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Distichodus teugelsi a new distichodontid from the middle Congo River basin, Africa (Characiformes: Distichodontidae)

Victor Mamonekene* and Emmanuel Vreven**

Distichodus teugelsi, new species, is described from the middle Congo River basin. The species is distinguished from all other *Distichodus* species by the following combination of characters: presence of two rows of bicuspid teeth on upper jaw and a single one on lower jaw; unique colour pattern characterised by a light greenish band dividing the flanks into a darker greenish upper and lower part. *Distichodus teugelsi* is a dwarf species of *Distichodus* (maximum size: 65.0 mm TL), based on the presence of nearly ripe eggs in several female specimens (50.9-54.3 mm SL). With a single row of bicuspid teeth in the lower jaw, instead of two rows, both dwarf *Distichodus* species *(D. teugelsi, D. decemmaculatus)* differ in this respect from the current diagnosis of the genus.

Introduction

The Distichodontidae is an endemic African freshwater fish family. Members of the family can be readily distinguished from other African characiforms by the possession of true ctenoid scales, with the ctenii formed of a series of independent ossifications along the posterior margin of the scale and in having at least some bicuspid teeth in each jaw (Vari, 2007).

The species of the genus *Distichodus* are characterised by the following unique combination of characters: an upper jaw that is only slightly mobile with respect to the cranium, an edentulous maxilla not tightly fixed to the posterior part of the premaxilla, two rows of bicuspid teeth in each jaw, a mobile joint between the dentary and the angulo-articular, and a completely pored lateral line (Vari, 2007).

Twenty four *Distichodus* species are currently recognised (Vari, 2007). Five species are known from the Lower Guinea ichthyofaunal province: *D. engycephalus, D. hypostomatus, D. kolleri, D. notospilus* and *D. rostratus*. Twelve species are known from the Congo River basin (Daget & Gosse, 1984): *D. affinis, D. altus, D. antonii, D. atroventralis, D. decemmaculatus, D. fasciolatus, D. langi* [possible synonym of *D. antonii* (see Daget & Gosse, 1984)], *D. lusosso, D. maculates, D. noboli, D. notospilus*, and *D. sexfasciatus*.

The right bank Congo River tributaries running through the Republic of Congo have not yet been the subject of an ichthyofaunal investigation. Within the framework of the project "Appui au

* Institut de Développement Rural, Université Marien Ngouabi, BP 69, Brazzaville, République du Congo. E-mail: mamonekene@hotmail.com
** Royal Museum for Central Africa, Vertebrate Section, Ichthyology, B-3080 Tervuren, Belgium. E-mail: emmanuel.vreven@africamuseum.be

laboratoire de biologie des populations de l'Université Marien Ngouabi de Brazzaville pour l'étude de la biodiversité et la conservation des poissons d'eaux douces du Congo-Brazzaville" in collaboration with the Musée Royal de l'Afrique Centrale (MRAC) an expedition was undertaken to the Léfini River basin, a right bank affluent of the Congo River basin. Among the collected fishes were a few *Distichodus* specimens, which could not be assigned to any of the presently known congeners.

Poll & Gosse (1963) reported a single specimen identified as *D. decemmaculatus*. The authors however highlighted the lack in that individual of a series of 10 spots on the flank that are characteristic for the species and also mentioned the shallower body depth of the specimen when compared to the holotype and other *D. decemmaculatus* specimens they examined. They concluded that if these differences were confirmed on other specimens this would justify the description of a new species. A detailed comparison of the Léfini specimens and the single specimen of Poll & Gosse (1963) confirmed their conspecificity as the new species described below.

Material and methods

All meristics and morphometrics were taken following Teugels & Thys van den Audenaerde (1990) and are listed in Table 1. Examined specimens are deposited in: AMNH, American Museum of Natural History, New York, USA; and MRAC, Musée Royal de l'Afrique Centrale, Tervuren, Belgium. All locality data have been translated in English.

Table 1. Morphometric and meristic data for the holotype and paratypes of *Distichodus teugelsi* and examined specimens of *D. noboli* and *D. decemmaculatus*.

