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# More new Malawi cichlids

by DON S. JOHNSON

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AS PART OF my continuing investigation of the mbuna of Lake Malawi I recently examined a number of fishes graciously provided TODAY'S AQUARIST by African Fish Imports, Verona, NJ. I have concluded — by behavioral observation in simulated environmental systems and by direct examination — that several of these fishes are unknown to science and these are here described for the first time.

I extend TA's appreciation, and that of our readers, to Jack Freiberg and John Lombardo of African Fish Imports and Peter Davies of Malawi for their continuing cooperation and unselfish assistance. Their aid has been invaluable in assisting us in cataloging the mbuna of Lake Malawi.

Photograph by Don S. Johnson

*Microchromis zebroides*, male below. Females are generally bluer than the one shown. Photographs of the living types.

Microchromis gen. nov.
*Microchromis zebroides* sp. n.

**Specimens examined:** one mature male, 70mm standard length; one mature female, 63mm standard length; one juvenile, USNM Z14170 49mm standard length. Juvenile examined but not included in this description. Fish collected by Peter Davies et al off Likoma Island, Lake Malawi, Malawi. Types deposited in U.S. National Museum, Natural History (Smithsonian), Washington, D.C.

**Description: Holotype** USNM Z14169 — male, 86mm total length; 70mm standard length. Color bright blue with six dark blue vertical bars. Three bright gold "egg spots" on anal fin. White edging on dorsal, ventral and anal fins; caudal partially edged in white from tip of caudal peduncle to approximately half the length of the caudal fin. Teeth: short, unicuspid, curved inward. Two rows. About eight teeth in outer row, bottom jaw. Teeth evenly spaced. Teeth absent from sides of jaws. Anterior teeth in first row slightly enlarged. Mouth broad. Lower jaw is slightly longer than upper, giving the fish a "bulldog" look with mouth agape. Head length 3.25, maximum depth 2.9, least depth of caudal peduncle 8.75, dorsal length 1.75, all in standard length. Snout length 2.1, orbital diameter 3.9; both in head. Scales markedly ctenoid. Scales in lateral

Photograph by Don S. Johnson

*Melanochromis chipokae*, male Photograph of the living holotype.

series: 10, 21. Dorsal: XVI,8. Anal: III,6. Caudal covered with fine scales. Scales in vertical series (counting from origin of dorsal to lateral line): 10. Gill rakers: 15 soft, long, finger-like, spotted. Maxillary does not reach vertical from anterior edge of eye.

**Description**: **Allotype** USNM Z14171 — female, 79.5mm total length; 63mm standard length. Color grayish blue with six dark blue vertical bands. Small band of white on dorsal fin; ventrals edged in white. Teeth: stout, unicuspid, two rows, outer row inward curving. Teeth widely spaced. Teeth in first row of lower jaw number 24; numerous small teeth in side of jaw. Upper jaw has 24 teeth in first row. Head length 2.8, greatest depth 2.8; least depth of caudal peduncle 8.4, dorsal length 1.7, all in standard length. Orbital diameter 4.0, snout length 3.6, both in head. Dorsal: XVI, 8. Anal: III,7. Scales in lateral series 9,19. Caudal covered with fine scales. Gill rakers on first arch: 18 small, pointed, spotted. Lower pharyngeal teeth are small, widely spaced; posterior row enlarged. Posterior of pharyngeal slightly indented.

**Remarks**: *Microchromis zebroides* bears a startling resemblence to *Pseudotropheus zebra*, and for this reason has been frequently sold as "Mini-zebra". The similarity of coloring — including the similarity of female coloration — has determined the specific name. *M. zebroides*

has been confused in popular literature with *Pseudotropheus minutus*. However, *M. zebroides* differs from *P. minutus* in several important ways. *P. minutus* has large median bicuspid teeth in the outer series; *M. zebroides* has conical inward curving teeth. Proportions, gill rakers, etc. differ noticeably from published descriptions of *P. minutus*. The only other Malawi cichlid to which *M. zebroides* bears any resemblance is *Cynotilapia afra*. However, Regan's description of *C. afra* (*Paratilapia afra* Boulenger) notes that the teeth are in three rows with definite canines. Other discrepencies are noted in the proportions of the head, snout length, scales in vertical series, etc.

