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## A NEW PŒCILIID FISH FROM THE CONGO, WITH REMARKS ON FUNDULINE GENERA<sup>1</sup>

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While investigating the genera of funduline pœciliid fishes I have had occasion to study critically the pœciliids collected by the American Museum Congo Expedition, 1909–1915. In a bottle with several fishes recorded as *Haplochilus elegans* by Nichols and Griscom (1917, Bull. Amer. Mus. Nat. Hist., XXXVII, p. 725) I found a few specimens of an apparently undescribed species. They were collected at Stanleyville by Messrs. H. Lang and J. P. Chapin in April, 1915. The specimens of the new form differ from *elegans* by the absence of any red color, carmine spots being very apparent in both sexes of that species.

A question immediately arose as to what genus the new form represented. I have considered placing it in *Panchax*, but after a study of the characters enumerated below I do not believe that course would be best.

*Panchax* has free gill-membranes, vomerine teeth, and flattened, produced jaws, the latter giving the profile a pointed aspect. Some published figures do not show this properly. The snout is usually longer than the eye and the lateral line nearly always complete (absent in *P. playfairii*). The eye margins are free (very much so in *P. panchax*, *P. lineatus*, and *P. playfairii*), although this freedom seems somewhat reduced in certain African species (*P. sexfasciatus* and *P. chaperi*). However, poor preservation of the specimens often obscures this character. Pseudobranchiæ are said to be present in the Indian species, but in a single, very large *P. fasciolatus* at hand they are very small and inconspicuous and are therefore probably not discernible with the naked eye in the smaller species. As I have not as yet examined any species under the microscope for this character, I shall not at present consider it. The caudal fin is rounded or with the middle rays produced in all the species of *Panchax*, excepting in *P. sexfasciatus* and *P. chaperi*, in which the lower rays as well are somewhat elongated.

The new species, in common with *Haplochilus elegans* of Boulenger and several others,<sup>2</sup> has a rounded physiognomy and a snout equal to or

<sup>1</sup>Scientific Results of the American Museum Congo Expedition. Ichthyology, No. 5.

<sup>2</sup>As far as I can ascertain from published accounts the following species belong to this group. I use Boulenger's nomenclature: *Haplochilus calliurus* Boulenger (1911), *H. calliurus* var. *australis* Rachow (1921), *H. cameronsis* Boulenger (1908), *H. christyi* Boulenger (1915), *H. decorsei* Pellegrin (1904), *H. elegans* Boulenger (1899), *H. exiguus* Boulenger (1911), *H. farranti* Boulenger (1910), *H. liberiensis* Boulenger (1908), *H. luzjæ* Boulenger (1911), *H. marmor* Steindachner (1881), *H. petersii* Sauvage (1882), *H. schoutedeni* Boulenger (1920), *H. senegalensis* Steindachner (1870), *H. singa* Boulenger (1899).

shorter than the eye. The profile is thus very much like that of *Rivulus* from the Americas. The lateral line is indicated by an incomplete series of pits. The gill-membranes are free, but if one does not examine closely it will appear that they are joined beneath the eye. However, holding in mind that the snout and whole physiognomy are much shortened, the condition seems practically the same as in *Panchax*. The gill membranes themselves are certainly not connected as they are in *Aplocheilichthys*. I do not find vomerine teeth in the new form or in *elegans*, though this statement may have to be changed when the isolated vomer is studied under the microscope. Sundara Raj<sup>1</sup> has shown that these teeth are small and few in number in *P. parvus*. The eye margins do not appear to be quite free, although, as I have said above, the condition of the specimens may have much to do with this. I am fairly sure that they are not so free as in *Aplocheilichthys* and in *P. panchax*. If this character is correctly ascertained, the relationship to *Rivulus*, suggested by the head shape, is strengthened, although the degree of attachment around the eye appears much greater in the American genus. In dentition the new species agrees with *Aplocheilichthys* and *Rivulus*, having an enlarged outer row of recurved conical teeth and an inner band of fine ones.

I believe that the characters, in so far as known, warrant the formation of a new genus, to include the new species, as well as *elegans* and probably others, although it is possible that future work may show that it cannot be separated from *Panchax*.

