Pseudotropheus (Maylandia), hajomaylandi n. sp., a new taxon from Lake Malawi

by Manfred K. MEYER* *** and Manfred SCHARTL**

Fig. 1. - *Pseudotropheus hajomaylandi* n. sp., male, aquarium specimen. H. Mayland
Pseudotropheus hajomaylandi n. sp., mâle, spécimen d'aquarium.

Abstract

Pseudotropheus hajomaylandi (loc. typ. Isle of Chisumulu, Lake Malawi) is described as a new species. It is compared with *Ps. aurora, Ps. greshakei, Ps. livingstonii, Ps. lombardoi,* and *Ps. zebra.* All these taxa, including *Ps. hajomaylandi* and *Ps. heteropictus,* are classified in the subgenus *Maylandia.*

Abbreviations

A : anal fin ; Bh : body height ; C : caudal fin ; cph : height of pedunculus ; cpl : length of pedunculus ; D : dorsal fin ; Ed : diameter of the eye ; Iow : Interorbital width ; HL : head length ; Ls : number of scales in mid-lateral series ; Mw : width of the mouth ; P : pectoral fin ; SL : standard length ; Sn : snout length ; TL : total length ; V : pelvic fin ; SMF : fish collection of the Senckenberg Museum Frankfurt, FRG.

Introduction

The closely related cichlid genera *Pseudotropheus* Regan, 1921 and *Melanochromis* Trewavas, 1935 (Pisces : Cichlidae) have undergone important revisions and additions by recent studies of **Ribbink** et al. (1983), **Trewavas** (1984) and **Meyer** and **Foerster** (1984). According to **Meyer** and **Foerster** (1984) five existing species of the *Pseudotropheus/ Melanochromis* complex, namely *Ps. greshakei* Meyer and Foerster, 1984, *Ps. aurora* Burgess, 1976, *Ps. zebra* (Boulenger, 1899), *Ps. livingstonii* (Boulenger, 1899), and *Ps. lombardoi* Burgess, 1977, are classified in the subgenus *Maylandia* Meyer and Foerster, 1984. In contemporary studies **Ribbink et al.** (1983), however, combine these five taxa together with *Ps. heteropictus* Staeck, 1980, and *Ps. elegans* Trewavas, 1935, as well as a variety of so far undescribed species and subspecies to a single «*Pseudotropheus zebra* complex».

Extensive studies in *Pseudotropheus* on the structure of the skeleton using X-ray images have shown, that *Ps. heteropictus* may be regarded as a member of the «*Pseudotropheus zebra* complex» (**Meyer** and **Zetsche**, in preparation). *Ps. heteropictus,* as investigated so far, shows some characteristics of the subgenus *Maylandia* (i.e. jaws with irregulary arranged inner rows of teeth, which are composed of tricuspid teeth with enlarged major cusp and unicuspid teeth; structure of the pharyngeal bone; body coloration with vertical stripes).

In this study we add a so far undescribed species of *Pseudotropheus* to the subgenus *Maylandia.* This new species is known as Ps. «greberi» to fish hobbyists, ex-and importers, and many authors.

* *Schwalheimer Hauptstrasse 22, D-6350 Bad Nauheim 6, Fed. Rep. Germany.*

** *Genetisches Institut der Justus-Liebig-Universität Giessen, Heinrich-Buff-Ring 58-63, D-6300 Giessen, Fed. Rep. Germany.*

*** *To whom all correspondence should be addressed.*

Pseudotropheus (Maylandia) hajomaylandi, n. sp.

Holotype: male (SMF 19554); SL = 78,7 mm; Isle of Chisumulu, North-eastern part of Lake Malawi; 14.7.1982, **Stuart M. Grant** leg.

Paratypes: female (SMF 19555), 2 males (SMF 19556-19557), 3 juv. (SMF 19558-19560), together with holotype; 1 specimen deposited at the British Museum (Natural History), London, Great Britain.

Etymology

The new taxon is named in honour of the author **Hans J. Mayland**, Oberursel, Fed. Rep. Germany, who has contributed considerably to our present knowledge on the taxonomy and biology of cichlid fish.

