

Aethiomastacembelus traversi, a new spiny-eel from the Zaïre River basin, Africa (Synbranchiformes: Mastacembelidae)

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Aethiomastacembelus traversi, new species, is described from the lower and middle Zaïre basin, Africa. It is morphologically close to the *A. paucispinis* and the *A. congicus* species-complexes and is diagnosed by its long postanal length (54.5-60.0 % SL), its number of dorsal spines (20-22 + 1) and its unique coloration characterised mainly by its uniform brown colour on head and body and its black caudal fin. The generic assignment is discussed based on the most recent phylogenetic analysis of the family.

Introduction

The Mastacembelidae or spiny-eels are a group of freshwater fishes which for some time have been considered as belonging to the Perciformes but more recently have been assigned to the Synbranchiformes by Gosline (1983) and Travers (1984b). They are characterised by their slender and eel-like body, the presence of a peculiar rostral appendage and a series of separate spines along the dorsum in front of the soft dorsal fin. They occur in Africa, the Middle East and in South-East Asia.

As part of an ongoing revision of the alpha-level taxonomy of the African spiny-eels, we found five specimens, originating from the Zaïre River basin, that do not fit the description of any known mastacembelid species. A detailed morphological study led to the recognition of a new species; its description is given below.

Methods

Methods used follow Vreven & Teugels (1996). All measurements defined by Vreven & Teugels (1996) are point to point measurements except for the distance from the dorsal edge of the pectoral fin to the first dorsal spine, the distance from the ventral edge of the pectoral fin to the first dorsal spine, and the distance from the posterior edge of the pectoral fin to the first dorsal spine.

The preorbital distance of Travers (1992a-b) is identical to the snout length as defined by Vreven & Teugels (1996) (Fig. 1., nr. 1). The postorbital distance of Travers (Fig. 1., nr. 2) is different from the definition given by Vreven & Teugels (Fig. 1., nr. 3): in the former it is the distance from the posterior edge of the eye to the posterior margin of the cranium, visible externally as a groove above the top of the preopercular bone;

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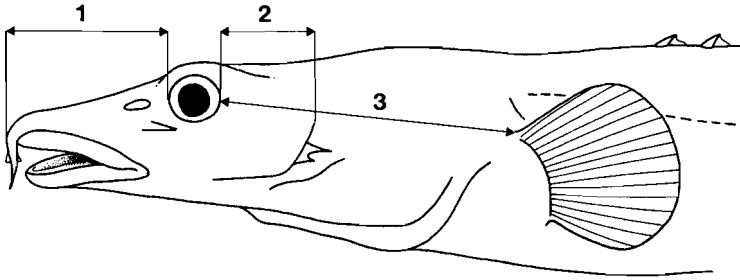


Fig. 1. Schematic illustration of the head of a mastacembelid fish, showing: 1, the preorbital distance of Travers (1992a-b) identical to the snout length of Vreven & Teugels (1996); 2, the postorbital distance of Travers (1992a-b); and 3, the postorbital distance of Vreven & Teugels (1996).

the latter, is defined as the distance from the posterior edge of the eye to the dorsal edge of the pectoral fin.

Institutional abbreviations are as follows: CAS-SU, California Academy of Sciences – Stanford University Collections, San Francisco; IRSNB, Institut Royal des Sciences Naturelles de Belgique, Bruxelles; MCZ, Harvard University Museum of Comparative Zoology, Cambridge; MRAC, Musée royal de l'Afrique centrale, Tervuren; and USNM, National Museum of Natural History, Smithsonian Institution, Washington.

Aethiomastacembelus traversi, new species
(Fig. 2)

Mastacembelus marchii (non Sauvage, 1879, in part)
(erroneous emendation): Poll, 1959: 111-112
(specimen MRAC 118575)

Holotype. MRAC 90-30-P-1951, 342 mm TL; Zaïre, Lualaba Riv., rapids, km 47 road Kisangani-Wanie Rukula; approx. 0°14'N 25°34'E; L. De Vos, 11 February 1990.