#### **APHYOSEMION,<sup>2</sup> new genus**

GENOTYPE.—*Aphyosemion castaneum*, new species.

The characters are discussed above.

#### **Aphyosemion castaneum, new species**

The holotype, A. M. N. H. No. 8337, is a male 34 mm. in length to base of caudal, from Stanleyville, April, 1915. Depth 5 in length,<sup>3</sup> head  $3\frac{3}{8}$ ; eye  $3\frac{1}{2}$  in head,  $1\frac{1}{2}$  in interorbital, equal to snout; caudal peduncle  $1\frac{3}{8}$  as long as deep.<sup>3</sup> Scales 30 in a longitudinal series, 7 rows between dorsal and anal; lateral line indicated by an incomplete series of pits. Head somewhat flattened and rather broad, mouth not large; lower jaw projecting. Dorsal 8, originating twice as far from snout as from caudal base and over the middle of the base of the anal, pointed, the longest (posterior)

<sup>1</sup>Rec. Indian Mus., XII, 1916, pp. 291-294.

<sup>2</sup>From *ἄφύη*, a small fish, and *σημειον*, a banner, in allusion to the ornamented, and often lyre-shaped, caudal fins of the males of this genus.

<sup>3</sup>The specimen is rather shriveled. The proper depth is better indicated in the figure.

rays as long as the head. Anal 15, ending slightly in advance of end of dorsal, pointed, the longest (posterior) rays about equal to those of dorsal. Pectorals  $\frac{1}{5}$  of head, just reaching ventral origin. Ventrals reaching anal. Caudal lyre-shaped, the central rays (not longest) slightly longer than head.

Color brown, darker on the back. The scale edges are darker. Along the median row of scales runs an irregularly distributed series of light spots. There is no suggestion of the carmine spots present on preserved specimens of related species. The fins are spotted with light. The outer rays of the caudal, which form the sides of the

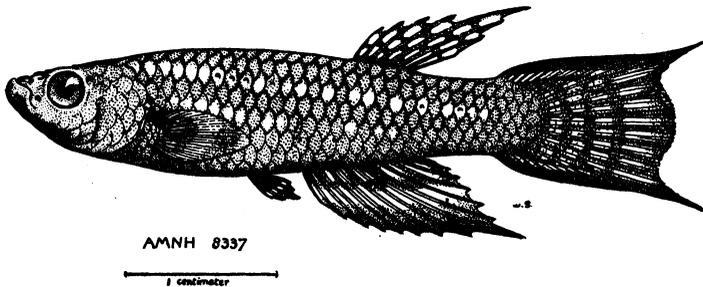


Fig. 1. *Aphyosemion castaneum*, new species. Type.

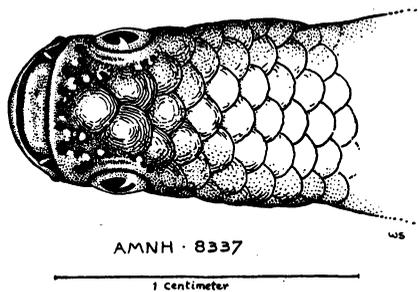


Fig. 2. Head of *Aphyosemion castaneum*, new species. Type.

“lyre,” are dark, this being interiorly bordered with a light stripe. Across the anal, near the edge, runs an orange line, probably very brilliant in life. There is also a suggestion of that color in the light spots and interior light border of the caudal.

Besides the holotype there are six paratypes, five males and one female. The data are the same as those of the holotype. The single female shows the spots of the side but very faintly. The caudal is rounded, the middle rays equal to the head. The anal and dorsal, although pointed, are not so long as in the males. The spots vary on the

sides of the five male paratypes. In one, nearly all the scale rows have at some point a few light spots in a broken or even series. One shows traces of orange in the spots of the dorsal fin. The female's fins are plain.

There are also two other specimens, from Medje, which formed the basis for Nichols and Griscom's record of *elegans* from that locality.

*Aplocheilichthys* Bleeker (1863, Nat. Verh. Wet. Haarlem, XVIII, No. 2, p. 116) is a valid genus of two species. I have discussed it in another paper.