While the newly erected genus *Microchromis* is at present monotypic, I expect that further collecting in Lake Malawi will obtain other species. At present the distinguishing characteristics of the genus are small size and the simple inward curving teeth, somewhat reminiscent of teeth found in *Tanganicodus sp.* from Lake Tanganyika. The teeth are readily distinguished from those of *Labidochromis sp.* which curve outward rather than inward. My suggestion for the differences in dentition between the type and allotype of *Microchromis zebroides* is the male's habit — observed in the aquarium — of excavating tunnels in substrata and lifting and carrying pebbles to guard the entrances to these tunnels.

## *Melanochromis chipokae* sp. n.

**Specimens examined**: one mature male, 85.5mm standard length; one mature female, 85mm standard length. Collected by Peter Davies et al off Chipoka Island, Lake Malawi, Malawi. Types deposited in the U.S. National Museum, Natural History (Smithsonian), Washington, D.C.

**Description: Holotype** USNM Z14173 — male, 105mm total length, 85.5mm standard length. Color in life: blue-black with wide light blue band extending through eye to beginning of caudal fin. Bands from both sides meet between eyes in typical *Melanochromis* "mask". Light blue band on upper side of body between dorsal and lateral line beginning behind gill plate. Ventral, anal and caudal fins dark, edged with white. Tip of caudal pale white. Dorsal fin dark with white band above and below. Teeth: at least three rows, first row bicuspid, second and third row tricuspid. Seven conical teeth on one side of upper jaw, eight on other. Head length 2.59, maximum body depth 3.2, dorsal length 1.6; least depth of caudal peduncle 8.55, all in standard length. Snout length 3, orbital diameter 4.4, length of lower jaw 4, all in head. Caudal covered with fine scales. Scales finely ctenoid. Scales in lateral series 8,23. Gill rakers on outer arch 12. Dorsal: XVII,8. Anal: III,8. ♂

Photographs by Don S. Johnson

*Melanochromis loriae*, the living types. Top fish is female. Note delicate yellow edging on male's fins.

**Description: Allotype** USNM Z14174 — female, 99mm total length, 85mm standard length. Color in life: cream white with broad blue-black band extending from above eye to end of dorsal between dorsal and lateral line. Broad blue-black band running through eye and extending to caudal fin. This band meets between the eyes in typical *Melanochromis* fashion. Fins white with black bands and white edging on all. Teeth: five rows. First row unevenly bicuspid numerous in even inward-curving band. Second and third row tricuspid. About four small conical teeth on each side of both jaws. Head length 3.0, dorsal length 1.1, maximum depth 3.2, least depth of caudal peduncle 8.0, all in standard length. Snout length 2.5, orbital diameter 4.6, length of lower jaw 4.6, all in head. Scales in lateral series: 8,21. Dorsal: XVIII,8. Anal: III,7. Gill rakers on outer arch 12.

**Remarks:** There are, at present, only a few species of *Melanochromis* known to science. Of all previous species, five are based on specimens in the Christy collection in the British Museum (Natural History). Of these species — *M. labrosus*, *M. perspicax*, *M. melanopterus*, *M. vermivorus* and *M. brevis* — *Melanochromis chipokae* bears closest affinities to *M. melanopterus*. *M. chipokae* may readily be distinguished by the short lower jaw, contained four times in the head length as opposed to *M. melanopterus'* 2 2/5 - 2 2/3 in length of head. According to Trewavas' original description, *M. melanopterus* differs from *M. chipokae* in

dentition also. The posterior rows of *M. chipokae's* teeth are tricuspid whereas those of *M. melanopterus* are simple. [Editor's note: See addendum at end of article.] Aquarists will be interested to learn that females of *M. chipokae* assume male-like coloration while brooding eggs. The cream white coloring of the female assumes a purple cast and the overall coloration of the fish darkens. Onset of spawning condition may be seen by the initial flush of purple on the flanks. This apparently signals males of the female's readiness to spawn. Once the spawning act has been completed and her buccal cavity has been filled with eggs the female's coloration deepens until she is difficult to distinguish from the male. Incubation time for the eggs at 25.5°C. (78°F.) and 18° hardness is 18 days. Whether or not the female eats during incubation varies from fish to fish.