Paratypes. MRAC 118575, 160 mm TL (with mutilated tail); Zaïre, Stat. 37, Stanley-Pool, in front of Ile du Contrebandier; approx. 4°19'S 15°21'E; Mission Brien-Poll-Bouillon, 7 October 1957. – MRAC 73-22-P-5048, 376 mm TL; Zaïre, Stanley-Pool; approx. 4°06'S 15°15'E; J. Mandeville, 24 July 1958. – CAS-SU 66748, 337 mm TL; Zaïre, Kinshasa, Leopoldville market; approx. 4°18'S 15°18'E; T. R. Roberts, June-July 1964. – MCZ 148434, 192 mm TL; Central African Republic, Bangui fish market; approx. 4°22'N 18°35'E; T. R. Roberts, May 1971.

Diagnosis. *Aethiomastacembelus traversi* is distinguished from all other African mastacembelid species by the following combination of characters: postanal length (54.5-60.0 % SL) greater than preanal length (38.4-44.1 % SL); origin of first dorsal spine situated in front, above, or just behind posterior extremity of pectoral fin; 20+1 to 22+1 dorsal spines; a generally uniform body coloration except for the dorsal fin which has a rather dark brown base and a light yellowish distal margin with small brown spots, and for the caudal fin which is black.

Description. Measurements and counts for holotype and paratypes are given in Tables 1 and 2.

Aethiomastacembelus traversi has a pointed snout. Fleshy angle of jaws situated before or just below anterior border of the posterior nare. Upper extremity of gill opening and dorsal edge of pectoral-fin base at same level, anterior to ventral edge of pectoral-fin base. Upper part of pectoral fin base situated above upper extremity of gill opening; both clearly above ventral edge of pectoral-fin base. Upper jaw longer than lower jaw. Rostral appendage long (18.8-22.7 % HL).

Preanal length always shorter than postanal length. Distance from snout to posterior extremity of last dorsal spine (when flattened) less than distance from snout to posterior extremity of last anal spine (when flattened); distance from snout to base of first anal spine and preanal length longer than distance from snout to posterior extremity of last dorsal spine (when flattened).

20 to 22 externally visible dorsal spines, increasing in size from first to last. One very short spine hidden under the skin, and situated anteriorly to the base of the first soft ray.

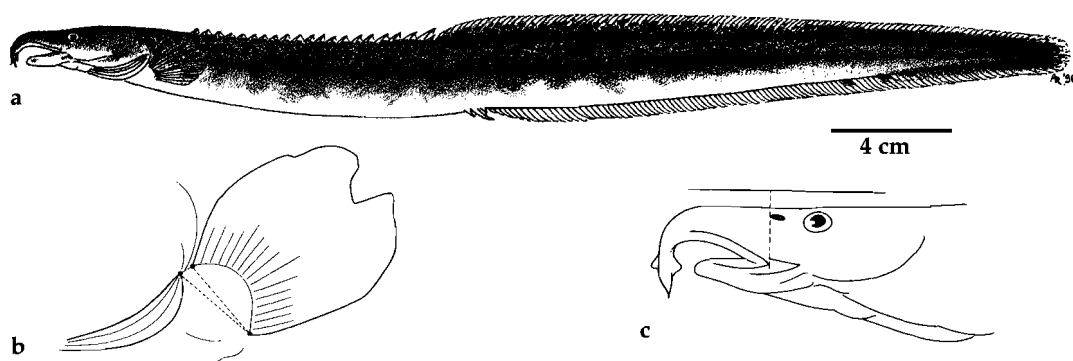


Fig. 2. *Aethiomastacembelus traversi*, MRAC 90-30-P-1951, holotype, 342 mm TL, Lualaba river. a, lateral view; b, detail of the gill opening region; note the anterior and distinctly superior position of the upper extremity of the gill opening compared to the ventral edge of the pectoral-fin base; c, position of the angle of the mouth, the posterior nostril and the eye.

