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Nanochromis teugelsi, a new cichlid species (Teleostei: Cichlidae) from the Kasai Region and central Congo basin

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Nanochromis teugelsi, new species, is described from the Kasai Region and the main channel of the Congo as far upstream as Lake Tumba. It differs from *N. dimidiatus*, *N. sabinae*, and *N. squamiceps* in lacking a supraneural bone and in lacking scales on the nape, cheek and chest. It has a more elevated upper lateral line, contiguous to the dorsal-fin base from about the 6th pored scale on. In addition to distinguishing coloration characters, *N. teugelsi* is distinguished from *N. minor*, *N. transvestitus*, *N. nudiceps*, *N. wickleri* and *N. splendens* by its fully scaled opercle, from *N. consortus* by its shorter and shallower caudal peduncle, and from *N. parilus* by a lower number of gill rakers on the first arch.

Introduction

The genus *Nanochromis*, distinguished by an extremely elevated upper lateral line, was originally erected by Pellegrin (1904) for *N. nudiceps*. In his revision of the genus *Pelmatochromis*, Thys van den Audenaerde (1968) included *Nanochromis* as a subgenus of *Pelmatochromis* sensu lato, for species of *Pelmatochromis* with 12 scale rows around the caudal peduncle. *Nanochromis* was considered again as a valid genus by Trewavas (1973, 1974). Roberts & Stewart (1976) characterized *Nanochromis* sensu stricto (excluding several species placed by Greenwood, 1987 in the genera *Parananochromis* and *Limbochromis*) as having half or more of the upper lateral line adjacent to the base of the dorsal fin, rather than separated from it by one or more rows of scales, and added four new species.

Greenwood (1987) recognized two groups within *Nanochromis*. The smaller group he characterised as having fewer than about half the pored scales of the upper lateral-line contiguous with the dorsal-fin base, a completely scaled belly and nape, a partially scaled chest and cheek, and the presence of a single, reduced and comma-shaped supraneural bone. At present, this group contains three named species: *N. dimidiatus*, *N. sabinae* and *N. squamiceps*. The second group contains all remaining species, characterised by the posterior half, or slightly more, of the upper lateral line contiguous with the dorsal-fin base, a naked nape, cheek and belly, and by the absence of a supraneural bone in most individuals. Green-

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Fig. 1. *Nanochromis teugelsi*, AMNH 233373, holotype, male, 49.7 mm SL; **a**, immediately after capture; **b**, preserved; Congo Democratic Republic: Kasai River.

wood's second group is equivalent to Roberts & Stewarts' *Nanochromis* sensu stricto.

In 1999, a *Nanochromis* from the Kasai Region in the Democratic Republic of the Congo, clearly a member of Greenwood's second group, appeared in the aquarium trade (Warzel, 2000). In 2002, some specimens of this species were collected by RS in the Kasai River (Democratic Republic of Congo). This new species is described herein.

Material and methods

External counts and measurements follow Barel et al. (1977). All measurements were taken on the left side of the specimens with digital callipers with an accuracy 0.03 mm. Clearing and staining follows Dingerkus & Uhler (1977). Description of coloration of live specimens is based on photographs of specimens made by R. Schelly in the field as well as on aquarium raised specimens (offspring of the first and second generation of the specimens imported by R. Numrich). Photographs and x-rays of holotypes of congeners has been used for comparison. Eight pairs, F1 and F2 descendents of the material imported by R. Numrich, were used for behavioural observations and additional description of coloration, but not included in the type series. Abbreviations used are: AMNH, American Museum of Natural History, New York; BMNH, Natural History Museum, London; MCZ, Museum of Comparative Zoology, Cambridge; MNHN, Muséum National d'Histoire Naturelle, Paris; MRAC, Musée Royal de l'Afrique Centrale, Tervuren; NMW, Naturhistorisches Museum, Wien; SL, standard length; HL, head length; DRC, Democratic Republic of Congo; CAR, Central African Republic.

Nanochromis teugelsi, new species
(Figs. 1-4)

Nanochromis sp. "Kasai": Lamboj, 2004: 165; Linke & Staeck, 2002: 111.