	D. teugelsi				
	holotype	holotype + paratypes			
Morphometrics		min	max	n	mean
Standard length (mm)	49.6	50.9	54.3	6	52.0
In percent of head length					
Snout length	30.9	25.8	31.7	6	29.9
Eye diameter	30.9	30.3	32.4	6	31.9
Interorbital width	38.1	37.4	41.4	6	39.3
In percent of standard length					
Head length	28.0	26.9	28.5	6	27.7
Predorsal distance	47.8	45.1	48.3	6	48.6
Prepectoral distance	24.2	24.5	26.3	6	25.5
Prepelvic distance	52.6	49.0	53.4	6	50.4
Preanal distance	75.8	74.0	79.6	6	75.6
Dorsal-adipose distance	21.1	20.6	21.5	6	20.6
Dorsal-fin base length	20.9	20.0	22.1	6	21.0
Anal-fin-base length	11.7	12.1	13.8	6	12.5
Caudal-peduncle length	13.9	11.6	12.1	6	12.4
Caudal-peduncle depth	12.9	12.3	13.3	6	12.8
Body depth	33.4	25.3	33.4	6	30.8
Meristics		min	max	n	median
Dorsal-fin rays	iii.12	iii.12	iii.13	6	iii.12-13
Anal-fin rays	iii.9	iii.8	iii.9	6	iii.8-9
Number of gill rakers	24	23	26	6	25
Scales along lateral line	39	39	39	6	39
Scales between lateral line and dorsal fin	5.5	5.5	5.5	6	5.5
Scales between lateral line and pelvic fin	5.5	5.5	5.5	6	5.5
Scales around caudal peduncle	16	16	16	6	16

Distichodus teugelsi, new species
(Fig. 1)

Holotype. MRAC A4-46-P-0005, 49.6 mm SL (female with eggs); Republic of Congo: Congo River basin: Léfini River, 3 km upstream of confluence with the Louna River, Réserve Naturelle Lésio-Louna, 3°00'S 15°30'E; V. Mamonekene, J. Snoeks & E. Vreven, 18 Sept 2004.

Paratypes. AMNH 237153 (former MRAC A4-046-P-0008), 1, 50.9 mm SL (female with eggs); Republic of Congo: Congo River basin: Louna River, at camp Projet Gorille (Abio), 3°10'S 15°52'E; V. Mamonekene, E. Vreven & A. Ibala Zamba, 3 Oct 2004. – MRAC 137862, 57.0 mm SL; Democratic Republic of Congo: Congo River basin: Yangambi, Congo River, ±0°47'N 24°28'E; A. Hulot, 1960. – MRAC A4-46-P-0006-0007, 2, 53.0-54.3 mm SL (females with eggs); Republic of Congo: Congo River basin: Louna River, at camp Projet Gorille (Abio), 3°10'S 15°52'E; V. Mamonekene, E. Vreven & A. Ibala Zamba, 3 Oct 2004. – MRAC A4-046-P-0257, 1, 56.6 mm SL (female with eggs); Republic of Congo: Congo River basin: Léfini River, 3 km upstream from confluence with the Louna River, Lésio-Louna Natural Reserve, 3°00'S 15°30'E; V. Mamonekene, J. Snoeks & E. Vreven, 16 Sept 2004.

D. noboli				*D. decemmaculatus*			
min	max	n	mean	min	max	n	mean
53.5	74.2	3	64.0	61.4	63.8	3	62.9
31.1	38.0	3	33.8	30.7	33.5	3	32.1
27.1	30.0	3	28.5	30.7	34.7	3	32.3
36.5	43.5	3	39.3	43.6	48.7	3	45.4
27.9	31.1	3	29.5	24.4	28.1	3	27.8
51.8	55.3	3	53.5	44.3	48.3	3	46.6
22.4	28.2	3	25.4	25.6	29.6	3	27.3
44.3	51.3	3	48.9	47.6	59.6	3	52.7
77.4	83.8	3	79.6	76.8	78.6	3	77.9
16.6	19.3	3	18.2	17.9	20.4	3	19.3
22.1	23.3	3	22.6	21.1	23.6	3	22.2
14.9	16.2	3	15.3	11.6	13.2	3	12.2
9.0	9.8	3	9.4	10.2	11.2	3	10.5
14.0	15.5	3	14.6	13.5	14.1	3	13.8
38.5	46.8	3	41.9	35.8	38.1	3	38.4
min	max	n	median	min	max	n	median
iii.14	iii.16	3	iii.15	iii.12	iii.14	3	iii.13
iii.11	iii.12	3	iii12	iii.9	iii.10	3	iii.9
22	24	3	23	18	21	3	19
40	41	3	40-41	39	41	3	40
6.5	6.5	3	6.5	6.5	6.5	3	6.5
7.5	7.5	3	7.5	6.5	6.5	3	6.5
16	16	3	16	20	20	3	20