Table 1. Measurements of holotype and paratypes of *Aethiomastacembelus traversi*.

	holotype	paratypes			
		CAS-SU 66748	MCZ 48419	MRAC 118575	MRAC 73-22-P-5048
Standard length, SL (mm)	327	319	181	154	357
In percents of HL					
Snout length	37.6	35.2	36.4	33.3	34.2
Eye diameter	7.9	7.1	11.4	9.2	6.8
Minimum interorbital distance	4.1	4.2	3.8	3.6	4.5
Rostral appendage length	20.0	18.8	20.8	18.8	22.7
Postorbital length	59.9	59.3	59.1	58.4	61.8
Angle of jaws to dorsal edge of pectoral fin base	73.4	76.3		73.6	74.3
Posterior tip of preorbital spine to dorsal edge of pectoral fin base	66.4	67.0	68.9	65.7	70.7
Upper tip of gill slit to pectoral fin origin	4.7	4.4		6.9	4.7
Upper jaw length		23.9			23.6
Lower jaw length		17.5		20.8	19.3
Pectoral-fin length	25.9	28.3	31.1	29.7	30.4
Dorsal edge of pectoral fin base to anterior base of first dorsal spine	22.1	22.3	26.1	28.7	23.6
Ventral edge of pectoral fin base to anterior base of first dorsal spine	17.1	17.3	18.6	23.8	17.6
Posterior edge pectoral fin to anterior base of first dorsal spine	11.5	10.6	11.0	5.0	13.0
Angle of jaws to eye	13.7	14.4			14.0
Angle of jaws to posterior external nare	10.1	9.5			11.7
Anterior border posterior external nare to eye	9.2	8.8	8.7	8.9	9.1
In percents of SL					
Head length	13.6	14.2	14.6		13.2
Snout to first dorsal spine	16.9	17.6	19.0		16.6
Snout to last externally visible dorsal spine	42	44.0	46.6		42.3
Snout to first anal spine	44.1	42.8	45.9		40.4
Snout to last externally visible anal spine	47.4	46.9	49.3		44.2
Preanal length	42.3	40.9	44.1		38.4
Postanal length	56.9	58.5	54.5		60.0
Body depth at anus	7.3	7.0	7.8		8.0

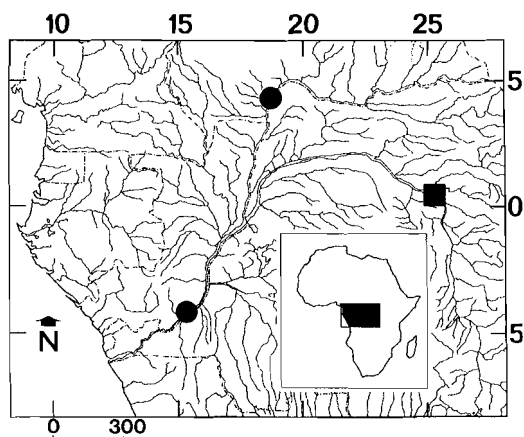


Fig. 3. Distribution of *Aethiomastacembelus traversi* based on the localities of the specimens examined, ■ type locality.

Two externally visible anal spines. One very short spine, hidden under the skin, and situated anteriorly to the base of the anal fin. First anal pterygiophore well developed, supporting first and second anal spine, and only pterygiophore supporting two spines.

In all specimens, the neural spine supporting the pterygiophore of the last externally visible dorsal spine and the haemal spine supporting the pterygiophore of the first anal spine are situated on two different vertebrae. The vertebra with the neural spine supporting the pterygiophore of the last externally visible spine is situated before the vertebra whose haemal spine supports the first anal spine.

All specimens have one preorbital spine, which may be hidden under the skin. Number of preopercular spines on left side 1 (in 1 specimen) or 2 (in 4 specimens) and 2 on the right side (in 5 specimens). The preopercular spines may also be hidden under the skin.

Coloration in alcohol. The coloration of most of the specimens is poorly preserved. Holotype with head and body uniformly colored, brownish dorsally and on sides, lighter yellowish on lips, lower cheek, lower side of head, belly, abdomen and ventral part of tail. Pectoral fins uniformly light yellowish. Dorsal fin, part of the confluent dorsal, caudal and anal fins rather uniformly dark brown at base. Outer margin light yellowish with small brown spots. Caudal fin black and anal fin uniformly light yellowish. No data on the life coloration are available.