Holotype. AMNH 233373, male, 49.7 mm SL; DRC: Bandundu province, Bokoni village, Kasai River, estuary across river (03°09'28"S 17°09'44"E); R. C. Schelly, 17 Sep 2002.

Paratypes. AMNH 233374, 1 female, 30.3 mm SL, same data as holotype; 20 Sep 2002. – AMNH 237593, 1 male, 55.9 mm SL, C&S; DRC: Congo River south of Kinshasa; R. Numrich. – NMW 94841, 1 female, 34.6 mm SL; same data as holotype; 18 Sep 2002. – MRAC 153663-664, 1 male, 1 female, 33.5-32.9 mm SL; DRC: River Kwenge, confluent riv. Kwenge et Kwilu, Leverville; A. Schreyen, May 1964. – MRAC P 17443-17444, 2, 38.9-42.1 mm SL; DRC: Mogende (02°06'S 16°20'E); Schouteden, 1927. – MRAC 18044-18045, 2 males, 27.9-29.7 mm SL; DRC: Tondu; Schouteden, 1927. – MRAC 94712, 1, 30.7 mm SL; DRC: Lulua River, Luebo; B. Worth, Jun 1954.

Diagnosis. *Nanochromis teugelsi* differs from *N. dimidiatus*, *N. sabinae* and *N. squamiceps* in the absence of scales on nape, cheeks, and chest (vs. presence) and a more elevated upper lateral line, with about half or more contiguous with the dorsal-fin base (vs. not contiguous), and in the absence of a supraneural bone (vs. presence). It differs from *N. transvestitus* in colour patterns (no black and white vertical bars on body and female dorsal, caudal and anal fin vs. presence). It differs from *N. minor*, *N. nudiceps*, *N. splendens*, *N. transvestitus* and *N. wickleri* in a fully scaled opercle (vs. an unscaled one in *N. minor* and *N. splendens* and only few, disperse scales in *N. nudiceps*, *N. transvestitus* and *N. wickleri*). It differs from *N. consortus* in a shorter and more slender caudal peduncle (11.2-13.9 % SL vs. 13.6-16.0; 99.5-120.9 % of caudal peduncle depth vs. 124.7-143.8), in a greater length of the dentigerous arm of the premaxilla (28.4-34.6 % HL vs. 25.4-30.2) and in

Fig. 2. *Nanochromis teugelsi*, male, about 55 mm SL; aquarium specimen, not preserved, stressed coloration.

Fig. 3. *Nanochromis teugelsi*, male, about 55 mm SL; aquarium specimen, not preserved, normal coloration.

Fig. 4. *Nanochromis teugelsi*, female, about 45 mm SL; aquarium specimen, not preserved, normal coloration.

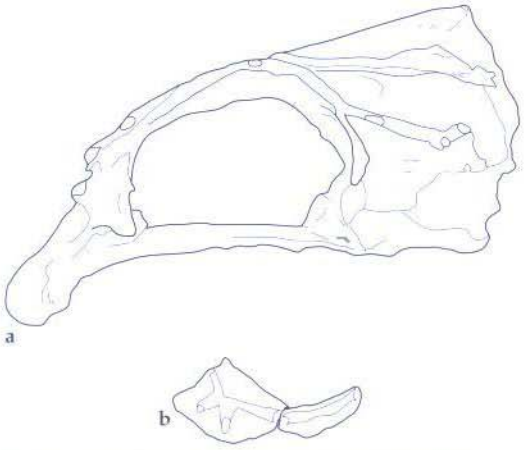

Fig. 5. *Nanochromis teugelsi*, AMNH 237593, 55.9 mm SL; **a,** neurocranium, lateral view of neurocranium; **b,** lachrymal with adjacent infraorbital element, lateral view.

profile of the dorsal fin (about last ten dorsal fin spines subequal in length vs. dorsal fin spines stubby anterliorly, increasing regularly in length from first to last in *N. consortus*) . It differs from *N. parilus* in a lower number of gill rakers on the first outer arch (total of 10-12 vs. 12-17) and in the colour pattern of the caudal fin (black margin, followed by a white submargin and one additional black margin on the upper edge of the fin, with no to numerous reddish dots oriented in vertical rows in the rest of the fin vs. black margin and white submargin on the upper edge of this fin, two to four horizontal, black to reddish lines in the upper half of this fin and numerous reddish dots, sometimes absent, oriented in vertical rows in the rest of the fin when present) and a yellow coloration on lower parts of snout, head, cheeks and opercles (vs. bluish coloration), also in presenting one to three black spots in the posterior part of the dorsal fin of most specimens, not visible in *N. parilus*.