Diagnosis. *Distichodus teugelsi* is distinguished from all other *Distichodus* species, except *D. decemmaculatus*, by the presence of two rows of bicuspid teeth on the upper jaw and only a single row of bicuspid teeth on the lower jaw (vs. two rows of teeth on both jaws). It differs from *D. decemmaculatus* in the number of scales around the caudal peduncle (16 vs 20) and in colour pattern (no series of spots on flanks vs. a series of 7 up to 12 small, rounded or more or less vertically elongated, black spots on flanks along the lateral line).

Description. All meristics and morphometrics taken are given in Table 1. Body rather elongated and only moderately compressed. Mouth subterminal. Caudal peduncle depth greater than its length. Gill rakers small; total 23 (12/1/10-11) to 26 (12/1/12-13) on first branchial arch. Dorsal fin situated slightly anterior to vertical through origin of pelvic fin. Body covered with small ctenoid scales. Lateral line complete and positioned along midlateral surface of body. Small, scaleless adipose fin situated closer to caudal fin than to dorsal fin. Caudal fin covered with scales on proximal one-third.

Coloration. Living or fresh *D. teugelsi* specimens have a light greenish band along lateral line, dividing lateral surface into dark greenish upper and lower parts. Distinctly contrasted belly yellowish-white marbled with red. Scales of lower two-thirds of lateral surface with yellowish-white spots giving impression of weave with light meshes. Central part and posterior margin of caudal fin transparent. Upper and lower lobes of caudal fin blackish distally and gradually becoming yellowish-orange proximally. Mid-base of caudal fin with more or less conical, black spot, with posteriorly-oriented apex. Head blackish above, and whitish with a metallic hue below, horizontal through ventral margin of eye. Dorsal fin reddish; with large black spot situated on basal portion of anterior 5 or 6 rays; anterior-most basal portion of dorsal fin yellowish-white to

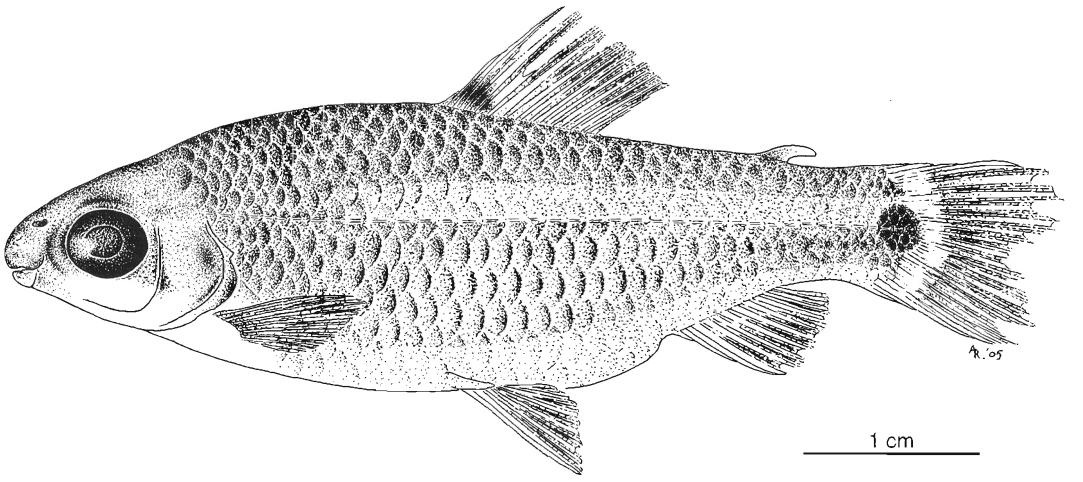

Fig. 1. *Distichodus teugelsi*, MRAC A4-046-P-0005, holotype, 49.6 mm SL (female with eggs); Republic of Congo: Léfini River.

transparent. Pectoral and pelvic fins transparent. Anal and adipose fins yellowish with transparent distal parts.

Preserved specimens with only black spot at base of caudal peduncle and spot on anterior base of dorsal fin remaining clearly distinguishable. Broad lateral band along lateral line whitish-grey. Pigmentation dorsal and ventral to that band brown, more so ventrally. Dorsal fin whitish-grey.

