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The identity of *Pseudotropheus elongatus*, with the description of *P. longior* from Mbamba Bay, Tanzania, and notes on *Genyochromis mento* (Teleostei: Cichlidae)

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Although *Pseudotropheus elongatus* was originally described from Mbamba Bay, Tanzania, a species of the *P. elongatus*-complex from Nkhata Bay, Malawi, has been considered to be the typical *P. elongatus*. Collections from Mbamba Bay revealed that at least two elongate *Pseudotropheus* species co-occur. The two extant syntypes of *P. elongatus* belong to the two species from Mbamba Bay. The specimen pictured by Fryer (1956) is selected as lectotype. The other species is described here as *P. longior*, new species. A third elongate cichlid, frequent at Mbamba Bay, is *Genyochromis mento*; some observations on this fish are included.

1956 beschrieb Fryer *Pseudotropheus elongatus* von Mbamba Bay, Tanzania, während in der Literatur bisher eine Form aus dem *P. elongatus*-Komplex von Nkhata Bay, Malawi, als *P. elongatus* im Sinne der Typen angesehen wurde. In Mbamba Bay gibt es zwei gestreckte *Pseudotropheus*-Arten. Die beiden existierenden Syntypen gehören unterschiedlichen Taxa an, nämlich jeweils einer der beiden bei Mbamba Bay vorkommenden gestreckten *Pseudotropheus*-Arten. Als Lectotypus für *P. elongatus* wurde das Exemplar festgelegt, das von Fryer (1956) abgebildet wurde. Die andere *Pseudotropheus*-Art wird hier als *Pseudotropheus longior* n. sp. beschrieben. Eine dritte gestreckte Cichlidenart, die in Mbamba Bay häufig vorkommt, ist *Genyochromis mento* Trewavas, 1935. Zu dieser Art werden einige Beobachtungen mitgeteilt.

Introduction

In modern times, with few exceptions (Fryer, 1956; Staeck, 1976), systematic research on the fishes of Lake Malawi has been done mostly in the Malawian waters. Since the time of Fülleborn at the end of the last century (not 1925-26 as suggested by Konings, 1994: 24; see Paepke & Seegers, 1995) there has been only very limited research in the Tanzanian waters of Lake Nyassa (as the lake is widely called in Tanzania). With the exceptions of Fryer and Staeck, the collections of the present author are the first from this part of the lake since those of Fülleborn.

Ribbink et al. (1983) and others showed that many cichlids of Lake Malawi, especially the 'mbuna' (Chitonga name for a group of rock frequenting cichlids defined by Ribbink et al., 1983), very often are restricted to a limited area, sometimes not more than a few kilometers of rocky shore or a little island. It would be interesting, therefore, to know if there are species in

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Fig. 1. The type locality of *Pseudotropheus elongatus* and *P. longior* south of Mbamba Bay. To the left of the sandy shore is Chinyangi Point; Mbamba Bay is situated behind that landmark. In the foreground some rocks where *P. elongatus* and *P. longior* were collected.

the Tanzanian waters of the lake which are different from those known from the Malawian shores and to determine their distribution.

Unfortunately, there is a serious misunderstanding about the identity of *P. elongatus*. Not only Ribbink et al. (1983: 189), but all authors in the scientific and aquarium literature (Staeck, 1988: 83; Stauffer, 1988; Konings, 1989) consider a fish from Nkhata Bay as *P. elongatus* in the sense of the types.

Fryer (1956) described four 'mbunas': *Pseudotropheus minutus, P. elongatus, P. fuscoides* and *Labidochromis caeruleus*. While the drawings of *P. minutus* and *L. caeruleus* coincide with the living fish, this is not the case with *P. elongatus*. First of all, the forehead is much too curved and the mouth is large and slightly subterminal. The lips are much thicker than those shown in the drawing in Ribbink et al. (1983: 183). The diameter of the eye is strikingly large. Moreover, the body is rather deep in relation to its length. The drawing of *P. elongatus* in Ribbink et al. (1983) in lateral view shows the highest point of the body at the origin of the dorsal fin. From this point the body gets more and more slender to reach the least depth at the caudal peduncle. The drawing of Fryer does not show such a gentle decrease of the body depth, but in his fish the greatest body depth is near the end of the pelvic fins (at about the middle of the body). Finally, the fins disagree, especially the dorsal fin which is much deeper in the drawing of Fryer and has a different shape, and the caudal fin, which has a concave margin in Fryer's drawing, whereas the margin of the caudal fin in Ribbink et al. is not concave but truncate or slightly convex and much more rounded. In conclusion either the drawing in Fryer (1956) is very crude (which contradicts the accuracy of the drawings of at least *P. minutus* and *L. caeruleus*), or the illustrated species is not identical with the *P. elongatus* of subsequent authors including Ribbink et al. (1983).

Because of all these contradictions, it was desirable to collect at the type locality of *P. elongatus* and to compare that material with the types.

In fact, the text in Fryer (1956: 85) is not unequivocal: 'Occurrence: The three specimens of this species from which the above description was prepared were collected at Mbamba Bay on the eastern shore of the lake. Three juvenile specimens have also been collected on the western shore, at Nkata Bay'. Following of numerous discussions with colleagues, I interpret the first sentence as a designation of syntypes according to ICZN art. 72 (a) (i), (b) (i) and especially (vi). The 'three juvenile specimens' which 'have *also* been collected' in my opinion are mentioned separately from those from which the description was prepared. This 'separate mention of the latter expressly excludes them from the type series.' [ICZN art. 72 (b) (vi)]. In this interpretation, the type locality of the syntypes used in the original description is Mbamba Bay; the Nkhata Bay specimens thus cannot be regarded as types. If, however, the text is interpreted as not excluding of the Nkhata Bay specimens, then these specimens would also belong to the syntype series and both localities would constitute the type locality. Beside from these technical and theoretical discussions the fact is that Fryer deposited only two syntypes of *P. elongatus* from Mbamba Bay in a museum; Nkhata Bay specimens never were deposited as types or non-types (see below).