Distribution. The specimens of *Aethiomastacembelus traversi* have been collected from the lower and middle Zaire River basin. The species is probably endemic to those parts of the Zaire River basin (Fig. 3).

Habitat. The holotype of *Aethiomastacembelus traversi* was collected from rapids on the Lualaba River, in a secondary forest area. Up and downstream of the rapids, the Lualaba is a large river (several hundred meters wide) and the next rapids downstream are those of Kisangani and upstream those of Wanie Rukula. More detailed information on the habitat and biology of the species are lacking.

Table 2. Counts for holotype and paratypes of *Aethiomastacembelus traversi*.

	holotype	paratypes			
		CAS-SU 66748	MCZ 48419	MRAC 118575	MRAC 73-22-P-5048
Predorsal vertebrae	5	6	5	7	6
Abdominal vertebrae	28	29	27	28	29
Vertebrae between dorsal and anal spine supporting pterygiophores	3	0	1	2	1
Caudal vertebrae	61	65	57		62
Vertebrae total	89	94	84		91
Dorsal spines	20+1	22+1	20+1	21+1	22+1
Anal spines	2+1	2+1	2+1	2+1	2+1
Dorsal fin rays	107	102	95		101
Anal fin rays	95	91	82		94
Caudal fin rays	11	11	12		11

Etymology. Named for Robert A. Travers who first tentatively recognised part of the type material as belonging to a new mastacembelid species.

Generic position and affinities. Vreven & Teugels (1996) discussed inaccuracies and contradictions in the diagnoses of *Caecomastacembelus* Poll, 1958 and *Aethiomastacembelus* Travers, 1988 the two African genera recognised by Travers (1988, 1992a-b). Several of these diagnostic characters have no value for generic distinction because even the type species of the two genera do not exhibit the character state described for their genus (see Vreven & Teugels, 1996: table 5). For the remaining diagnostic characters the following character states were observed in *A. traversi* (data for both genera according to Travers, 1988, 1992a-b in parentheses): 11 principal caudal-fin rays (10-12 in *Aethiomastacembelus*; 8-10 in *Caecomastacembelus*); snout pointed (tendency to have a pointed snout in *Aethiomastacembelus*; tendency to have a blunted snout in *Caecomastacembelus*); body depth greatest midway along length (body depth greatest midway along length in *Aethiomastacembelus*; body depth even for most of length in *Caecomastacembelus*) and dorsal fin deeper than anal fin (median fins of even height in *Aethiomastacembelus*; median fins low and fleshy, increase in height caudally in *Caecomastacembelus*). Based on the character state of the remaining diagnostic characters mentioned above, we tentatively place *A. traversi* in *Aethiomastacembelus*.

Despite of the current confusion on the status of the genera and pending the results of an accurate generic revision of the African mastacembelids (Vreven, in prep.), we describe *A. traversi* here as a new species because it is clearly different from all other known African Mastacembelidae species.

The new species is morphologically close to *A. paucispinis* (Boulenger, 1899) (the 'representative' of the *paucispinis* complex) and *A. congicus* (Boulenger, 1896) (the 'representative' of the *congicus* complex) (both complexes defined by Travers, 1992a-b). *Aethiomastacembelus traversi* shows, but in a far less developed condition, the diagnostic characters of the *A. paucispinis* complex: a unique anterior development of the soft dorsal fin extending well beyond the origin of the soft anal fin, a reduction of the number of dorsal spines (6-9 + 1 dorsal spines in *A. paucispinis*) and an increased number of dorsal soft fin