Distribution. *Distichodus teugelsi* is known in the middle Congo River basin, from the Louna River, a right bank tributary of the Léfini River, the Komo River, a right bank tributary of the Alima River (photograph at MRAC; specimen not preserved), and a single specimen from Yangambi [a locality near Kisangani (Democratic Republic of Congo)] (see Poll & Gosse, 1963) (Fig. 2).

Habitat. *Distichodus teugelsi* was found in shallow as well as deep areas inhabited by aquatic plants such as *Echinochloa* sp. or other graminea species. The species was collected in waters with a pH 4.2-4.5, a very low conductivity (6.6 $\mu s \cdot cm^{-1}$), and a concentration of dissolved oxygen of about 2.41 $mg \cdot l^{-1}$. These waters of the Congo River basin run under riparian or flooded forest and as a result are acid due to humic acids.

Ecology. All recently collected specimens from the Léfini River basin (Republic of Congo) are nearly ripe females indicating a possible reproductive period in September and October. The presence of nearly ripe females at a maximum size of 65.0 mm TL suggests that *D. teugelsi* is a dwarf species of *Distichodus*.

Etymology. The species is named in memory of the late Guy Teugels (1954-2003), the first promoter of the project that resulted in the collection of this new species.

Discussion

Within the Lower Guinea and Congo ichthyofaunal provinces *D. teugelsi* can also be distinguished from *D. antonii*, *D. atroventralis*, *D. engycephalus*, *D. fasciolatus*, *D. hypostomatus*, *D. langi* (possible synonym of *D. antonii*), *D. lusosso*, *D. maculates*, *D. rostratus* and *D. sexfasciatus* by its low number of lateral line scales (39 vs. >50); from *D. kolleri* and *D. noboli* by its low total number of dorsal-fin rays [15-16 vs. 21-27 and 20-22 respectively]; from *D. noboli* and *D. notospilus* by its low total number of anal fin rays (11-12 vs. 17-22 and 12-15 respectively); from *D. notospilus* by its shallow body depth [25.3-33.4 % SL vs. 33.0-42.0 % SL)] and by its colour pattern [dorsal fin with distinct, dark mark on proximal part of anterior 5 or 6 rays and absence of vertical bars on flank vs. dorsal fin with distinct dark mark extending from distal two-thirds of last unbranched ray to basal portions

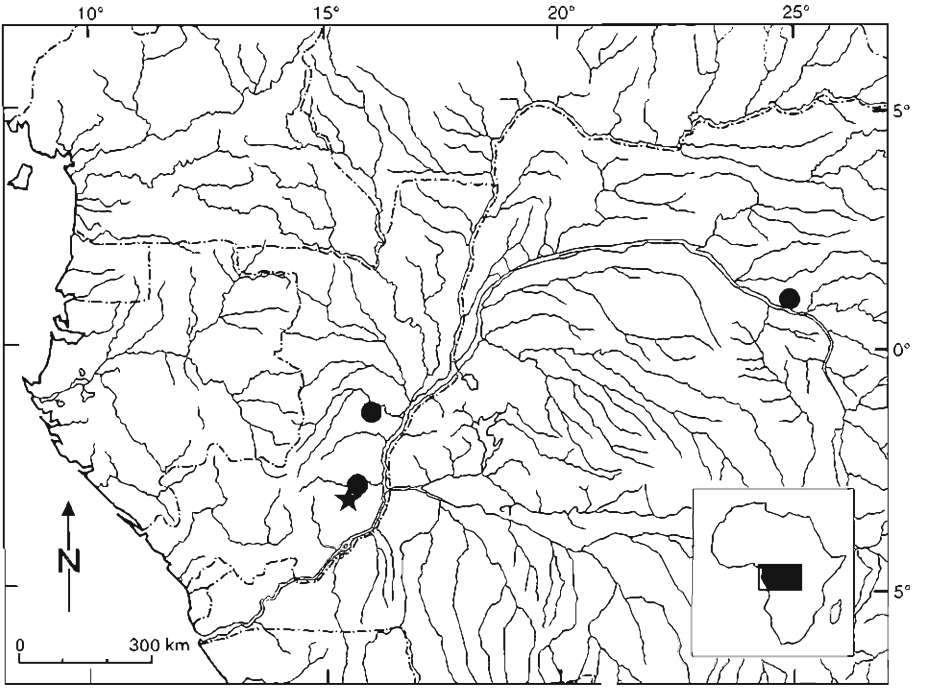

Fig. 2. Distribution of *Distichodus teugelsi*. ★, type locality; ●, other localities.