Ribbink et al. (1983) were able to show that there are several populations in Lake Malawi which resemble *P. elongatus* from Nkhata Bay, Malawi. Ribbink et al. (1983) recognize 24 different populations or even species. Since their publication, some of these populations have been formally described (Stauffer, 1988). The species to which these populations are compared is *P. elongatus* Fryer, 1956. It is the purpose of this paper to redescribe this basic form to avoid further confusion.

Material and methods

Fishes were collected by chasing them into a monofilament net (10 m × 1 m × 0.4 cm mesh size) and removed with a hand net at Mbamba Bay, Tanzania, in April, 1990. Mbamba Bay consists of a shallow sandy beach, but is surrounded by rocky shores (Fig. 1; see map in Mayland, 1982: 64). Collections were made at some rocks at the northern end of the bay where the road to Liuli leaves the village and from about 1,000 m south of the landspit of Chinyangi-Point which is situated in the south of Mbamba Bay. Further collections were made at Maunyuni Rocks, located approximately 700 m off shore to the west of Chinyangi Point and from a small bay with a rocky shore at the western side of Ngkuyo Island, a small island about 6 km southeast of Mbamba Bay. Most of the material was collected south of Chinyangi Point and at Maunyuni Rocks. Live fishes were taken to Germany and used for color notes, photography or behavioral studies.

Standard length (SL) is used throughout. External counts and measurements widely follow Barel et al. (1977). Scales in the lateral line series are counted as described in Trewavas (1983: 39). All counts and measurements were made on the left side of the fish where possible.

The material is deposited in the Natural History Museum, London (BMNH) and the Zoologisches Museum der Humboldt Universität, Berlin (ZMB).

Pseudotropheus elongatus Fryer

(Figs. 2a, 3a, 4a, 5, 6)

Material examined. BMNH 1956.9.4:1 (Fig. 3 top, 4 top), lectotype (present designation), male (?) 65.9 mm SL; 76.4 mm TL; Mbamba Bay, L. Nyasa, Tanzania; G. Fryer. - BMNH 1995.8.15:1-5, 5 spms., 74.9-95.2 mm SL; Tanzania, Lake Nyassa or Malawi, about 1,000 m south of Chinyangi-Point, south of Mbamba Bay (TZ 90/117); collected alive April 1990, preserved December 1990; B. Kilian & L. Seegers. - BMNH 1995.8.15: 6-8, 3 spms., 41.7-56.9 mm SL; same data, preserved in the field. - ZMB 32.558, 5 spms., 59.3-70.3 mm SL; same data, preserved in the field.

Diagnosis. A rock-dwelling cichlid ('mbuna') of the genus *Pseudotropheus* which is morphologically similar to the relatively short and compact species of the *P. elongatus* complex as defined by Ribbink et al. (1983). It is distinguished from most species of this complex by the combination of the following characters: its deep and short body (body depth 27.7-31.4 % SL), the convex forehead profile and the coloration consisting of 7-8 blue vertical bars on a dark brown to blackish back ground in territorial adult males.