Diagnosis

A species of *Pseudotropheus (Maylandia)*, with small head and short snout. Length of head in standard length 3.3-3.5; length of snout in length of head 3.0-3.5. Spines of the dorsal fin XVIII-XIX. Lower pharyngeal teeth fine; teeth of 3-9 posterior rows somewhat crowded. Adult males with yellowish-orange colored head; body blue with 7-9 dark vertical stripes, 6-8 of which are located in the region of the dorsal fin, odd fins bluish and yellowish. LS = 29-31 scales, number of vertebrae = 31 (from 7 radiographes), gill rakers (total) on the outer arch = 13-15 (3 + 1 + 9 – 11).

Description

Meristic and morphometric features. Body moderately elongated with small head and short snout; lips thick (figs. 1, 2). Longitudinal scale series 29-31, upper lateral line piercing 23-25 scales, lower 10-12; cheek with 4-5 horizontal rows. Length of head 3.3-3.5 in standard length. Snout 3.0-3.5, diameter of eye 3.1-3.4, interorbital width 2.5-2.7, greatest width of lower jaw 2.7-3.0, in length of head. Gill-rakers (fig. 3) on the first arch 13-15, of which 9-11 are on the lower part. Teeth of upper jaw 38-44, mean 40, in outermost row, the middle 14-18 bicuspid and distally enlarged, the lateral unicuspid, usually with 3-4 near angel of mouth somewhat enlarged. Outermost teeth of lower jaw (fig. 4) average 29-30. Jaws with 2 or 4 irregulary arranged inner rows; in females usually tricuspid, in adult males many unicuspid and enlarged mixed in with tricuspid ones; tricuspid teeth with much smaller minor cusps. Lower pharyngeal (fig. 5) with a total of up to 500 teeth, 12-16 of which are situated in each of the middle rows, and 44-50 of which are in the posterior row; teeth fine and crowded posteriorly, those of the posterior row higher than those directly in front of them. Fin ray formula: D = XVIII-XIX/8-9, A = III/7-8, C = 16, V = I/5, P = 14-15. Fins well developed, soft fin rays of the dorsal and of the anal fin prolonged in adult males to the base of the caudal fin. First dorsal spine short, the last 1.8-2.1 in the length of the head. Caudal fin with margin concave, edges rounded.

Pelvic fins in adult males prolonged to the level of the first anal spine with the most elongated ray reaching a vertical line from the 11^{th}-12^{th} spine of the dorsal fin.

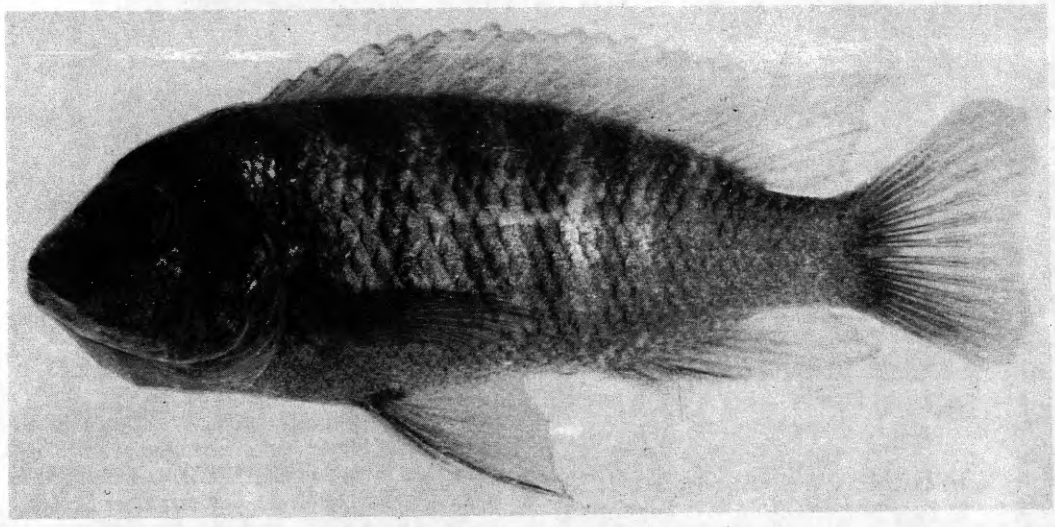

Fig. 2. - Male of *Pseudotropheus hajomaylandi* n. sp., holotype (SMF 19554).
Mâle holotype de *Pseudotropheus hajomaylandi* n. sp. (SMF 19554).