*Nothobranchius* Peters (1863, Monatsb. K. Ak. Wissensch. Berlin, p. 145) is a monotypic (*orthonotus*) genus from East Africa, known by the compressed body, free gill membranes, lack of vomerine teeth, and the great, obliquely-gaping mouth. The physiognomy is serranid rather than pœciliid. The caudal is rounded and the dorsal and anal fins subequal. I have examined one of Peters' cotypes of *Cyprinodon orthonotus* from Quellimane, Carnegie Museum, No. 2920.

The other African species grouped with *orthonotus* under *Fundulus* by Boulenger (1915, 'Cat. Freshw. Fish. Africa,' III, pp. 23-40) belong to at least two genera. *Fundulus nisorius* Cope (1870, Proc. Amer. Philos. Soc. Philadelphia, XI, p. 456, and Fowler, 1916, Proc. Acad. Nat. Sci. Philadelphia, LXVIII, p. 417) is the only true *Fundulus* I know from Africa. It is very close to *F. heteroclitus* (Linnæus) from our own coast and is evidently directly derived from it.

After deleting *Nothobranchius orthonotus* and *Fundulus nisorius*, the residue of Boulenger's "*Fundulus*" is perplexing. There are at least two well-marked groups in the material I have examined. One, composed of more or less elongated species in which the males are highly ornamented, is undeniably closely related to *Aphyosemion*. In fact, there is an almost perfect intergradation and I can do no more than separate it subgenerically.

#### **FUNDULOPANCHAX**,<sup>1</sup> new subgenus

GENOTYPE.—*Fundulus gularis* var. *cærulea* Boulenger.

This subgenus is distinguished by the dorsal fin being inserted forward, above, or very slightly behind the anal origin, and by the subequality of these two fins. It grades directly into the typical *Aphyosemion* through *A. liberiense* (Boulenger) and *A. (Fundulopanchax) gardneri* (Boulenger). The size is usually considerably larger than in *Aphyosemion* proper.

The subgenus *Fundulopanchax* is almost entirely confined to the third subregion of Pellegrin's "région mégapotamique sous-équatoriale"

<sup>1</sup>From *Fundulus* and *Panchax*, related genera, whose characters this subgenus to some extent combines.