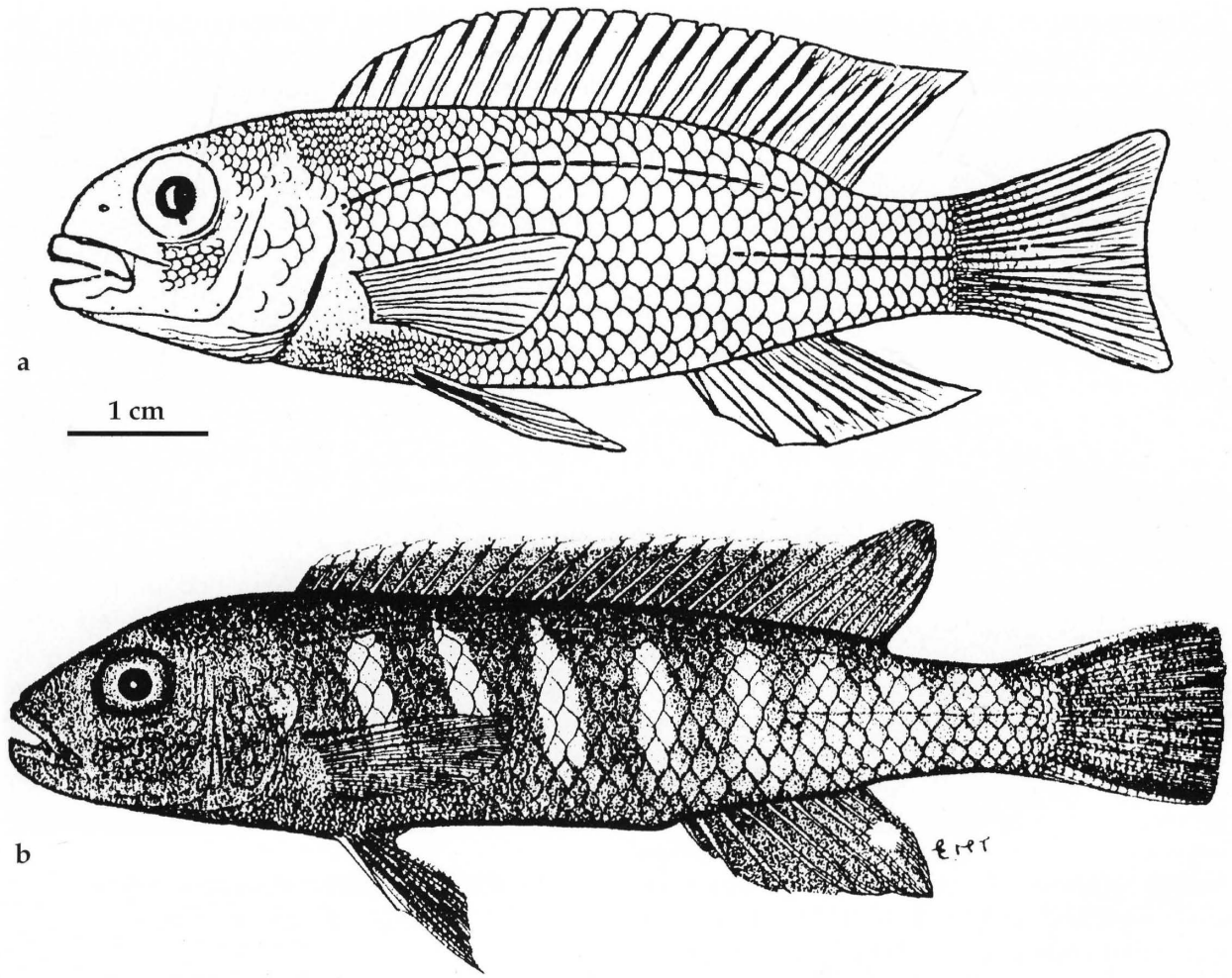

Fig. 2. a, *Pseudotropheus elongatus* (from Fryer, 1956: 85, fig. 3). **b,** *P. elongatus*, Nkhata Bay, 80 mm SL (from Ribbink et al., 1983: 183, fig. 9a).

Description. The following description is based on the lectotype (BMNH 1956.6.4: 27) and 13 specimens collected from Mbamba Bay in 1990. The description of life colors has been taken from wild caught, aquarium kept fish.

Morphometric and meristic characters are given in Table 1. Body moderately compressed and elongate in comparison with *Pseudotropheus* species which do not belong to the *P. elongatus*-complex in the sense of Ribbink et al. (1983) but relatively deep and compact in comparison with species within this complex (Ribbink et al., 1983: 218-219). Body depth exhibits allometric growth. Young to subadult fish are more slender while the body is deeper in fully adult males. Snout and forehead with a convex profile. Jaws isognathous, the lip of the upper jaw very slightly protruding. Mouth slightly subterminal in position, horizontal, lips a little thickened, especially upper lip. Posterior tip of maxilla not reaching a vertical through the anterior margin of the eye. Jaws and dentition as described by Fryer (1956: 84) [my findings added in brackets]: 'Both upper and lower jaws broadly rounded, each having four [3-4] series of teeth in fairly regular rows. Outermost series in each jaw bicuspid save last 3 or 4 lateral teeth [up to 7] of upper series which are conical and somewhat enlarged [usually smaller]. 34 to 36 bicuspid teeth in outer series of upper jaw. Inner 3 series of teeth in both jaws considerably smaller than outermost and all tricuspid'.

Dorsal moderately high, 17(2) or 18(8) dorsal spines, 8-9 soft rays. Anal with 3 spines and 6-7 soft rays. Caudal feebly emarginate, upper and lower distal edge rounded. Lectotype with 14 abdominal and 15 caudal vertebrae (Fig. 4).

Fig. 3. *Pseudotropheus elongatus*, lectotype (**a**), BMNH 1956.9.4:1, 65.9 mm SL, and paralectotype (**b**), BMNH 1956.6.4:27, 61.1 mm SL.