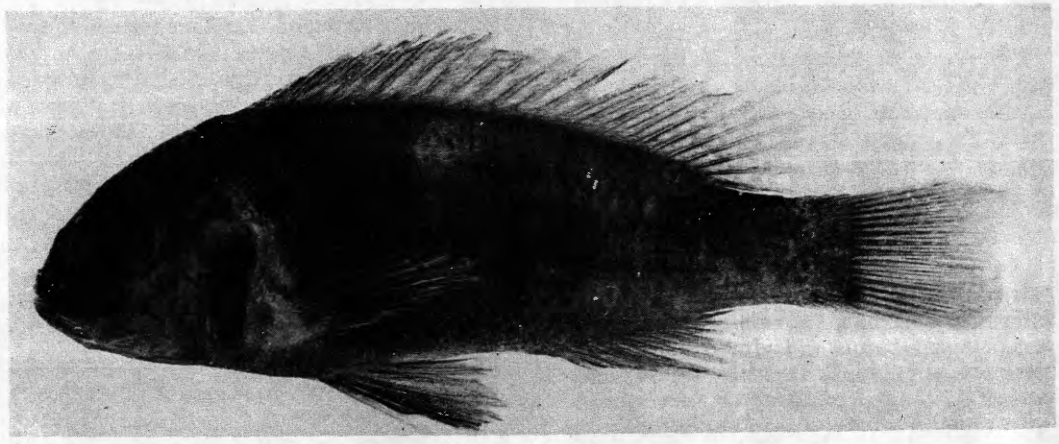

Fig. 3. - Female of *Pseudotropheus hajomaylandi* n. sp., paratype (SMF 19555).
Femelle paratype de *Pseudotropheus hajomaylandi* n. sp. (SMF 19555).

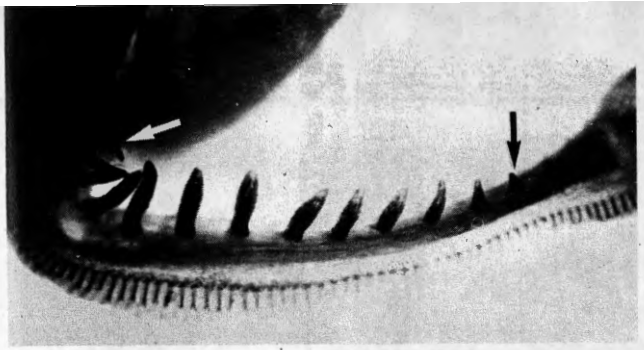

Fig. 4. - First gill arch on the right from an adult male of *Pseudotropheus hajomaylandi* n. sp., cleared up by treatment with 3 % potassium hydroxide, stained with alizarine red, dehydrated by ascending glycerine/water mixtures and mounted in glycerine. 10x. 13 gill rakers, the first and the last of which are marked by arrows.

Premier arc branchial, moitié droite, d'un mâle adulte de *Pseudotropheus hajomaylandi* n. sp., éclairci dans une solution de potasse à 3 %, coloré au rouge d'alizarine, déshydraté par passage dans des solutions de plus en plus concentrées d'eau glycérinée et monté dans la glycérine. x 10. 13 branchiospines, la première et la dernière marquées d'une flèche.

Fig. 5. - Lower jaw with outermost row of bicuspid teeth; specimen prepared as described in figure 4. 20x.

Mandibule avec la rangée la plus externe de dents bicuspides; spécimen préparé comme celui de la fig. 4. x20.