of middle and posterior rays and some individuals with deeper-lying, dark pigmentation forming irregular, vertically-elongate marks in regions along, and proximate to, lateral line in area posterior of vertical through origin of dorsal fin (such pigmentation more obvious in smaller individuals)]; and from *D. affinis*, *D. altus* and *D. noboli* in number of scales between lateral line and origin of dorsal fin (5.5 vs. respectively 7 in *D. affinis*, 9 in *D. altus* and 6.5 in *D. noboli*) and the number of scales between the lateral line and the origin of pelvic fin (5.5 vs. respectively 7 in *D. affinis*, 9 in *D. altus* and 7.5 in *D. noboli*). In addition, *D. teugelsi* differs from all other Lower Guinea and Congo River basin species, except *D. decemmaculatus* (75 mm TL), by its small maximum size (65.0 mm TL vs. more than 100.0 mm TL) [Comparison of *D. teugelsi* with all Lower Guinea and Congo River basin species partly based on literature (Boulenger, 1909; Nichols & Griscom, 1917; Pellegrin, 1926; Poll & Gosse, 1963b; Matthes, 1964; Daget & Gosse, 1984 and Vari, 2007)].

Finally, *D. teugelsi* also differs in life colour pattern from all Lower Guinea and Congo River basin species of *Distichodus*, except *D. noboli*, in having a light, greenish band along the lateral line dividing the lateral surface of the body into dark greenish upper and lower parts. However, freshly captured *D. noboli* have alternating black and red bands. *Distichodus teugelsi* has a large, conical black spot on the caudal peduncle (vs. proportionally smaller and elliptical in *D. noboli*); a small black spot on the five or six anterior dorsal-fin rays (vs. larger black spot covering the first eight rays in *D. noboli*); the dark band under the lateral line darker than the dorsal region of the body (vs. lower band sometime interrupted at its middle in *D. noboli*). *Distichodus teugelsi* furthermore lacks the series of dark brown spots along the lateral line typical for *D. decemmaculatus*.

Within the family Distichodontidae dwarf species are also known from the genera *Nannaethiops* and *Paradistichodus*.

Distichodus teugelsi is clearly distinguished from the monotypic genus *Nannaethiops* by having an edentulous maxilla (vs. tooth-bearing) and a mobile joint between the dentary and the angulo-articular (vs. lower jaw without mobility between the dentary and the angulo-articular) (see Vari, 2007).

Distichodus teugelsi is also distinguished from the monotypic genus *Paradistichodus* by the fol-

lowing characters: large body depth, 3-4 times in SL (vs. 4-5 times); scales covering the proximal third of caudal fin (vs. only scales at base); 39 lateral line scales (vs. 52-63); 5½ scales between the origin of the dorsal fin and the lateral line (vs. 6½-8½); and 5½ scales between the lateral line and the insertion of the pelvic fins (vs. 7½-8½) (see Gosse & Coenen, 1990).

According to Vari (2007) all *Distichodus* species are characterised by the presence of two rows of teeth in the upper as well as the lower jaw. However, *D. teugelsi* and *D. decemmaculatus* possess only a single row of bicuspid teeth in the lower jaw. In all other diagnostic characters both agree with Vari's (2007) definition of the genus. Therefore, the new species has been assigned to the genus *Distichodus* despite the difference in the number of teeth rows on the lower jaw.

Comparative material. *Distichodus decemmaculatus*: MRAC 19697, holotype, 61.4 mm SL; Democratic Republic of Congo: Kunungu, ±2°06'S 16°26'E. – MRAC 41858, 1, 63.8 mm SL; Democratic Republic of Congo: Bolobo, ±2°10'S 16°14'E. – MRAC 79-09-P-204-206, 1 out of 3, 24.5 mm SL; Democratic Republic of Congo: Boende, Tshuapa River, ±0°14'S 20°50'E.

Distichodus noboli: MRAC A4-046-P-0009-0010, 2, 64.3-74.0 mm SL; Republic of Congo: Léfini River, 3 km upstream of confluence with the Louna River, 3°00'S 15°30'E. – MRAC A4-046-P-0011, 1, 53.5 mm SL; Republic of Congo: stagnant branch of Louna River, tributary of the Léfini River at camp Projet Gorille, 3°10'S 15°52'E.

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