## *Melanochromis loriae* sp. n.

**Specimens examined**: one mature male, 105mm standard length; one mature female, 78mm standard length. Collected by Peter Davies et al off Chipoka Island, Lake Malawi, Malawi. Types deposited in the U.S. National Museum, Natural History (Smithsonian), Washington, D.C. Named for Lori Lombardo, the daughter of the importer.

**Description**: **Holotype** USNM Z14175 — male, 125mm total length, 105mm standard length. Color: body dark blue. Bright blue band running from between eyes through eye and on side, extending slightly into caudal fin. Dorsal, anal and caudal fins banded with white, edged in bright yellow. Ventrals edged in white. Two gold "egg spots" on end of anal rays. Bright blue-green spot on operculum which fades in preservative. Teeth: at least five rows. First row bicuspid with several long conical teeth at maxillary in upper jaw. Second row tricuspid. Gill rakers on first arch 11, blunt, stubby. Head length 3.5, greatest depth 3.1; least depth of caudal peduncle 8.4, dorsal length 1.6, all in standard length. Orbital diameter 4.2, snout length 2.4, lower jaw length 3.7 all in head. Dorsal: XIX,8. Anal: III,7. Scales in lateral series: 8,22.

**Description**: **Allotype** USNM Z14176 — female, 92mm total length, 78mm standard length. Color in life as shown. Color in alcohol dark with light stripe on side. Fins dark with clear margins edged in yellow. Teeth: at least three rows. Outer row unequally bicuspid, crowded in broad transverse bands. Several conical closely spaced teeth in sides of upper jaw at maxillary. Posterior teeth at least two rows tricuspid. Gill rakers on first arch 11, several bifurcated. Head length 2.8, maximum depth 3.3; least depth of caudal peduncle 8.2, dorsal length 1.8, all in standard

length. Orbital diameter 5, snout 2.89; length of lower jaw 5.5. Dorsal: XVII,8. Anal: III,5. Scales in lateral series: 8,23.

**Remarks:** Superficially, *M. loriae* and *M. chipokae* are similar enough to be classed as different "color morphs" of the same species. However, the Malawi mbuna (inshore rock-dwelling fishes) present a unique problem in classification. Before we can say "this is a species" we must first define exactly what is a species. Mayr's[1] description seems adequate: "A species is a group of actually or potentially interbreeding natural populations which are reproductively isolated from other such groups." Such reproductive isolation may be physical — a geographic barrier prevents one potentially interbreeding group from encountering another. The isolating element may be climatological — one potentially interbreeding group may have adapted to water or temperature conditions hostile to another such group adapted to a different environment. Isolating elements may be ethological — courtship patterns, color, scent, etc. may be subtly different and thus prevent two closely related forms from mating. This is what we have not only in the case of *M. loriae* and *M. chipokae* but in most of the Malawi mbuna. Color is the limiting factor! Careful study in aquariums for the past four years has demonstrated that, given access to a mate of the same color, these fishes will *always* choose to spawn with their own kind. In the absence of a suitable mate these fish will mate with other species, and even with species of other genera. This ability to interbreed is both evidence of descent from a common ancestor and evidence that there is a limiting factor operating in the wild to prevent frequent random crossing of these fishes. It is my contention that this limiting factor — coloration — maintains the uniqueness of both *M. chipokae* and *M. loriae* even though they share an overlapping habitat. Since behavioral observations in aquariums support this contention I have no difficulty in assigning these fish to separate species. I believe that eventually all of the mbuna will be re-assigned to species on the basis of color as a limiting factor. It seems to be stretching credibility to assume — in at least one case — some 14 or more "morphs" for one "species" especially when several of their ranges overlap.