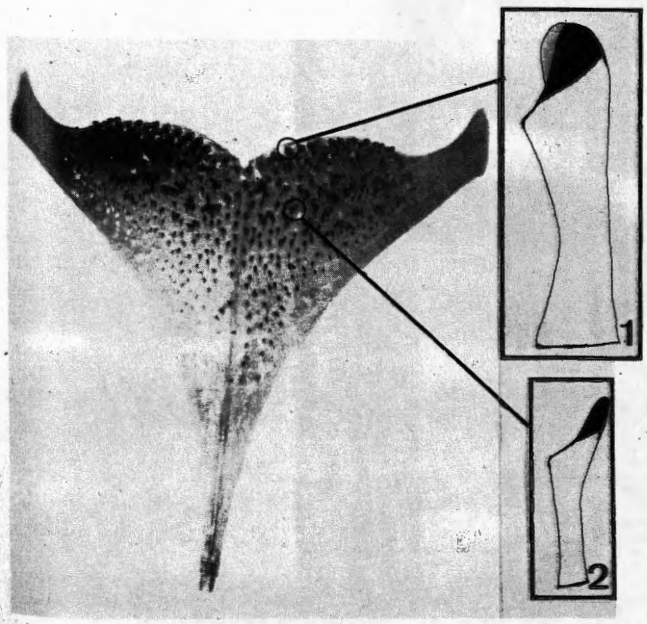

Fig. 6. - Lower pharyngeal bone of an adult male of *Pseudotropheus hajomaylandi* n. sp.; specimen prepared as described in figure 3. 10x. 1 = typical tooth from the enlarged posterior row; 2 = typical tooth from the midlateral area.

Os pharyngien inférieur d'un mâle adulte de *Pseudotropheus hajomaylandi* n. sp. ; spécimen préparé comme celui de la fig. 4. x 10. 1 = dent typique de la rangée postérieure plus développée ; 2 = dent typique de la région médiolatérale.

Cytogenetic characteristics. 11 well spread metaphases of a male of *Ps. hajomaylandi* n. sp. were analysed. The fish was injected with 0,03 ml of a 0.01 % solution of colchicine for about three hours, then killed and the gills removed. After hypertonic treatment (0.5 % KCl for 20 min) the gill epithelium was fixed in 1:3 acetic alcohol and stained with Giemsa. The total number of chromosomes was constantly 44 in all 11 mitoses. The length varied from 2 to 6 μm. Three types of chromosomes occur in *Ps. hajomaylandi* n. sp. : 1. metacentric (centromere approximately in the middle of the chromosome, no. 3, 4, 5); 2. submetacentric (centromere divides the chromosome into a short arm and a long arm, no. 1, 2, 6); 3. acrocentric (centromere separates a long arm from an extremely short arm, no. 7-22). The karyotype of *Ps. hajomaylandi* n. sp. consists of some characteristic chromosomes: No. 1 is a long large submetacentric chromosome; No. 2 is a large submetacentric chromosome, too, but the short arm is smaller; No. 3-5 are metacentric chromosomes that vary slightly in length; No. 6 is a medium sized submetacentric chromosome; No. 7-22 are 16 pairs of acrocentric chromosomes, which differ slightly in their length. In this group there exist individual differences in size, but a further differentiation was not possible. Satellites, an important morphological feature of human acrocentric chromosomes, were not visible (fig. 6).