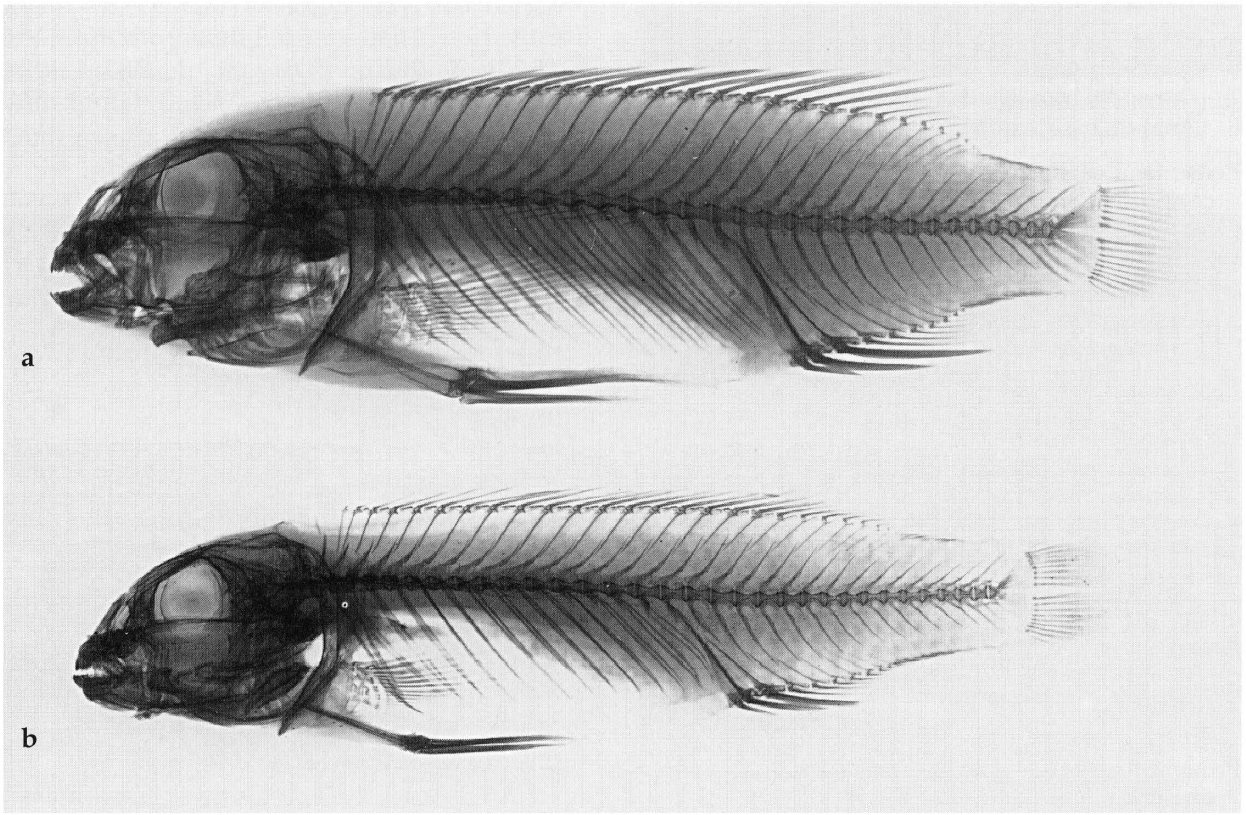

Fig. 4. Radiographs of the lectotype (**a**) of *Pseudotropheus elongatus* (BMNH 1956.9.4:1) and the paralectotype (**b**) (BMNH 1956.6.4:27), reversed.

Scales in longitudinal series (of 10 specimens: 30(1), 32(2), 33(5), 34(1) or 35(1), mean 32.8), 23-25 pore-bearing scales on the upper branch of the linea lateralis, 10-12 on the lower branch plus 1-3 small scales on the caudal fin. Gill rakers short and simple, anterior gill arch 10 or 11 on ceratobranchial, 3 or 4 on epibranchial, one between epibranchial and ceratobranchial.

Table 1. Morphometric proportions and meristic data of the lectotype (BMNH 1956.9.4:1) and 10 specimens (BMNH 1995.8.15:1-5, ZMB 32.558) of *Pseudotropheus elongatus*, and the holotype (BMNH 1995.8.15:9), 3 paratypes (BMNH 1995.8.15:10, ZMB 32.559 (2)) and one non-type (BMNH 1956.6.4:27) of *P. longior*, all collected from Mbamba Bay. * = damaged.

	P. elongatus			*P. longior*				
	lectotype	10 specimens		holotype	3 paratypes			non-type
		range	mean		BMNH	ZMB		
Standard length (mm)	65.9	59.3-95.2		86.7	65.1	75.8	61.0	61.1
Total length (mm)	79.9	74.1-114.1		107.8	80.0	91.4	72.1	72.1
Percentage of standard length								
Total length	121.2	117.2-125.9	122.0	124.3	122.9	120.6	118.2	118.0
Body depth	31.4	27.7-31.3	28.6	27.5	28.3	27.3	24.6	26.0
Body width	16.7	14.2-17.5	16.2	12.3	15.5	14.8	17.5	14.2
Head length	33.4	29.3-34.0	31.9	30.1	31.0	31.0	30.7	30.0
Head depth	27.3	25.9-29.4	27.3	24.2	26.3	25.1	24.6	22.9
Head width	18.2	16.3-17.8	16.9	16.0	17.7	16.0	17.7	15.7
Predorsal length	36.4	32.1-37.5	34.3	31.4	35.3	34.3	32.5	30.3
Prepelvic length	42.2	35.3-41.5	38.3	36.9	37.9	36.9	37.9	36.8
Preanal length	70.7	67.3-70.6	69.2	66.6	69.0	68.6	65.7	70.2
Caudal-peduncle length	15.0	14.5-17.9	16.3	15.8	16.9	16.6	16.9	16.5
Least caudal-peduncle depth	12.3	11.3-13.5	12.1	11.5	12.4	11.6	12.0	11.6
Pectoral-fin length	24.7	15.9-23.4	20.3	21.8	21.4	22.4	16.2*	20.5
Pelvic-fin length	25.5	23.3-31.4	26.7	26.5	24.0	24.3	21.0	21.3
Dorsal-fin base length	57.8	57.3-61.5	59.0	61.2	58.8	59.2	60.5	57.3
Anal-fin base length	18.5	16.9-19.1	17.9	19.6	20.3	18.6	20.3	16.4
Percentage of head length								
Snout length	35.9	39.5-46.8	42.0	39.8	44.6	41.3	36.4	35.5
Orbit diameter	28.2	25.1-30.3	27.6	29.5	29.7	26.8	30.5	28.4
Interorbital distance	40.7	26.0-34.8	30.9	34.1	29.2	31.1	32.1	27.9
Postorbital length	31.8	40.1-46.6	43.0	42.9	42.1	42.1	42.2	42.6
Pectoral-fin length	74.1	48.7-73.5	63.7	72.4	68.8	72.3	52.9	68.3
Pelvic-fin length	76.4	76.3-99.6	83.9	88.1	77.2	78.3	68.4	71.0
Longest dorsal spine	41.8	38.3-49.8	41.9	45.2	43.6	43.8	43.3	27.3*
Longest dorsal soft ray	62.3	51.3-78.5	60.2	75.9	60.9	70.6	54.0	54.1
Longest anal spine	49.1	37.5-47.5	42.3	41.4	44.1	41.3	40.6	31.7
Longest anal soft ray	54.5	56.0-71.3	60.7	67.4	65.8	67.7	51.3	54.6
Caudal peduncle length	45.0	42.8-57.3	51.3	52.5	54.5	53.6	55.1	55.2
Percentage of eye diameter								
Snout length	127.4	133.3-184.2	153.2	135.1	150.0	154.0	119.3	125.0
Interorbital distance	140.3	91.7-136.6	112.7	115.6	98.3	115.9	105.3	136.5
Dorsal-fin rays	XVII/ 8+1	XVII-XVIII/ 7-8+1		XVIII/ 8+1	XVIII/	XVIII/ 8+1	XVIII/ 8+1	XVIII/ 8
Anal-fin rays	III/ 6+1	III/6+1(6) -III/7+1		III/ 7+1	III/ 7+1	III/ 7+1	III/ 7+1	III/ 7+1
Pectoral-fin rays	13	13		13	13	14	14	13
Pelvic-fin rays	I/5	I/5		I/5	I/5	I/5	I/5	I/5
Lateral line scales	31	30, 32(2), 33(5), 34, 35		35	34	34	34	33
Upper/lower lateral line scales	23/12	23-25/10-12		25/12	25/13	23/12	25/11	24/11

Fig. 5. *Pseudotropheus elongatus*, BMNH 1995.8.15:1-5, male, about 60 mm TL, Mbamba Bay, Tanzania; four weeks after capture.