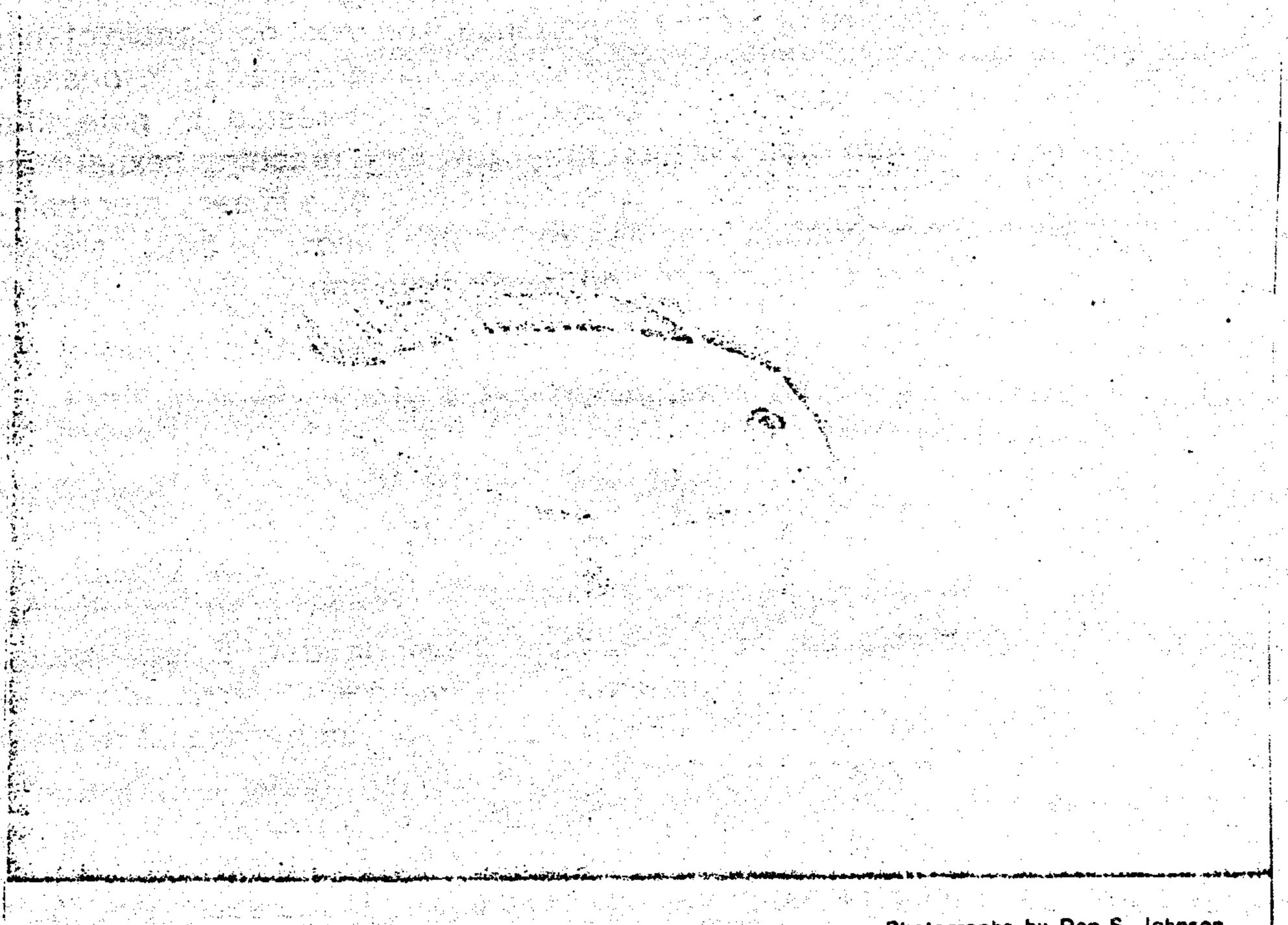
*Melanochromis interruptus* sp. n.

**Specimens examined:** One mature male, 82mm standard length; one male in juvenile coloration, 68mm standard length; eight immature specimens examined but not included in this description. Collected by Peter Davies et al off Likoma Island, Lake Malawi, Malawi.