Description. Measurements and meristics for holotype and 10 paratypes in Table 1. Sexual dimorphism and dichromatism well-developed. First ray of pelvic fin longest in both sexes, but always more produced in males than in females. Caudal fin rounded. Caudal peduncle length from 99.5 % to 120.9 % of caudal peduncle depth.

Osteology and dentition. Supraoccipital crest elevated (Fig. 5a). Infraorbital bone series consisting of lachrymal and one tubular element (2nd infraoribital, Fig. 5b); lachrymal with four openings of laterosensory canal system. Twenty five-27 vertebrae, 12-13 abdominal and 13-14 caudal.

Premaxilla (Fig. 6a) and dentary (Fig. 6b) with 2-3 rows of unicuspid teeth. Lower jaw anteriorly with a few teeth orientated posteriorly, not buccally. Dentary with five laterosensory canal openings; two openings in anguloarticular; and seven openings in preopercle (Fig. 6c). Lower pharyngeal bone triangular (Fig. 7a,b), with teeth bevelled unicuspid (lateral parts of the bone) or asymmetric bicuspid (central field).

Six to eigth tuberculate gill rakers on ceratobranchial of first gill arch, 4-5 pointed gill rakers on epibranchial (Fig. 7c). Well-developed hanging pad on roof of pharynx.

Scales cycloid. Nape to origin of dorsal fin, cheek and anterior parts of chest unscaled. Opercle with 3-4 rows of scales. Chest scales normally absent, no scales between pectoral and pelvic fin or a few dispersed scales (in one specimen).

Upper lateral line always with some nonpored scales in row, especially anteriorly; separated from dorsal-fin base anteriorly, but contiguous from about 6th scale on; end of upper lateral line not overlapping lower lateral line. About ¼-⅓ of caudal fin covered with scales; other fins unscaled.

Coloration. Live specimens of both sexes (Figs. 2-4): Head greyish brown, body greyish to greyish blue. Stressed individuals with 7-8 dark vertical bars on body, reaching from dorsal-fin base to about mid-body, first bar immediately behind outer edge of opercle. Body darker dorsally than ventrally. Upper parts of cheek and opercle iridescent turquoise. Upper lip orange-brown to yellowish brown, lower lip pale white to light yellowish-brown. Lower parts of head, cheeks and opercle yellow to pale orange. Chest whitish. Flanks with an iridescent green blotch about 2-3 scale-rows in height and below upper lateral line; more prominent in females. Upper edge of eye red. One to three black dots in posterior parts of dorsal fin in most specimens.

Male: Anterior edge of body scales in dorsal body parts dark to black. Dorsal fin and upper edge of caudal fin with thin red margin, followed by a white submargin and a second black submargin. Dorsal fin pale yellow to pale orange, with dark spines and rays and with 6-7 dark vertical rows posteriorly, covering about half of soft part. Upper half of caudal fin white to yellow,