Lower pharyngeal bone in form of an approximately equilateral triangle, with rather deep indentation in posterior margin. Pharyngeal teeth fairly numerous and small, the most posterior row being somewhat enlarged, especially medially (Fryer, 1956: 85).

Color. In life (Figs. 5-6). The color description given by Fryer (1956: 85) is very unsatisfactory although the general impression is correct. Subadult specimens show a fawn overall coloration with bluish tinges when taken from the water. Underwater, subadult specimens are dark brown

Fig. 6. *Pseudotropheus elongatus*, female, about 50 mm SL, Mbamba Bay, not preserved.

Fig. 7. *Pseudotropheus longior*, BMNH 1995.8.15:9, holotype, male of 86.7 mm SL, Mbamba Bay.

to nearly black with 7-8 bluish vertical bars. When kept in aquaria, subadults and subdued fish show a fawn ground color with about 8 bluish vertical stripes. Territorial males have a dark brown to black ground color with 7-8 blue vertical bars of variable width. Two blue interorbital bars on forehead, lower part of head below eye dark brown to blackish. Pelvics black with anterior edge white. Anal black in its anterior part with the anterior edge white in most specimens, posterior part of anal slightly lighter colored and with 1-8 (mostly 1-4) yellow egg-like spots of various sizes. Dorsal with a white to light blue outer margin. Inner part variable. In some specimens the barring on the body continues to the white margin of the fin, most specimens having a wide submarginal black band. Intermediate phenotypes between the dorsal-fin patterns described do occur. Caudal proximally dark blue to fawn, distally blackish with narrow light blue stripes running along the fin rays. Upper and lower edge of the fin white. Pectorals hyaline to slightly blue. See Spreinat (1994: 251) for underwater photographs of male and female (as *Pseudotropheus* "Elongatus Sand") from the sunken pontoon at Mbamba Bay. The specimen shown on page 249 in Spreinat (1994), bottom left, clearly is of the same species; the bottom right picture seems to be *P. elongatus* as well.

In alcohol (Fig. 3, top). Freshly preserved wild-caught specimens of *P. elongatus* rapidly become very dark. The blue color then disappears and the bars cannot be seen. After 4 years in preservation the body is somewhat lighter and no longer shows any color pattern; the fins remain dark. Aquarium kept specimens are lighter brown when preserved, with dark submarginal bands in their fins, and they retain a pattern of dark vertical bars.

Distribution and ecological notes. I observed *P. elongatus* in the whole area from north of Mbamba Bay to Maunyuni Rocks. Spreinat (1994: 248-249) reported this species under the name *Pseudotropheus* "Elongatus Robust" and found it at Cove Mountain (north of Manda) and near Manda (both to the north of the mouth of the Ruhuhu River). On page 249 he illustrated 5 specimens, of which the uppermost and the specimen second row right reportedly are from Manda. In my opinion these specimens are not *P. elongatus* but *Cynotilapia afra*. Both are too short and too deep-bodied for *P. elongatus*, their mouth is not slightly subterminal (compare with photograph in Spreinat, 1994: 251 top). The specimen shown in the second row left may be *C. afra* too but in this case I am not absolutely sure; the mouth does not seem to be slightly subterminal in this fish. Since the identification of these northern fishes is probably erroneous and the fish from Manda are not *P. elongatus*, the species seems to be restricted to Mbamba Bay; maybe it extends further south at least to Hai Reef, near the Mozambique border, if the report by Spreinat (1994) indeed refers to *P. elongatus*.

Pseudotropheus elongatus seems to prefer areas of rocks mixed with stretches of sandy bottom; I observed the fish in such areas in a depth from 0.5 m to at least 6 m. Spreinat (1994) saw this species down to about 20 m or more. Young and half grown specimens were living together in small groups of individuals of about the same size but there was no special behavior noted within such a group. They were strictly bound to boulders and rocks and tried to keep close contact with the stony surface with their belly even if the surface was vertical. In trying to keep in contact with overhanging rocks they usually swam upside down. This behavior was less distinct in adult males. *Pseudotropheus elongatus* seemed to be only weakly territorial. Altogether, this species had much more secretive, reserved and less aggressive habits than *P. longior*, described hereafter. The behavior mentioned above was observed in aquaria as well, and even aquarium-bred F_1 specimens were relatively shy.

Remarks. The *P. elongatus*-complex (sensu Ribbink et al., 1983) is a polyphyletic group which phenotypically consists mainly of two lineages: the more slender forms of the *P. longior* sub-complex, and the more compact forms of the *P. elongatus* sub-complex (as characterized by the lectotype of the latter taxon). In this sense *P. elongatus* may belong to a group including the following species (sensu Ribbink et al., 1983): *P. elongatus* 'mbako', Likoma Island (plate 7 (b)); *P. elongatus* 'gold bar', Chisumulu Island (plate 7 (d)); and *P. elongatus* 'chisumulu', Chisumulu Island (plate 7 (e)). But even in comparation with this group of species, *P. elongatus* has a deep body and may be intermediate between the *P. elongatus* sub-complex and the group of small and short *Pseudotropheus* species which are closer to the *P. zebra* complex. The foregoing remarks, however, only refer to the general form of the

body and may not express actual relationships. Presently we do not know if body depth in *Pseudotropheus* is the result of convergence or of phylogenetic relationships. Although there are indications for the latter in at least some groups of *Pseudotropheus*, other indications, however, clearly show that the situation is more complex.