**Description: Holotype** USNM Z14221 — male, 98mm total length; 82mm standard length. Color in preservative: Head dark blue, body lighter with line of short vertical light blotches extending from above operculum to end of caudal peduncle. Fins dark with white edging. Gold tips on dorsal spines. White interradial markings on caudal fin. Gold "egg spots" on tips of anal rays. Light cross bars — *Melanochromis* "mask" — between eyes. Color in life: Body and head either uniformly light or uniformly dark blue with bright interrupted horizontal line composed of short vertical blotches. Dorsal: XVIII,8. Anal: III,6. Head length 3.56, dorsal length 1.6; least depth of caudal peduncle 8.6, maximum body depth 3.2, all in standard length. Snout length 2.55, orbital diameter 4.6; lower jaw 7.66, all in head length. Scales in lateral series 8,23. Teeth: At least four rows in each jaw. Upper jaw has six conical teeth on each side near maxillary, teeth larger nearest maxillary. Anterior row both jaws bicuspid; posterior rows tricuspid. Anterior teeth in even transverse bands both jaws.

**Description: Paratype** USNM Z14222 — male, 81.5mm total length; 68mm standard length. Color in preservative: pale brownish yellow, dark blue flanks; dark fins with white edging. Gold tips on dorsal spines and rays. Gold tips on caudal. Caudal with white interradial markings. Gold "egg spots" on tips of anal rays. *Melanochromis* "mask" cross bars between eyes. Dorsal: XVIII,7. Anal: III,7. Head length 3.3, dorsal length 1.67; maximum body depth 3.2, least depth of caudal peduncle 9, all in standard length. Snout length 2.9, orbital diameter 3.4; lower jaw length 4.55, all in head length. Scales in lateral series: 12,20. Teeth: at least three rows each jaw. Six conical teeth each side of upper jaw near maxillary. Anterior row both jaws bicuspid; posterior row tricuspid. Teeth in uniform transverse bands. Pharyngeal slightly damaged but shows few widely spaced teeth, posterior teeth enlarged.

**Remarks**: Since the fish has been widely distributed and publicized as the "Likoma Island johanni", it seems appropriate to discuss its affinities with *Pseudotropheus (=Melanochromis?) johanni* Eccles 1973. While there are morphological similarities between the two species, Eccles' description calls attention to the fine dentition of the pharyngeal in *P. johanni*. The pharyngeal dentition of *M. interruptus* is sparse, widely spaced and, in the posterior row, elongated. As one of the main distinctions between the genera *Pseudotropheus* and *Melanochromis* is the larger and fewer pharyngeal teeth in *Melanochromis* (Trewavas 1935) it would seem that, if Eccles is correct in assigning *P. johanni* to the genus *Pseudotropheus*, there is a fundamental distinction. If, on the other hand, this author's proposal is adopted (see addendum) other dif-



Photographs by Don S. Johnson

Above, *Melanochromis interruptus*, male, photograph of the living type. Males are usually much darker. Below, *Pseudotropheus* (= *Melanochromis*?) *johanni* Eccles 1973, female at right.

ferences become of greater importance. The most noticeable of these is the shorter snout of *M. interruptus* (2.55, 2.9 compared to *P. johanni's* 4.1 according to Eccles). Aquarists will be interested to note that all juvenile *M. interruptus* are bright yellow until reaching sexual maturity whereupon the males begin to acquire first a blue sheen, later their dark blue body coloration. Females retain the yellow coloring, showing a slight amount of blue over this while brooding.

## A Proposed Method of Classifying Species of the Genera *Melanochromis* and *Pseudotropheus* by Color Pattern

It is readily apparent to anyone who has seen specimens of *Melanochromis sp.* and *Pseudotropheus sp.* that these fishes are evolving definite color patterns. The majority of *Melanochromis sp.* show horizontal striping with cross bars between the eyes. The majority of *Pseudotropheus sp.* show vertical striping. Species of both genera have several rows of teeth; the outer row bicuspid, posterior rows tricuspid. *Melanochromis sp.* usually, and *Pseudotropheus sp.* frequently, have conical teeth in the sides of the jaws in the outer row. The only major difference between the two genera, according to Trewavas, is the fewer and larger pharyngeal teeth in *Melanochromis sp.* Fryer points out that *Pseudotropheus sp.* feed mainly on Awfwuchs (algae) although several species feed on insects as well, while *Melanochromis sp.* feed primarily on insects. Since the genera are quite similar in dentition and feeding habits, it is logical to look for other ways of differentiating between them This brings us back to color.

