

# A new species of *Gephyrochromis* (Pisces : Cichlidae) from Lake Nyasa, with notes on its ecology and affinities

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Among the cichlid fishes collected during a recent study of some littoral communities of Lake Nyasa was an undescribed species which is referable to the hitherto monotypic genus *Gephyrochromis*. The present paper describes this fish and comments on its ecology and affinities.

## ***Gephyrochromis lawsi* sp. nov.**

Standard length 2.59 to 3.19 times as long as maximum depth (in specimens of total length 8.5 to 12.8 cm.). Caudal peduncle about as long as deep.

Head comprising between 27.9 and 31.5 % of body length. Snout with a slightly convex, fairly evenly curved profile, comprising 32.3 to 38.1 % of head length, and a little shorter than post-orbital part of head. Premaxillary pedicel 23.4 to 27.4 % of head length. Diameter of eye 27.9 to 32.0 % of head length. Interorbital width 25.0 to 32.8 % of head length. 3 or 4 series of scales on cheek.

Mouth wide, about as wide, or slightly wider than interorbital width, slightly subterminal in position, and with a distinct tendency for lower jaw to be shorter than upper. Both jaws very broadly rounded with tendency to develop a straight anterior margin in some specimens. Each jaw with 5 rows of teeth. Outermost series long, slender, mobile and bicuspid or conical save for last 7 or 8 on each side of upper jaw

which are always conical and, in case of outermost 3 or 4, distinctly enlarged. Outermost series of lower jaw distinctly protruded. 46 to 60 bicuspid or conical teeth in outermost series of upper jaw (excluding the short lateral series), the number increasing as the fish becomes older. Second series of teeth similar to outermost and located very close behind them, but shorter and with tricuspid tips. Remaining series much shorter and all tricuspid.

Maxillary of upper jaw not extending backwards to the vertical from anterior margin of eye.

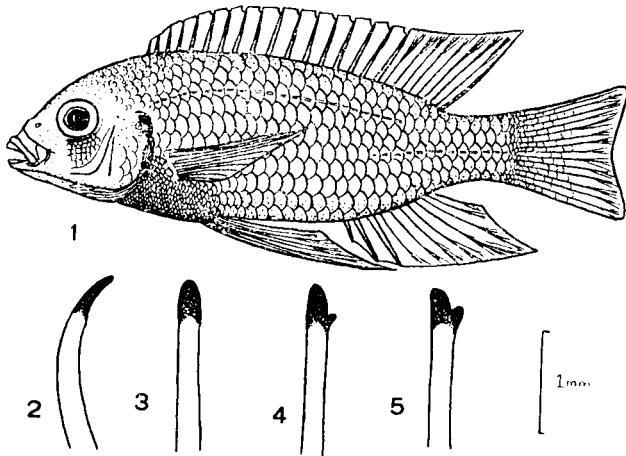


Fig. 1. — *Gephyrochromis lateralis* sp. nov. Holotype. Figs 2-5. Teeth of outer series of upper jaw. — 2) Conical tooth from holotype, standard length 9.74 cm. (Nkata Bay) (Lateral). — 3) The same, inner face. — 4) Bicuspid tooth from a specimen of standard length 9.7 cm. (Florence Bay). — 5) Bicuspid tooth from specimen of standard length 9.5 cm. (Nkata Bay).

Gill rakers fairly short, 8 to 10 on lower part of anterior arch.

Lower pharyngeal bone triangular, with a fairly deep median indentation on posterior margin. Pharyngeal teeth small, densely crowded, particularly posteriorly. Most posterior row rather feebly enlarged.

Scales ctenoid. Nape densely covered with small scales. Lateral line interrupted. 32 to 31 (usually 33) scales in longitudinal series.

Dorsal fin with 17 to 19 (usually 18) spines and 9 or 10 soft rays. Anal fin with 3 spines and 7 or, more usually, 8 soft rays. Caudal fin feebly emarginate, covered with minute scales, particularly near root. Last anal spine not quite half length of head. Pelvic fin not quite extending backwards to anal in female but just reaching beyond anterior margin in ripe male.

Female with left ovary atrophied. Both testes of male functional.

Colour of adult female pale, actually silvery on belly; otherwise grey with trace of blue in chin area. Very faint traces of seven dark vertical bars present. Caudal and anal fins rather dark. Dorsal fin pale. A small yellowish or orange spot on anal fin.

Male yellowish or bronze dorsally, bluish ventrally, the point of demarcation being approximately the upper lateral line. Distinctly black under throat. A trace of seven dark vertical bars (fairly distinct in one specimen) sometimes, but not always, present. A blue cross bar on snout between eyes. Dorsal fin lemon yellow. Pelvics with a white margin, otherwise dark. Anal blackish, particularly anteriorly, and with a conspicuous orange spot posteriorly. Caudal yellowish, dark near root.

The specific epithet commemorates the name of Dr. Robert LAWS to whose pioneering missionary endeavour the present peace and prosperity of the Nyasan peoples owes so much.

The holotype, a male of standard length 9.74 cm., collected at Florence Bay, and several paratypes from Nkata Bay and Florence Bay have been deposited in the collection of the British Museum (Natural History) London.

*Occurrence and ecology* : The description is based on 16 specimens collected at Florence Bay and 5 specimens collected at Nkata Bay by the writer, all of which were observed alive, together with one specimen in the collection of the Joint Fisheries Research Organisation which had been collected at Nkata Bay. Three more specimens, preserved with the last, have also been studied but they are badly preserved and have not been considered in the preparation of the description.