Fryer (1956: 85) stated: 'The three specimens of this species from which the above description was prepared ...'. There are only two syntypes in the BMNH, sent by Fryer in two different sendings. No specimens of the *P. elongatus*-like 'mbuna' from Nkhata Bay were sent by Fryer to the BMNH nor are present in the collections of that institution. Because of the presence of two species in the syntype series of *P. elongatus* a lectotype had to be selected. Fryer (1956) evidently had in mind to describe the deep bodied species pictured, for the description much better fits that species than the other one. So, I am of the opinion that the aim of the describer of *P. elongatus* as well as ICZN recommendation 74B are fulfilled for the best by selecting the specimen BMNH 1956.9.4:1, 65.9 mm SL, 79.9 mm TL, the lectotype, the other specimen becoming a paralectotype. The description of the species which probably is represented by the paralectotype of *P. elongatus* will be given hereafter, using specimens from Mbamba Bay, so that other populations of the complex can be referred properly to this distinct form.The paralectotype of *P. elongatus* (BMNH 1956.6.4:27), which probably is *P. longior*, is not included in the type series of the new species in order to avoid further confusion.

Pseudotropheus longior, new species
(Figs. 3b, 4b, 7, 9)

Holotype. BMNH 1995.8.15:9, male, 86.7 mm SL, 107.8 mm TL; Tanzania, Lake Malawi or Nyassa, Mbamba Bay, about 1,000 m south of Chinyangi-Point (TZ 90/117); B. Kilian and L. Seegers, 14 April 1990. Taken alive to Germany and photographed (Figs. 7, 9).

Paratypes. BMNH 1995.8.15:10, 1 spms., female, 65.1 mm SL, collected with the holotype. - ZMB 32.559, 2 spms., 61.0-75.8 mm SL; Tanzania, Lake Malawi or Nyassa, south of Mbamba Bay; H. Fleischer, M. Engel et al., January 1990.

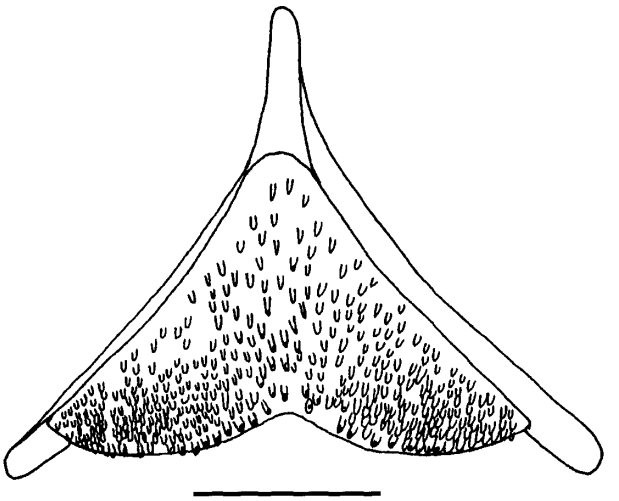

Fig. 8. *Pseudotropheus longior*, ZMB 32.559, paratype 75.8 mm SL. Lower pharyngeal bone, occlusal view. Scale bar: 2 mm.

Additional material (non-type). BMNH 1956.6.4:27, 1 spms., 61.1 mm SL, 72.1 mm TL; paralectotype of *P. elongatus*; Tanzania, Lake Nyassa, Mbamba Bay; G. Fryer.

Diagnosis. A slender and elongate rock-dwelling cichlid ('mbuna') of the genus *Pseudotropheus* belonging to the group of slender species within the *P. elongatus* complex (sensu Ribbink et al., 1983). *Pseudotropheus longior* can be distinguished from other species of this complex by its coloration and color pattern. It differs from the syntopic *P. elongatus* by the more slender body (depth 24.6-28.3 % SL, vs. 27.7-31.4 %) and the shape of the head which is less deep (22.9-26.3 % SL, vs. 25.9-29.4 %) and has a terminal mouth (vs. more subterminal) with slightly more teeth in the upper jaw (about 44, vs. about 34-36).

Description. The following description is based on the material listed above. The description of life colors has been taken from aquarium-kept, wild caught fish from the same locality.

Morphometric and meristic characters are given in Table 1. Body long and elongate, greatest body depth at the beginning of the dorsal fin, decreasing from this point to the caudal peduncle. Head longer than high, snout pointed, mouth small and terminal, upper lip slightly thickened. Jaws isognatous, upper lip projecting slightly beyond lower when mouth closed. Snout with a slightly concave profile, convex on the forehead.