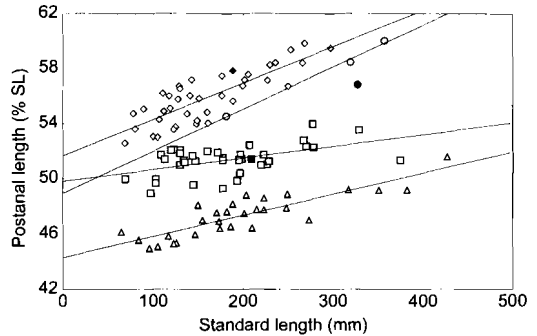


Fig. 4. Scatterplot of the postanal length (in % SL) against standard length for *Aethiomastacembelus traversi* (○), *A. congicus* (△), *A. paucispinis* (□) and *Caecomastacembelus greshoffi* (◇). Full symbols refer to type specimens. Heavy lines are regression lines for *A. traversi*, *A. greshoffi*, *A. paucispinis* and *C. greshoffi*. The equations of the regression lines for the different species are: $y = 0.027x + 49.477$ for *A. traversi*; $y = 0.015x + 44.328$ for *A. congicus*; $y = 0.008x + 49.831$ for *A. paucispinis* and $y = 0.027x + 51.661$ for *A. greshoffi*.

rays (110-131 dorsal fin rays against 73-89 anal fin rays). This species-complex contains seven species (Travers, 1992a-b). Nevertheless, *A. traversi* can be distinguished from *A. paucispinis* by the elongation of its postanal region (see Fig. 4).

Further *A. traversi* possesses a narrow and tapered snout which is the diagnostic character of the *A. congicus* (Boulenger, 1896) complex. The snout length [preorbital distance of Travers (1992b)] is 1.5 times longer than the postorbital distance, as mentioned by Travers (1992b). The 11 species which were considered in this species-complex were not mentioned by Travers. However *A. traversi* can also be distinguished from *A. congicus* by the elongation of its postanal region (Fig. 4). As *A. traversi* exhibits the diagnostic characters of both complexes, their usefulness as presently defined can be questioned.

Caecomastacembelus greshoffi (Boulenger, 1901) is the only other mastacembelid species, endemic to the Zaïre river basin, with a postanal length comparable to that in *A. traversi* (Fig. 4). *Aethiomastacembelus traversi* has fewer dorsal spines than *C. greshoffi* (20-22 + 1, vs. 29-33 + 1).

Comparative material. *Aethiomastacembelus congicus*: Zaïre: Lower Zaïre River basin: MRAC 19075, 213 mm TL; Boma; approx. 5°50'S 13°03'E; Schouteden. - MRAC 19150, 287 mm TL; Kidada; approx. 5°22'S 14°32'E; Schouteden. - MRAC

78147-78148, 1, 336 mm TL; Leopoldville; approx. 4°18'S 15°18'E; M. H. Pierret, 1951. – MRAC 103305-306, 2, 229-236 mm TL; Kingabwa fishing post, Leopoldville; approx. 4°19'S 15°21'E; J. Mandeville, 8 Sept. 1955. – MRAC 104001-002, 2, 234-365 mm TL; Stanley-Pool; approx. 4°06'S 15°15'E; A. Werner, June 1955. – MRAC 118246, 68 mm TL; Stat. 35, Stanley-Pool, Riv. Nsele; approx. 5°45'S 15°32'E; Mission Brien-Poll-Bouillon, 4 Oct. 1957. – MRAC 118914, 156 mm TL; Stanley-Pool; P. Brichard, 1956. – MRAC 177560, 131 mm TL; rapids at Kinsuka, Kinshasa; approx. 4°20'S 15°13'E; P. Brichard, 1964. – MRAC 177698-699, 2, 179-198 mm TL; Stanley-Pool, Kinshasa; approx. 4°06'S 15°15'E; P. Brichard, 1967. – MRAC 73-22-P-5039, 89 mm TL; MRAC 73-22-P-5041, 100 mm TL; Stanley-Pool, between Mbamu archipel; approx. 4°06'S 15°15'E; J. Mandeville, 20 Oct. 1957. – MRAC 73-22-P-5042-5043, 2, 123-155 mm TL; MRAC 73-22-P-5044, 130 mm TL; Stanley-Pool, Riv. Nsele; approx. 5°45'S 15°32'E; J. Mandeville, 30-31 Oct. 1957. – MRAC 73-22-P-5045, 261 mm TL; MRAC 73-22-P-5047, 450 mm TL; Stanley-Pool; approx. 4°06'S 15°15'E; J. Mandeville, 1 Aug. 1958 & 23 April 1958. – MCZ 50162, 164 mm TL; Zaïre River at Gombe or Ngombe, about 20 km. W. of Kinshasa; approx. 4°24'S 15°10'E; T. R. Roberts & D. J. Stewart, 23 June 1973. – MCZ 50484, 396 mm TL; Zaïre River near Inga, a few km upstream and on the opposite side from the river from Inga hydroelectric dam; approx. 5°27.5'S 13°36'E; T. R. Roberts & D. J. Stewart, 1 Aug. 1973. – MCZ 50561, 3, 111-197 mm TL; Zaïre River mainstream near Inga hydroelectric dam; approx. 5°31.5'S 13°37.5'E; T. R. Roberts & D. J. Stewart, 4 Aug. 1973. – CAS-SU 66378, 2, 181-262 mm TL; Zaïre (Congo) R. System, Kinshasa (Leopoldville), rapids at Kinsuka; approx. 4°18'S 15°18'E; T. R. Roberts, July 1964. – IRSNB 21223, 220 mm TL; Lower Zaïre, Bangu massif, Riv. of Marvete; Billiet & Jadin, 3 Feb. 1987. – IRSNB 21224, 2, 184-212 mm TL; Lower Zaïre, Bangu massif, Luenda Riv.; Billiet & Jadin, 4 Feb. 1987.