At Nkata Bay the 5 specimens collected by the writer were all taken at the outer fringe of a typical north Nyasan rocky shore, that is, in water rather deeper than that frequented by the majority of the rock fishes to which *G. lawsi* is related. The ecological data relating to the other specimens caught at Nkata Bay indicate that they too occurred on the fringe of rocky shore where it gives way to a sandy beach.

At Florence Bay all the specimens caught were taken by trapping at a depth of 4 to 5 metres on a beach consisting of coarse shingle and boulders. Such beaches are atypical of L. Nyasa as a whole; that at Florence Bay being the only one of its kind seen by the writer. *G. lawsi* appeared to be quite common here, the sixteen specimens studied being part of a catch of fifty-three specimens of this species out of a total of fifty-seven fishes caught. Local information indicated that on this beach

it forms an appreciable part of the fish caught in traps for human consumption.

The food consists of algae scraped from rock surfaces. In all the guts examined there was with the algae a considerable admixture of inorganic particles. At Nkata Bay this can be taken as a reflection of the relatively deep-water environment in which the fishes occurred, for in deeper water the rate of algal production is less than that near the shore and small sand grains tend to settle there more readily than in shallow water. Inorganic particles are seldom found in the gut of those rock-scraping fishes to which *G. lawsi* is quite closely related which live in shallow water in Lake Nyasa.

*Affinities and Taxonomic Status* : Besides affinities with *G. moorii* BOULENGER (Syn. *Christyella nyassana* TREWAVAS — see TREWAVAS 1947) which was the only species of the genus *Gephyrochromis* previously known, *G. lawsi* exhibits numerous resemblances to the rather ill-defined genus *Pseudotropheus*, and particularly to *P. elegans* TREWAVAS, *P. lucerna* TREWAVAS, and some forms of the very variable *P. tropheops* REGAN. It does in fact to a large extent bridge the gap between the two genera. The only real structural difference between *Gephyrochromis* and *Pseudotropheus* as they at present stand defined is that the teeth of the outer series of both jaws in *Gephyrochromis* may, and often do, become conical, and are longer and more slender than in any of the known species of *Pseudotropheus*. The species of *Pseudotropheus* with a dentition most similar to that of *G. lawsi* is *P. elegans* in which, however, the number of teeth is fewer and the individual teeth are more robust. In the genus *Pseudotropheus* the teeth apparently never become conical, for although TREWAVAS (1935) says that the teeth of old individuals of *P. zebra* (BOULENGER) « become simple » I have examined many hundreds of specimens of this species without noticing any signs of such conversion.

These differences in dentition are no more dis-similar than are the differences to be found within the genus *Pseudotropheus* as it is at present constituted. The rather pale coloration of *G. lawsi*, however, (and apparently of *G. moorii*, of which I have seen only preserved specimens) stands apart from most of the colour forms to be found in species of *Pseudotropheus*, and until a complete taxonomic revision of this complex group is made it seems advisable to allow the genus *Gephyrochromis* to stand and to assign *G. lawsi* to it, for it is undoubtedly as closely related to *G. moorii* as to any species of *Pseudotropheus* yet described.

*G. lawsi* can be readily separated from *G. moorii* by the possession of more numerous, more slender, and more densely crowded teeth in the outer series in both jaws, and by its fewer gill rakers.

*Variation and General Remarks* : Slight differences have been detected between the Nkata Bay and Florence Bay populations. These concern the outer row of teeth in each jaw. In the Nkata Bay population there is no marked tendency for these teeth in the upper jaw to become conical, and in fact no truly conical teeth are present in the limited material available, whereas the tendency is strong in the Florence Bay population. At least the median teeth of the series of most members of the latter population, even including the smallest, tend to be conical. While, in the Florence Bay population, the change from a bicuspid to a conical tooth seems to be correlated at least in part with increasing age, a strict correlation does not exist, for a number of these teeth, including some of those near the centre of the series of one of the largest specimens, are distinctly bicuspid. The teeth of the outer series in the lower jaw in general exhibit the same features as those of the upper jaw, being entirely bicuspid in the Nkata Bay population, and usually conical in the specimens from Florence Bay. In one of the largest individuals of the latter population, however, the entire series is bicuspid.

The females of the Nkata Bay population, but not the males, are very slightly deeper in the body in relation to standard length than are most, but not quite all, members of the Florence Bay population of comparable size. Because of the allometric relationship between standard length and body depth, however, it is only possible to express this correctly by means of a graph, and in this case the difference is too slight and the number of specimens involved is too small to merit the publication of such an explanatory illustration.

In spite of these differences, I have no hesitation in regarding both populations as comprising a single species. Indeed the differences are of the type which one might reasonably expect in well isolated populations, and they indicate how subspecies, and eventually distinct species, may have arisen by allopatric means within a single lake basin. Whether these tendencies to differ in dentition are adaptive remains to be seen but, bearing in mind the rather different ecological conditions prevailing at Florence Bay and Nkata Bay, it seems possible that this is the case.

REFERENCES

- TREWAVAS, E. (1935). — A synopsis of the Cichlid Fishes of Lake Nyasa.  
— *Ann. Mag. Nat. Hist.*, (10) **16** : 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 1901. — *Proc. Zool. Soc. Lond.*, **116** : 240-246.