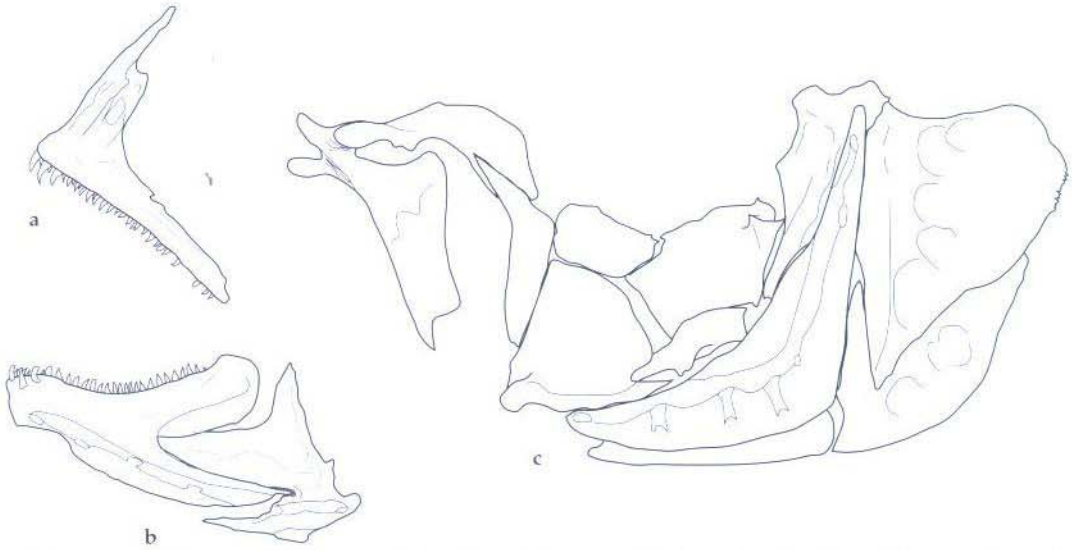

Fig. 6. *Nanochromis teugelsi*, AMNH 237593, 55.9 mm SL. **a**, premaxilla, **b**, dentary and anguloarticular, **c**, additional bones of suspensorium and operculum, lateral view.

with 5-7 vertical rows of dark-brown to black spots or with 3-4 vertical rows in anterior part and 4-5 dark horizontal lines in posterior part of this half of the fin. Ventral parts of caudal fin bluish, with 9-10 vertical rows of reddish to reddish brown spots. Anal fin bluish to violet, with black outer edge and with some rows of red spots on most posterior soft-rayed parts. Anterior edge of pelvic fins dark to black, other parts of fin yellow to pale orange. Pectoral fin clear to pale yellow.

Female: Dorsal fin with red margin, followed by a white submargin, always broader than in male, and a thin, black to reddish second submargin. Rest of fin yellow to pale orange, with one or two black spots in posterior parts of most individuals. Caudal fin with red margin and white submargin on the upper edge; rest of fin pale blue to violet. Anal fin bluish to slightly violet, with black margin on most outer edge. Pectoral fin clear. Pelvic fin whitish, with dark anterior edge. Flanks and belly region pale violet to dark violet

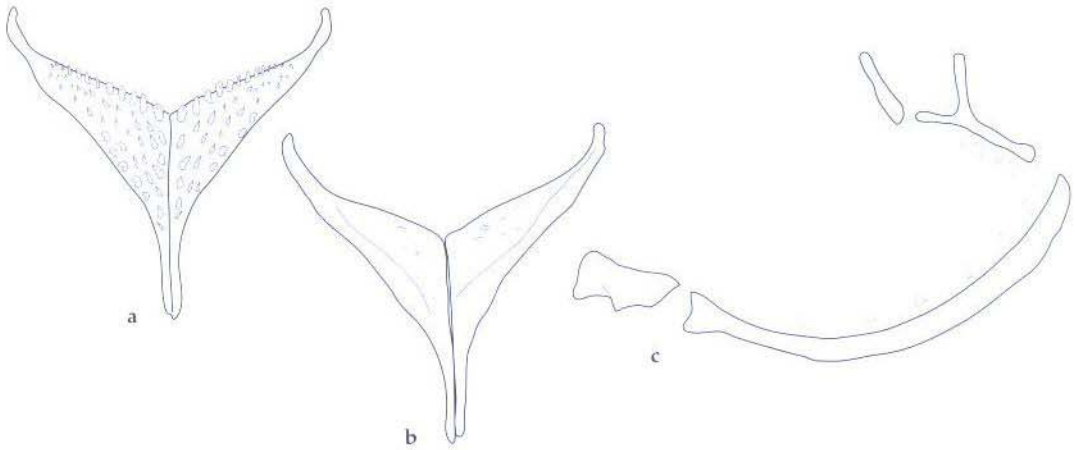

Fig. 7. *Nanochromis teugelsi*, AMNH 237593, 55.9 mm SL; **a**, lower pharyngeal jaw, dorsal view, **b**, ventral view; **c**, first gill arch, lateral view.

in ripe females, from posterior edge of pectoral fin origin to anal fin origin, up to about mid-body or higher in some individuals. Genital papilla white.