Zaïre: Upper Zaïre River basin: BMNH 1896-3-9-4, holotype (with mutilated tail), 252 mm TL; Upper Congo, some 50 miles south of Mangala, at Monsembé; ±4°10'S 27°29'E; J. H. Weeks, 1896?

Aethiomastacembelus paucispinis: Lower Zaïre River basin (Zaïre): MRAC 55, holotype, 220 mm TL; Matadi; approx. 5°49'S 13°27'E; Wilverth, 1896. – MRAC 55074, 390 mm TL; Leopoldville; approx. 4°18'S 15°18'E; Henrard, 1937. – MRAC

88010-013, 4, 109-241 mm TL; Leopoldville West, Rapids at Kinsuka; approx. 4°18'S 15°18'E; J. J. Deheyne, 24 Sept. 1957. – MRAC 103728, 153 mm TL; Stanley-Pool; approx. 4°06'S 15°15'E; A. Werner, June 1955. – MRAC 118258, 200 mm TL; Stanley-Pool; approx. 4°18'S 15°18'E; Mission Brien-Poll-Bouillon, 24 Sept. 1957. – MRAC 177685-691, 7, 102-150 mm TL; MRAC 177692-694, 3, 203-347 mm TL; Stanley-Pool, Kinshasa; approx. 4°18'S 15°18'E; P. Brichard, 1967. – MCZ 50420, 291 mm TL; Zaïre River mainstream near Isangila; approx. 5°18'S 13°36'E; T. R. Roberts & D. J. Stewart, 15 Aug. 1973. – MCZ 50485, 281 mm TL; Zaïre River near Inga, a few km upstream and on the opposite side of the river from Inga hydroelectric dam; approx. 5°27.5'S 13°36'E; T. R. Roberts & D. J. Stewart, 1 Aug. 1973. – USNM 216358, 4, 186-283 mm TL; Zaïre River mainstream near Inga hydroelectric dam; approx. 5°31.5'S 13°37.5'E; T. R. Roberts & D. J. Stewart, 4 Aug. 1973. – CAS-SU 64787, 168 mm TL; Leopoldville (Kinshasa), rapids of Kinsuka; approx. 4°20'S 15°13'E; T. R. Roberts, 21 July 1964. – CAS-SU 66295, 2, 137-206 mm TL; CAS-SU 66296, 5, 108-141 mm TL; CAS-SU 66297, 4, 186-234 mm TL; Zaïre (Congo) R. System, Kinshasa (Leopoldville), rapids at Kinsuka; ±4°20'S 15°13'E; T. R. Roberts July 1964.