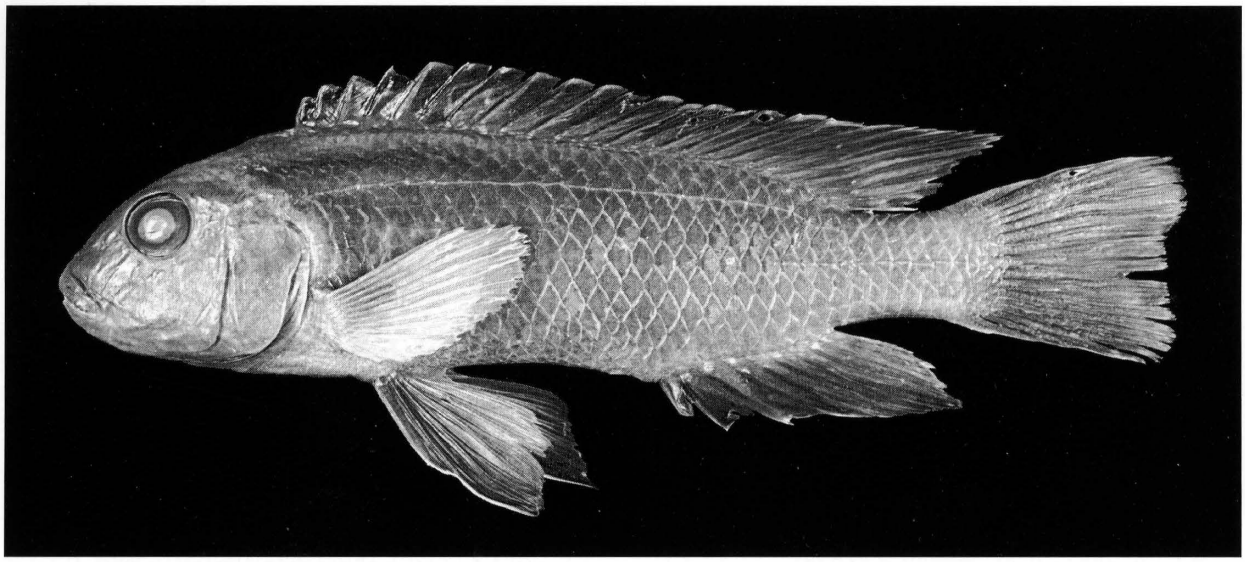

Fig. 9. *Pseudotropheus longior*, BMNH 1995.8.15:9, holotype, male, 86.7 mm SL, Mbamba Bay.

Teeth in 3-4 rows, outermost row with bicuspid teeth, except the 5-7 most lateral ones of upper jaw which are unicuspid, innermost rows with tricuspid teeth. Upper jaw with about 44 teeth.

Dorsal-fin origin just posterior to upper end of gill opening, dorsal not very high, 18-19 dorsal spines, first spines shortest, last longest; 8-9 soft rays. Anal fin with 3 spines and 7 soft rays. Caudal fin with slightly convex posterior margin, upper and lower end rounded.

33-35 scales in longitudinal series, 23-25 pore-bearing scales on the upper branch of the linea lateralis, 11-13 on the lower branch.

Gill rakers short and simple, with 10 or 11 on ceratobranchial of first arch, 3 or 4 on epibranchial, one between epibranchial and ceratobranchial.

Dentigerous area of lower pharyngeal tooth plate triangular and markedly intended on posterior margin, broader as long (dentigerous area length about 63 % of width) (Fig. 8). Teeth small and slender, those in posterior row longer and with hooks, dentition more dense on the posterior part of the tooth plate, about 11-12 teeth along midline and 22-23 teeth in posterior row of one side.

Color. In life (Fig. 7). Fawn on the body to darker brownish on the head with a more or less distinct bluish hue. In the lake, some very intensely colored territorial males, for example at some rocks, some 100 m off the coast south of Chinyangi-Point, had a darker brownish basic color with more distinct blue bars especially on the head (two interorbital bars and one occipital bar) and anterior to the vent. These bars become more faint posterior to the vent. Usually barring is much more faint, especially on caudal peduncle, so that it appears unbarred in many individuals. In several specimens the ground color was dark brown and the light blue bars were reduced to only spots. Dorsal fin with whitish to light bluish lappets, black or with a prominent black submarginal band running most of the fin's length. Proximal parts of the last spines and soft rays sometimes orange, skin between the rays blue. Caudal fin fawn, upper and lower margin whitish to light blue, followed by a black submarginal band. Posterior margin orange. Blue stripes running along the skin between the posterior half of the rays. Anal fin fawn with a faint whitish to bluish margin and a broad black submarginal band. The dorsal and anal fins have orange trailing edges as described for the caudal fin. There is usually one, rarely more, orange to yellow spot, sometimes similar spots are shown in the posterior part of the dorsal fin. Pelvics are black, pectoral fins more or less translucent with a fawn or brownish hue.

In alcohol four years after preservation (Fig. 9). Brown on flanks and proximal parts of all fins, lighter on the belly. The blackish spot on the upper gill cover remains visible. Unpaired fins with dark margins. No bars or spots visible on body.

Fig. 10. *Genyochromis mento*, male, about 75 mm SL, Mbamba Bay, personal collection LS. Note the slender body and caudal peduncle in comparison with the specimen from Matema in Figure 11.

Fig. 11. *Genyochromis mento*, male, about 70 mm SL, Matema, Tanzania, personal collection LS.

Fig. 12. *Melanochromis* sp. 'Matema', male, about 75 mm SL, personal collection LS.

Etymology. *Longior*, from the Latin, meaning longer, was chosen to characterize the elongate form of the body which is longer in relation to its depth than that of the syntopic *P. elongatus*. A noun in apposition.

Distribution and ecological notes. I observed *P. longior* on the rocks north of Mbamba Bay southwards to Ngkuyo Island, but it was not seen at Lundu south of Lituhi and was not among the species exported by Fleischer & Engels from Lundo Island between Mbamba Bay and Liuli nor from Liuli itself. The species was present at depths between 1 and 8 m; maybe it can be found in deeper areas as well. It feeds on aufwuchs and clearly belongs to the species of the *P. elongatus*-complex which are strongly territorial and keep 'algal gardens' (Ribbink et al., 1983: 184) which they aggressively defend against other fishes. Such a territory (about 1-2 m^2) is most often situated on the horizontal surface of a large rock or boulder or on the horizontal and adjacent vertical surfaces of two rocks. As far as could be observed the fish do not feed on the algae in the first place but pick the small animals living among them. The algae of such a territory therefore grow better than in the surrounding area and are kept clean; these areas are light greenish whereas in the surrounding areas the grey color of the rocks is dominant. The females of *P. longior* seemed to be territorial as well, but since males and females look very much alike this cannot be

stated with certainty. Aquarium observations confirmed the aggressiveness of *P. longior*.