Juveniles of both sexes: A pattern of irregular dark spots on mid-brown coloration, up to a size of about 10 mm. Adult coloration is seen with increasing size.

Preserved specimens (Fig. 1): Head and body pale brown, with front of head darker than rest. Black dots in dorsal fin easily visible. Red and black coloration patterns in dorsal, caudal and anal fins, as given in description of living specimens, dark brownish-red to blackish in preserved specimens. In males, anterior edge of upper body scales dark. In ripe females, belly region wine red.

Breeding behaviour. In aquaria, *Nanochromis teugelsi* is a monogamous and pair bonding cave spawner, as typical for the genus (Lamboj, 2004). Eggs and larvae normally guarded by the female alone, with no or only little participation of the male. Hatching of larvae occurs after three days after spawning. Juveniles are swimming free 8-9 days after spawning and are guarded by both parents for about 5-7 weeks.

Table 1. Morphometrics and meristics data of holotype and 10 paratypes of *Nanochromis teugelsi*.

	holotype	mean	SD	range
Standard length	49.7	42.6	9.0	30.3-55.9
Percents of standard length				
Body depth	24.6	25.0	2.1	22.7-30.0
Head length	28.8	31.4	1.4	28.8-33.0
Length of caudal peduncle	12.5	12.4	1.0	11.2-14.0
depth of caudal peduncle	11.4	11.4	0.7	10.1-12.3
Lenght of dorsal-fin base	63.2	60.5	2.7	56.8-65.0
Length of anal-fin base	21.1	20.0	1.3	17.7-21.5
Predorsal distance	26.4	27.8	1.1	25.9-29.4
Preanal distance	68.5	67.1	1.8	63.9-69.0
Prepectoral distance	33.0	34.6	1.3	33.0-37.1
Prepelvic distance	34.9	36.9	1.7	34.7-39.9
Percents of head length				
Head depth	67.3	59.4	4.1	54.2-67.3
Snout length	34.4	29.4	4.9	20.0-36.4
Eye diameter	28.8	30.9	1.8	28.5-33.7
Postorbital distance	36.8	39.7	3.8	34.4-46.6
Interorbital distance	15.7	17.9	2.2	15.4-20.8
Cheek depth	28.2	26.5	2.3	23.1-31.1
Length of lower jaw	39.7	38.3	2.7	34.6-44.6
Length of premaxilla-dentigerous arm	32.5	31.1	2.6	28.4-34.7
Preorbital distance	19.9	18.9	1.7	15.8-21.8
Percents of depth of caudal peduncle				
Length of caudal peduncle	110.3	108.7	7.0	99.5-120.9
Meristics		median		
Upper lateral-line scales	20	18		15-23
Lower lateral-line scales	7	6		4-8
Total lateral-line scales	30	27		24-30
Circumpeduncular scales	12			12
Dorsal-fin spines	18	18		17-19
Dorsal-fin rays	9	8		8-9
Anal-fin spines	3			3
Anal-fin rays	8	7		7-8
Pectoral-fin rays	13	13		12-13
Gill rakers on lower limb of first arch	8	7		6-8
Total gill rakers on first arch	12	11		10-12