Zaïre: Middle Zaïre River basin: MRAC 178097-099, 3, 73-179 mm TL; Boende; approx. 0°18'S 20°50'E; P. Brichard, 1969 (2+1 specimen cleared and stained). – MCZ 111604, 152 mm TL, Central African Republic, Koto at Kembe, mostly rapids; approx. 4°36'N-21°54'E; T. R. Roberts, May 1971.

Caecomastacembelus greshoffi: Zaïre: Lower Zaïre River basin: BMNH 1900-11-26-3, holotype, 194 mm TL; Stanley-Pool; approx. 4°06'S 15°15'E; Greshoff, 1900? – MRAC 41766, 71 mm TL; MRAC 43855, 80 mm TL; MRAC 44017, 127 mm TL; Leopoldville; approx. 4°18'S 15°18'E; A. Tinant, 1934 & 1935. – MRAC 80136, 122 mm TL; Leopoldville; approx. 4°18'S 15°18'E; Van De Weyer, June 1955. – MRAC 103717-727, 10, 51-259 mm TL; Stanley-Pool; approx. 4°06'S 15°15'E; A. Werner, June 1955. – MRAC 118248-250, 3, 152-235 mm TL; Stanley-Pool, great Isle of the Ndjili, Congo-Ubangi hiding-place; approx. 4°06'S 15°15'E; Mission Brien-Poll-Bouillon, 26 Sept. 1957. – MRAC 118251-253, 3, 76-103 mm TL; Stat. 35, Stanley-Pool, Riv. Nsele; approx. 4°15'S 15°33'E; Mission Brien-Poll-Bouillon, 4 Oct. 1957. – MRAC 118915-918, 4, 84-143 mm TL; MRAC

125338, 303 mm TL; MRAC 177701, 116 mm TL; Stanley-Pool, Kinshasa; approx. 4°06'S 15°15'E; P. Brichard, 1956, Sept. 1958 & 1967. – MRAC 73-22-P-5025, 263 mm TL; Stanley-Pool, between Mbamu archipel; approx. 4°06'S 15°15'E; J. Mandeville, 20 Oct. 1957. – MRAC 73-22-P-5026-5030, 5, 92-239 mm TL; Stanley-Pool, Mbamu coast up to Nzelé-Moko; approx. 4°06'S 15°15'E; J. Mandeville, 25 Oct. 1957. – MRAC 73-22-P-5033, 183 mm TL; Stanley-Pool, along the banks, Mbamu archipel; approx. 4°06'S 15°15'E; J. Mandeville, 30 Oct. 1957. – MRAC 73-22-P-5034, 133 mm TL; Stanley-Pool, place Iseba; approx. 4°18'S 15°31'E; J. Mandeville, 31 Oct. 1957. – MRAC 73-22-P-5035, 148 mm TL; Stanley-Pool, riv. Kalamu; approx. 4°20'S 15°30'E; J. Mandeville, 5 Nov. 1957. – MRAC 73-22-P-5036-5037, 2, 92-129 mm TL; Stanley-Pool, passage on Mbamu side; approx. 4°06'S 15°15'E; J. Mandeville, 13 Nov. 1957. – MRAC 73-22-P-5038, 133 mm TL; Stanley-Pool, beach of Kingabwa; approx. 4°19'S 15°21'E; J. Mandeville, 14 Nov. 1957. – MRAC 88-01-P-2955, 126 mm TL; swamps in the neighbourhood of Kingabwa; approx. 4°19'S 15°21'E; Mission Bri-en-Poll-Bouillon, 26 Sept. 1957.

Zaire: Middle Zaire River basin: MRAC 19086, 193 mm TL, MRAC 19149, 245 mm TL & MRAC 19237-238, 2, 157-205 mm TL; Mongende; approx. 2°06'S 16°20'E; Schouteden. MRAC 67257-258, 2, 209-276 mm TL; Mushie Region, riv. Kasai; approx. 3°02'S 16°55'E; Vleeschouwers June 1945.

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