Remarks. Spreinat (1994: 246, 252), listed two additional phenotypes of the *P. longior*-complex from Mbamba Bay: *P.* 'Elongatus Ngkuyo' (dark blue vertical stripes on a light blue ground colour, yellow caudal fin) and *P.* 'Elongatus Spot' (blackish ground colour with light blue spots or short stripes on the back). The same phenotypes, evidently following Spreinat, but using different names (it is difficult to understand why every author uses his own designations when working names are already available for certain populations), were illustrated by Konings (1995: 64, fig. 5 as *Ps.* sp. 'elongatus mbamba'; 66: fig. 3 as *Ps.* sp. 'elongatus ruarwe', a specimen from Lundo, Tanzania). Both phenotypes, however, are too elongate to be identical with the lectotype of *P. elongatus* and do not fit the color description given by Fryer (fawn, no yellow tail mentioned). It has to be concluded therefore, that they do not belong to the same phenotype as the paralectotype of *P. elongatus* either. *Pseudotropheus longior* in the sense of this description is restricted to the phenotype as shown in the figures of this paper and in Konings (1995: 64, fig. 2) by an underwater photograph.

Mimetism in *Genyochromis mento*

Genyochromis mento Trewavas, 1935 is well-known for its scale and fin-eater habits. The fish has a lake-wide distribution and there are many color forms. Ribbink et al. (1983: 242) report on these forms, and were able to distinguish at least 9 different phenotypes.

Genyochromis mento is present along the Tanzanian shore of the lake. We caught it at Mbamba Bay (Fig. 10), at Lundo, south of Lituhi, at Matema (Fig. 11), Ikombe and Lumbira. The presence of *G. mento* in a certain habitat can be guessed before the species is actually seen; if it is present, many fishes show damaged fins.

At Mbamba Bay, it is rather difficult to identify *G. mento* underwater, because the color pattern of most specimens is nearly the same as that of *P. longior* (some specimens have a different coloration as well). The two species can only be distinguished by the shape of the mouth. But at least at Mbamba Bay this sometimes is difficult for some specimens of that population have smaller mouths than others and this makes the camouflage striking. Even in aquarium it is not easy to recognize *G. mento* at once. The question arises as to why *G. mento* mimics *P. longior*. The advantage seems to be quite clear: the aggressor is able to approach a prey much closer than would be possible if it had a distinctive or unique color pattern. By this camouflage, the prey may mistake *G. mento* for *P. longior*, so the advantage for *G. mento* is obvious. Ribbink et al. (1983) reported at least 24 different phenotypes (if not species) of their *P. elongatus*-complex. They also report on the polychromatism of *G. mento*. I never collected species of the *P. elongatus*-complex nor *G. mento* in Malawi, and I am not aware of observations reporting on *G. mento* and a species of the *P. elongatus*-complex and their behavior at different localities in the lake, but it would be worth obtaining information about *G. mento* possibly mimicking more forms (species?) of the *P. elongatus*-complex in other areas, as it apparently does at Mbamba Bay.

Between Matema and Lumbira along the northeastern shore of Lake Nyassa, Tanzania, the commonest phenotype of *G. mento* is remarkably darker than it is at Mbamba Bay and I did not see there any bluish specimens. At those places most specimens (again, not all) are rather dark and quite often show a pattern of longitudinal stripes and vertical bars. In aquarium the color became lighter. As mentioned above, I could not observe any form of the *P. elongatus*-complex at the northern end of Lake Nyassa. But from my observations an undescribed species of *Melanochromis* (Fig. 12) evidently has a similar ecological niche than has *P. longior* at Mbamba Bay. This relatively small fish is elongate and dark with a pattern of blackish longitudinal bands and vertical crossbars and is very common. There are strong indications that at the northeastern shore of Lake Malawi or Nyassa *G. mento* mimics that *Melanochromis* species.

There is a similar case in Lake Tanganyika. Near Luhanga/Uvira, Zaïre, I observed a specimen of *Perissodus straeleni* which is a scale- and fin-eater as well. In this particular area of the lake, *P. straeleni* evidently imitates *Neolamprologus tretocephalus*. It sometimes was difficult to distinguish the two species. Staeck (1985: 97) reports, that in those areas of Lake Tanganyika in which the brown-barred form of *Tropheus moorii* occurs, *P. straeleni* develops a similar pattern of brown

bars on a yellowish or olive green background and mimics that species. In both cases the aggressors - *G. mento* and *P. straeleni* - evidently imitate colors of species which have the same body shape as themselves.

Ribbink et al. (1983: 242) state: 'We have never seen *G. mento* eat scales or fins of conspecifics'. This complex has not been studied in detail until now, although it is very interesting, because if *G. mento* does eat scales or fins of conspecifics, then there would be the problem how this species could mate without risking to be attacked by the proposed sexual partner. But some observations have shown that indeed *G. mento* does attack conspecifics, at least males. Firstly, we caught specimens with damaged fins (see caudal fin of the fish shown in Fig. 10). Secondly, G. Fleischer et al. caught some *G. mento* and *P. longior* at Mbamba Bay and kept them together, as the *G. mento* were mistaken for *P. longior*. In this aquarium, I observed *G. mento* attacking *P. longior* as well as members of its own species. All fishes in this aquarium had damaged fins. Of course these are only very limited observations, and perhaps the behavior in the lake may be different from that in aquarium, but at least *G. mento* does not in general spare idividuals of its own species from being attacked. So the question still stands: How does *G. mento* mate without risking being attacked by their proposed partner of the opposite sex?

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