation overlying membranes of that organ in most species of *Creagrutus*. Larger specimens with dark pigmentation especially dense in region of fontanels. Dense surface pigmentation continues anteriorly over snout and upper lip, often with pigmentation particularly intense over snout. Crescent-shaped patch of denser pigmentation anterior to nares obvious in some smaller specimens, particularly those with light overall coloration; patch continuous with other dark pigmentation anterior to orbit in more darkly pigmented smaller individuals and all larger specimens. Regions immediately anterior and ventral to orbit with variably developed field of dark pigmentation. Lower portion of cheek lacks dark chromatophores in all but largest individuals that have scattered dark chromatophores in that region. Variably developed pattern of dark pigmentation posterior to orbit; pigmentation ranges from diffuse, irregular pattern to somewhat more distinct but, nonetheless, overall diffuse horizontal stripe. Dark pigmentation on cheek, when present, and on opercle extends further ventrally in larger individuals.

Scales of dorsal portion of body with small dark chromatophores concentrated along posterior margin of scales to form overall reticulate pattern. Pigmented region on each scale more extensive in larger individuals. Darker primary portion of humeral mark rotund, with variably developed, less intensely pigmented areas that extend to varying degrees dorsal and ventral of main body of mark in some individuals. Pigmentation in humeral mark absent or less developed along irregular horizontal line that overlies lateral-line canal. Midlateral stripe extends from slightly posterior of rear of humeral mark to rear of caudal peduncle. Stripe more intensely pigmented in larger individuals. More darkly pigmented individuals with scattered dark pigmentation in region above base of anal fin and across ventral portion of caudal peduncle.

Dorsal fin with membranes and margins of anterior fin rays with fields of black chromatophores on distal two-thirds of fin. Pigmentation

does not extend to distal portions on fin membranes in smaller individuals but reaches fin margin in larger specimens. Intensity of pigmentation in that region increases ontogenetically and supplemented in larger individuals by distinct elongate patches of dark pigmentation on fin membranes proximate to anterior margin of two or three fin rays posterior to primary field of dark pigmentation. Basal portions of anal-fin rays outlined by small dark chromatophores in small to mid-sized individuals; pigmentation extends further distally in larger specimens. Anal-fin membranes unpigmented in all smaller specimens and in larger individuals with light overall pigmentation but with patches of dark pigmentation that form obscure patch of dark pigmentation on central portion of membranes between first and third to first to fifth branched anal-fin rays in darkly pigmented individuals. Caudal-fin rays and membranes with scattered small dark chromatophores; pigmentation particularly developed in larger individuals. More intensely pigmented specimens with diffuse dark patches of pigmentation on basal portions of each caudal-fin lobe, at base of middle caudal-fin rays, and on distal portions of each fin lobe. Pelvic and pectoral fins nearly hyaline in smaller individuals, with scattered dark pigmentation along fin margins in larger specimens.

*Ecology.*—At the type locality of *C. tuyuka*, the Rio Tiquié is a moderate-sized river, about 12–14 m wide, with black water that is not, however, as dark as that in most of the Rio Negro basin or even further downstream in the Rio Tiquié. The type series was collected along the edge of a large pool immediately below a small fall preceded upstream by a long series of rapids. Water depth in the collection area was approximately 0.20–0.50 m with a bottom composed of sand and fine gravel. Other paratypes were collected at Igarapé Umari, a clear water stream approximately 0.4–0.6 m deep with a sandy bottom. Stomach contents of the cleared-and-counterstained paratype consisted exclusively of benthic aquatic insect larvae, specifically several entire individuals of the Baetidae (Ephemeroptera) and a head of Hydropsychidae (Trichoptera). Underwater observations of individuals of *C. tuyuka* at a small beach about 1 km upriver from the type locality indicated that individuals swim in small schools of four to six fish close to the substrate. These observations, along with the stomach contents of the single paratype, indicate that *C. tuyuka* is a benthic, insectivorous forager, a feeding habit similar to that of *C. britskii* from the upper Rio Tocantins basin and an

unidentified species of *Creagrutus* from the upper Rio Paraguay basin (FCTL pers. obs.). Other species of *Creagrutus* are also insectivorous (Vari and Harold, 2001)

*Distribution.*—*Creagrutus tuyuka* is only known from Rio Tiquié, a tributary of the Rio Uaupés, in the Rio Negro basin of northwestern Brazil.