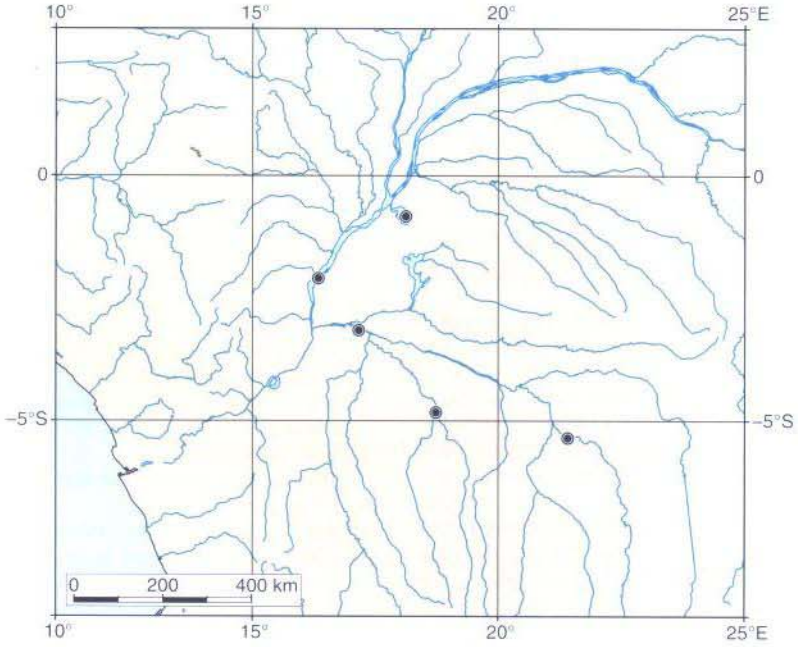

Fig. 8. Distribution of *Nanochromis teugelsi*.

Fig. 9. Type locality of *Nanochromis teugelsi*, Congo Democratic Republic: Kasai River, backwater of the main channel near the village of Bokoni.

Distribution (Figs. 8-9). DRC, Kasai drainage and Congo River main channel, region from Kasai River to Lake Tumba. The particular locality where the holotype was collected was a protected backwater connected to the main channel, with a sandy substrate and some aquatic vegetation (submerged grasses and floating *Eichhornia*).

Etymology. Dedicated to Guy G. Teugels, former curator of fishes at the Africa Museum in Tervuren (Belgium).

Comparative material. *Nanochromis consortus*: MCZ 50552, 2 paratypes: DRC: Congo River.

Nanochromis dimidiatus: MNHN 92-120, holotype; CAR. – MNHN 92-121, 3 paratypes, CAR. – MNHN 1921-440, 3; CAR: Bangui. – MNHN 1921-441, 3; CAR: Bangui. – MRAC 96-044-P-0113; Congo (Brazzaville): Etoumbi.

Nanochromis minor: MCZ 50342, paratype; DRC: Congo River.

Nanochromis nudiceps: MRAC 1045, holotype; DRC: Lake Kutu. – BMNH 1899.11.27.64, paralectotype; DRC: Stanley Pool.

Nanochromis parilus: MCZ 50309, 2 paratypes; DRC: Congo River. – MCZ 50475, 3 paratypes; DRC: Congo River.

Nanochromis sabinae: NMW 94839, holotype; Congo, (Brazzaville): Loubi River. – NMW 94840, 2 paratypes; same data as holotype. – AMNH 235651-2, 2 paratypes; same data as holotype. – MRAC 20479-20481, 3 paratypes; Congo (Brazzaville): Sangha River. – MRAC 2396-044-P-0196-0197, 2 paratypes; Congo (Brazzaville): Olombo. – MRAC 96-044-P-0198-0199, 2 paratypes; Congo (Brazzaville): 50 km N d'Obouya. – MRAC 096-044-P-0200-0201, 2 paratypes; Congo (Brazzaville): Makoua. – MRAC 96-044-P-0202, paratype; Congo (Brazzaville): small creek 3 km E of Louenk. – MNHN 1930-60, 4 paratypes; Gabon: Liboumba (Ogowe system).

Nanochromis splendens: MCZ 50311, 4 paratypes, DRC: Congo River. – MCZ 50553, 6 paratypes; DRC: Congo River.

Nanochromis squamiceps: BMNH 1902.4.14.11, holotype; DRC: Lindi River. – MRAC 49244-29251, 8; DRC: Kunungu. – MRAC 78-19-P-265-268, 4; DRC: Iteli River.

Nanochromis transvestitus: MRAC 81-14-P-1-10, 5 paratypes; DRC: Lac Mai Ndombe.

Nanochromis wickleri: AMNH 236665, 1 paratype; DRC: Lac Mai Ndombe.

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