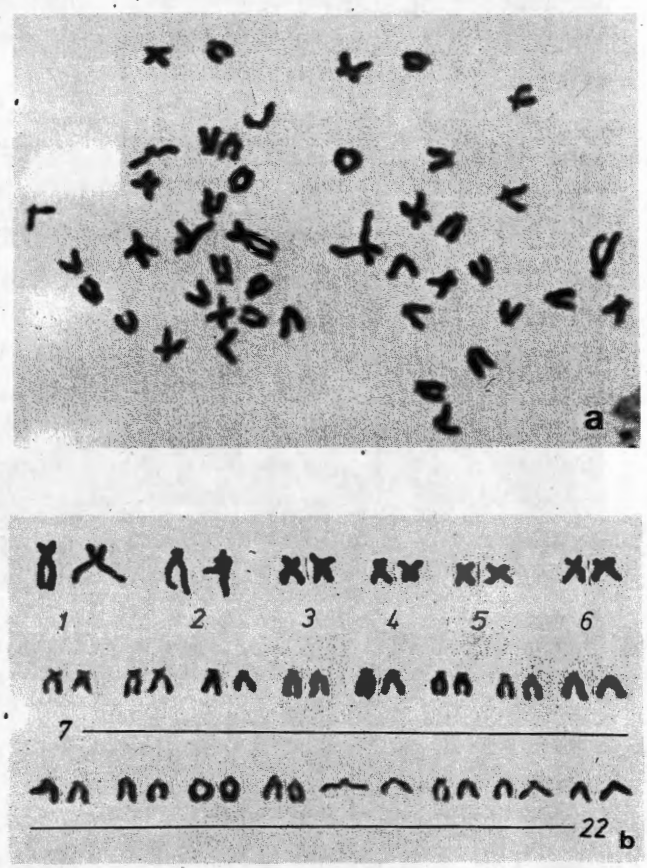

Fig. 7. - Metaphase (a) and karyotype (b) of a male of *Pseudotropheus hajomaylandi* n. sp. All chromosome preparations are from gill epithelium, stained with Giemsa (Chromosome preparations by W. Foerster).

Métaphase (a) et caryotype (b) d'un mâle de *Pseudotropheus hajomaylandi* n. sp. Toutes les préparations de chromosomes proviennent de l'épithelium, colorés par le giemsa (préparations de W. Foerster).

Fig. 8. - *Pseudotropheus hajomaylandi* n. sp., female, aquarium specimen. H. Mayland
Pseudotropheus hajomaylandi n. sp., femelle, spécimen d'aquarium.

Coloration. Adult males (fig. 7) greyish-blue; 7-9 yellow-brown vertical stripes on the body-side; 2-3 blue stripes following the upper part of the head, depending in expression on the state of excitation. Head, throat and chest orange-yellow; cheeks opalescent blue. Median fins tinted blue and yellow; dorsal and caudal fin exhibiting blue and yellow fin rays. Dorsal fin in the caudal part of the soft fin ray region with yellow egg spot marking. Anal fin showing 2-7 orange-yellow egg spots with dark margin. Pelvic fins tinted yellow and blue, first and second fin ray whiteish-blue, second fin ray sometimes dark. Females greyish-brown or greyish-blue; dark vertical stripes, more narrow and less prominent than in males; pectoral region silvery-grey. All fins greyish-blue.

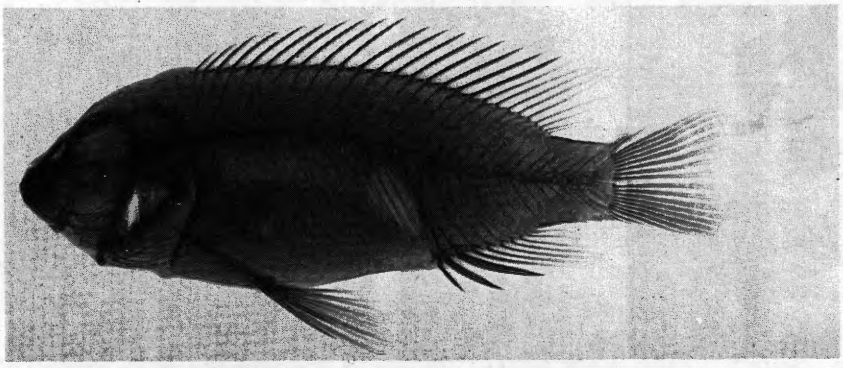

Fig. 9. - Radiograph showing the skeleton of *Pseudotropheus hajomaylandi* n. sp., Holotype, SMF 19554. (Radiograph by H. Zetsche).
Radiographie du squelette de *Pseudotropheus hajomaylandi* n. sp., Holotype, SMF 19554.