*Phylogenetic relationships.*—*Creagrutus tuyuka* shares the series of synapomorphies for members of *Creagrutus* proposed by Vari and Harold (2001:39; clade C—synapomorphies 16 to 29) and the synapomorphies for Clade E within that genus that includes the majority of species of *Creagrutus* (Vari and Harold, 2001:40; clade E—synapomorphies 35 and 36). Vari and Harold (2001:41) advanced three synapomorphies for a clade (Clade I) that consists of *C. amoenus* and *C. kunturus*. *Creagrutus tuyuka* shares two of these features (Synapomorphy 57—primordial ligament distinctly rotund in cross-section and extends ventrally nearly to distal tip of maxilla; and Synapomorphy 58—scapula lacks narrow ring-like process that forms anterior border of scapular foramen). *Creagrutus tuyuka* lacks the third synapomorphy for *C. amoenus* and *C. kunturus*, the presence of midlateral body pigmentation in the form of a series of dark spots that progressively coalesce ontogenetically and sometimes form a midlateral stripe in larger individuals. The latter feature, that is unique to those two species in *Creagrutus*, is, thus, herein considered to be a synapomorphy for *C. amoenus* and *C. kunturus*. *Creagrutus tuyuka* is, in turn, hypothesized to be the sister species of *C. amoenus* and *C. kunturus* based on the common possession in the three species of the two synapomorphies noted above (Synapomorphies 57 and 58 of Vari and Harold, 2001).

*Etymology.*—The species name, *tuyuka*, is in reference to the Tuyuka tribe, an indigenous group of the Rio Tiquié who have long carefully managed the subsistence fishery of that region (Chernela, 1989) and were of great assistance to the second author during the expedition that yielded the specimens that served as the basis for this study.

#### COMPARATIVE MATERIAL EXAMINED

*Creagrutus amoenus*: Ecuador, Pastaza, Río Danta, tributary to Río Conambo. USNM 164070, 1 (specimen cleared and counterstained). Ecuador, Pastaza, Río Danta, tributary to Río Conambo (1°45'03"S, 76°47'04"W), USNM 311297, 2 (64.2–68.0); USNM 311339, 3 (1 specimen

cleared and counterstained). Ecuador, Napo, Río Cowi (0°08'10"S, 76°15'18"W), USNM 340985, 4. Ecuador, Sucumbios, Río San Miguel basin, Río La Bermeja, in front of Comunidad Shuor Chari (approximately 0°10'N, 76°25'W), USNM 340986, 4.

*Creagrutus kunturus*: Peru, Amazonas, Provincia Condorcanqui, Cordillera del Condor, upper Río Comainas, 20 m upriver of Puesto de Vigilancia No. 22 (3°56'30"S, 78°24'20"W), USNM 335146, 1 (paratype of *Creagrutus kunturus*). Peru, Amazonas, Provincia Condorcanqui, Cordillera del Condor, Río Comainas, 30 m down river of Puesto de Vigilancia No. 22 (3°56'30"S, 78°24'20"W), USNM 335148, 2 (paratypes of *Creagrutus kunturus*). Peru, Amazonas, Provincia Condorcanqui, Cordillera del Condor, Quebrada no. 3, tributary of Río Comainas, Puesto de Vigilancia No. 22 (3°56'30"S, 78°24'20"W), USNM 335147, 2 (paratypes of *Creagrutus kunturus*; 1 specimen cleared and counterstained).

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