If we divide the two genera into groups by color pattern, we arrive at the following:

| Present | Proposed |
|---|---|
| *Melanochromis melanopterus* | Same |
| *M. vermivorus* | Same |
| *M. perspicax* | Same |
| *M. brevis* | *Pseudotropheus brevis* |
| *M. simulans* | Same |
| *M. chipokae* | Same |
| *M. loriae* | Same |
| *M. interruptus* | Same |
| *Pseudotropheus auratus* | *Melanochromis auratus* |
| *P. johanni* | *M. johanni* |
| *P. fuscus* | *M. fuscus* |

In using a system of color pattern to identify the genus, very little revision is needed as shown. Since the major difference between the species within each genus is in color pattern, it seems irresponsible to ignore the phenomenon. The only known exception to the logic of assigning species with similar dentition to either *Melanochromis* or *Pseudotropheus* according to color pattern is *Melanochromis labrosus*. I think that further investigation will bear out the logic of using color patterns to identify members of these genera and that *M. labrosus* will eventually be reclassified, probably as a *Haplochromis sp.* □

## References


Ahl, E. (1927) Einige neue Fische der Familie Cichlidae aus dem Njassa-See. *S.B. Ges. naturf. Fr. Berl.* (1926) pp. 51-62.

Bertram, C.K., Borley, H.J.H. & Trewavas, E. (1942) *Report on the Fish and Fisheries of Lake Nyasa.* London.

Boulenger, G.A. (1908) Diagnoses of new fishes discovered by Captain E. C. Rhoades in Lake Nyasa. *Ann. Mag. Nat. Hist.* (8), II, 238

Boulenger, G. A. (1909-16) *Catalogue of the Fresh-Water Fishes of Africa* Vol. 1-4. British Museum (Natural History).

Eccles, D. H. (1973) Two new species of cichlid fishes from Lake Malawi (formerly known as Lake Nyasa). *Arnoldia* (Rhodesia) Vol. 6, No. 16.

Fryer, G. (1956a) New species of cichlid fishes from Lake Nyasa. *Rev. Zool. Bot. Afr.* LIII, 81-91.

Fryer, G. (1956b) Biological notes on some cichlid fishes of Lake Nyasa. *Rev. Zool. Bot. Afr.* LIV, 1-7.

Fryer, G. (1957) A new species of *Gephyrochromis* (Pisces, Cichlidae) from Lake Nyasa with notes on its ecology and affinities. *Rev. Zool. Bot. Afr.* LV, 347-52.

Fryer, G. (1959) The trophic interrelationship and ecology of some littoral communities of Lake Nyasa with special reference to the fishes and a discussion of the evolution of a group of rock-frequenting Cichlidae. *Proc. Zool. Soc. London* (Now *Journal of Zoology*) CXXXII No. 2 153-281.

Fryer, G., Greenwood, P.H., Trewavas, E. (1955) Scale eating habits of African cichlid fishes. *Nature, Lond.* CLXXV, 1089-90.

Fryer, G. Personal communication.

Jackson, P.B.N. (1959) New records and little-known species of fish from Rhodesia and Nyasaland. *Occ. Pap. Nat. Mus. S. Rhod.* XXIII B, 295-305.

Nichols, J.T. LaMonte, M. (1931) New cichlid fishes from Lake Nyasa. *Amer. Mus. Novit.* No. 431.

Regan, C. T. (1921) The cichlid fishes of Lake Nyasa. *Proc. Zool. Soc. Lond.* 1921, 675-727.

Stock, A. D. Personal communication.

Trewavas, E. (1935) A synopsis of the cichlid fishes of Lake Nyasa. *Ann. Mag. Nat. Hist.* (10) XVI, 65-118.

Trewavas, E. (1947) The types of African cichlid fishes described by Borodin in 1931 and 1936 and of two species described by Boulenger in 1901. *Proc. Zool. Soc. Lond.* CXVI No. 2 240-6

Trewavas, E. Personal communication.