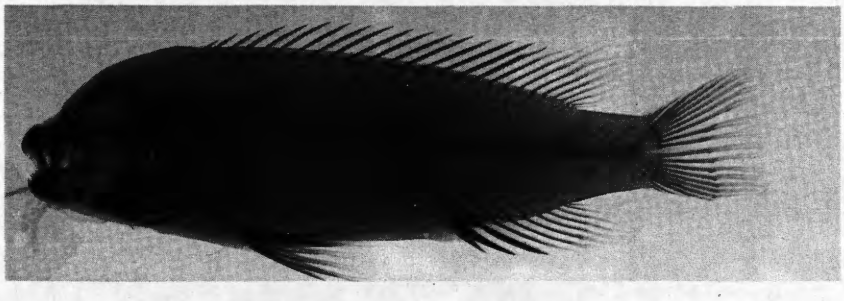

Fig. 10. - Radiograph showing the skeleton of *Pseudotropheus heteropictus,* Holotype, SMF 15178. (Radiograph by H. Zetsche).
Radiographie du squelette de *Pseudotropheus heteropictus,* Holotype, SMF 15178.

Table I

Measurements (in mm) of holotype and paratypes of *Ps. hajomaylandi* n. sp.

	TI	StI	BI	Bh	SI	Mw	Ph	PI	Ed	Iow
SMF 19554 (Holotype, ♂)	97,1	78,7	23,3	29,0	7,6	8,3	10,3	7,4	7,0	8,6
SMF 19555 (Paratype, ♀)	83,6	66,9	20,1	24,9	5,7	n.d.	8,9	n.d.	6,5	7,8
SMF 19556 (Paratype, ♂)	105,2	86,5	24,55	31,8	8,2	9,5	11,1	8,75	7,4	9,8
SMF 19557 (Paratype, ♂)	108,4	87,3	25,7	n.d.	8,3	9,7	11,2	n.d.	7,6	10,0
SMF 19558 (Paratype, ♀)	77,1	61,2	n.d.*	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
SMF 19559 (Paratype, ♀)	65,3	51,9	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
SMF 19560 (Paratype, ♀)	81,0	64,8	19,7	23,8	5,2	7,2	8,6	6,9	6,4	7,6

* n.d., not determined.

Habitat. The occurence of *Pseudotropheus hajomaylandi* n. sp. is recorded so far only from the north-eastern part of Lake Malawi in the litoral region of the Isle of Chisumulu; approximately 30 km offshore Mozambique. The new species is mainly found in waters with sediment rich bottom in a depth of 10-30 meters. The fish populate the interstices of small and medium sized rocks, sometimes appearing on the surface of large slabs. *Ps. hajomaylandi* is ecologically classified as plankton and encrusting algae eater.

Relationships

Pseudotropheus hajomaylandi n. sp. is unequivocally attached to the subgenus *Maylandia* because of the structure of the teeth of the lower pharyngeal bone, and the structure of the teeth of the jaws.

In comparison to *Ps. aurora,* the new species is characterized by a smaller diameter of the eye (index diameter of eye in length of the head 3.1-3.4 compared to 2.6-3.2 in *Ps. aurora*), lower index of interorbital width to length of the head. (2.5-2.7 compared to 3.2-3.9 in *Ps. aurora*), and lower number of gill rakers in lowermost arch (9-11 compared to 11-12 in *Ps. aurora*).

In contrast to *Ps. greshakei, Ps. hajomaylandi* n. sp. shows a lower index of the diameter of the eye in the length of the head (*Ps. greshakei* 3.7-4.1), a smaller head (index length of the head in standard length 3.3-3.5 compared to 2.85-3.0 in *Ps. greshakei*), a shorter snout (index length of snout in length of the head 3.0-3.5 compared to 2.5-2.65 in *Ps. greshakei*), a smaller index of interorbital width in length of the head (*Ps. greshakei* 3.0-3.3), color of the fins, and on an average a higher number of inner rows of teeth.

Compared to *Ps. livingstonii* the new taxon displays a lower index of the diameter of the eye in length of the head (*Ps. livingstonii* 3.5-4.2), higher index of length of the head in standard length (*Ps. livingstonii* 2.6-3.2), higher index of length of the snout in length of the head (*Ps. livingstonii* 2.4-2.8), a smaller index of interorbital width in length of the head (*Ps. livingstonii* 3.5-4.0), and different number of vertical bands in body coloration.

In comparison to *Ps. lombardoi,* the new species is distinguished by a smaller index of diameter of the eye in length of the head (*Ps. lombardoi* 3.2-3.8), higher index of length of the head in standard length (*Ps. lombardoi* 3.1-3.3), smaller index of interorbital width in length of the head (*Ps. lombardoi* 3.4-4.1), a smaller number of gill rakers in the lowermost arch (*Ps. lombardoi* 12-13), a higher number of vertical dark bands, and in coloration of the males.

Compared to *Ps. zebra, Ps. hajomaylandi* n. sp. shows a smaller index of diameter of the eye in length of the head (*Ps. zebra* 3.6-4.3), higher index of length of the snout in length of the head (*Ps. zebra* 2.3-2.8), and a smaller number of gill rakers on the lower part of the first arch (*Ps. zebra* 12-14).

The most important characteristics of the new species are the high number of spines in the dorsal fin, which is XVIII-XIX (all other species D XVII-XVIII as investigated so far ; **Trewavas** (1935), however, records XIX in some other «mbuna» cichlids, including *Ps. zebra*), and the colouration of the body and of the fins. This distinguishes *Ps. hajomaylandi* from all other members of the subgenus *Maylandia* described so far.

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Fig. 11. - *Pseudotropheus hajomaylandi* n. sp., male, aquarium specimen. H. Mayland
Pseudotropheus hajomaylandi n. sp., mâle, spécimen d'aquarium.

RÉSUMÉ

Pseudotropheus (Maylandia) hajomaylandi n. sp. un nouveau taxon du Lac Malawi

Les genres voisins *Pseudotropheus* Regan, 1921 et *Melanochromis* Trewavas, 1935 ont fait récemment l'objet de révisions importantes (**Ribbink** et **al.** 1983, **Trewavas** 1984, **Meyer** et **Foerster** 1984). Selon **Meyer** et **Foerster**, 5 espèces (*greshakei, aurora, zebra livingtonii, lombardoi*), appartiennent à *Maylandia*, sous-genre de *Pseudotropheus*. Cependant, **Ribbink** et **al.** (1983) y ajoutent *heteropictus* et *elegans*, ainsi que de nombreuses formes non encore décrites, pour former le «complexe de *Pseudotropheus zebra*».

Des recherches approfondies sur le squelette de *Pseudotropheus*, à l'aide des rayons X, montrent que *Ps. heteropictus* peut être considéré, en effet, comme un membre du «complexe *zebra*» (**Meyer** et **Zetsche**, en préparation). *Ps. heteropictus* présente même quelques caractères du sous-genre *Maylandia*.

Dans cette note, nous décrivons une espèce inédite du sous-genre *Maylandia*, connue dans le commerce aquariophile sous le nom de «greveri».

***Pseudotropheus (Maylandia) hajomaylandi* n. sp.**

L'holotype est un mâle de l'île de Chisumulu, dans la portion nord-orientale du Lac Malawi, long de 78,7 mm LS ; les paratypes (une femelle, deux mâles et trois juvéniles) ont été pris en même temps que l'holotype. La nouvelle espèce est dédiée à **Hans J. Mayland**, dont **Hajo** est le surnom familial.

Diagnose et description

Se reporter aux figures et au texte anglais.

Coloration

Celle du mâle et celle de la femelle adultes sont représentées sur les figures 2 et 8.

Habitat

La nouvelle espèce n'est connue jusqu'ici que de la zone littorale de l'île de Chisumulu, à une trentaine de kilomètres de la rive du Mozambique, à des profondeurs de 10-30 mètres sur fond de sédiments. Les Poissons peuplent les interstices de rochers de petite à moyenne taille, s'aventurant parfois à la surface de grandes dalles. C'est un mangeur de plancton et d'Algues encroûtantes.

Affinités

Pseudotropheus hajomaylandi se rapporte sans équivoque au sous-genre *Maylandia*, en raison de la structure des dents du pharyngien inférieur et de celle des dents des mâchoires. Il est comparé à *Ps. aurora* dont il est très voisin, à *Ps. greshakei, Ps. livingstonii, Ps. lombardoi* et *Ps. zebra*. Ses caractères les plus importants sont le grand nombre d'épines à la dorsale (XVIII-XIX, les autres espèces en ayant XVII-XVIII, à de rares exceptions près, notamment *Ps. zebra* qui peut en avoir XIX) et la coloration du corps et des nageoires.