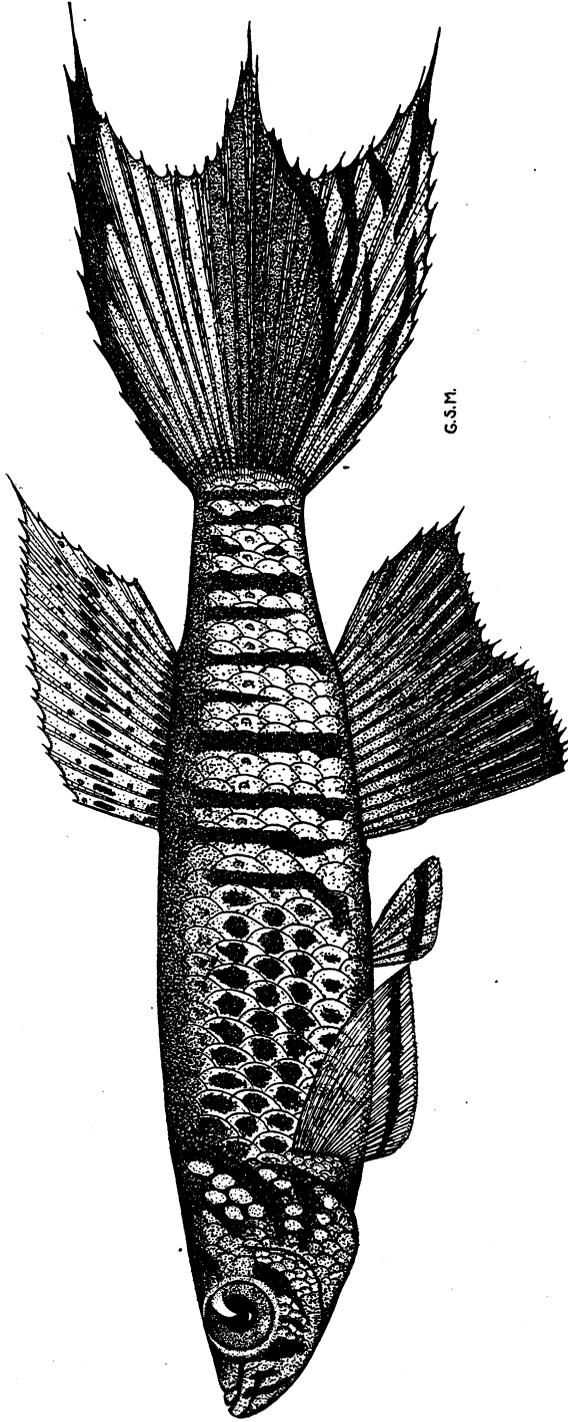


Fig. 3. *Aphyosemion (Fundulopanchax) ceruleum* (Boulenger). ♂. Nigeria.

(C. R. Congrès. Ass. Fr. Av. Sci. Rouen, 1921, p. 633-634). This is the great section to the north of the Gulf of Guinea, from Senegal to the Niger region as far south as Old Calabar, or practically, to the border of Cameroon. Only two species, *A. (F.) batesii* (Boulenger) and *A. (F.) loenbergii* (Boulenger) are found entirely outside this region, in South Cameroon in the extreme northern part of the Congo drainage. Two others extend their ranges to South Cameroon from Nigeria, *A. (F.) bivittatus* (Lönnerberg) and *A. (F.) sjoestedti* (Lönnerberg). The typical subgenus *Aphyosemion* is much less confined in its range, if we have correctly placed certain species here. Its center of abundance seems to be the Congo, in both its upper and lower reaches. From thence it extends through Gaboon, Cameroon, and as far as Liberia. If *Haplochilus decorsei* Pellegrin (1904, Bull. Mus. Hist. Nat. Paris, X, p. 223) and *H. senegalensis* Steindachner (1870, Sitzb. Math.-Naturw. Cl. K. Ak. Wien, LXI, (1), p. 559) actually belong to this group rather than to *Panchax*, the range is enlarged to include Senegal and Ubangi.

The other section of Boulenger's "*Fundulus*" as yet unaccounted for is the group of chubby little fishes confined to the Tanganyika Territory (formerly German E. Africa) and adjacent regions. That they are related to the subgenus *Fundulopanchax* cannot be denied, but how close this relationship is I cannot say, owing to the very poor condition of the few specimens of the latter named group I have seen. At best all I can do now is to erect another subgenus for these fishes, although I do not believe that they should be considered generically the same as *Aphyosemion*.

#### ADINIOPS,<sup>1</sup> new subgenus

GENOTYPE.—*Fundulus guentherii* Pfeffer.

Distinguished from the subgenera *Aphyosemion* and *Fundulopanchax* by the chubby form and rounded fins.

There are four species that I am certain belong here. *Aphyosemion* (*Adiniops*) *guentherii* (Pfeffer) and *A. (Adiniops) neumanni* (Hilgendorf) I have seen. *Nothobranchius tæniopygus* Hilgendorf (1891, Sitzb. Ges. Nat. Fr. Berlin, p. 20) undoubtedly should stand here and *Fundulus palmquistii* Lönnerberg (1907, 'Kilim.-Meru, Exped., Fisch.,' p. 7) seems more closely related to *A. guentherii* than would at first appear from a casual examination of Boulenger's figures. (1915, 'Cat. Freshw. Fish. Africa,' III, pp. 32 and 36.)

<sup>1</sup>From *Adinia*, an American genus resembling the present fishes, and *ωψ*, appearance.

There now remain three species unplaced, *Fundulus microlepis* Vinciguerra (1897, Ann. Mus. Civ. St. Nat. Genova, (2) XVII, p. 356), *F. capensis* Garman (1895, Mem. Mus. Comp. Zoöl., Cambridge, XIX, 1, p. 113), and *F. melanospilus* Pfeffer (1895, 'Deutsch-Ost-Africa,' III, p. 48). The first, from southern Italian Somaliland, may be an *Adiniops*. The second, from the Cape of Good Hope, and the third, from the Seychelles, must remain until specimens can be examined.

I present herewith a figure of *Haplochilus platysternus* Nichols and Griscom (1917, Bull. Amer. Mus. Nat. Hist., XXXVII, p. 724) as the original drawing was somewhat crude. I have elsewhere made this species the type of a new genus.

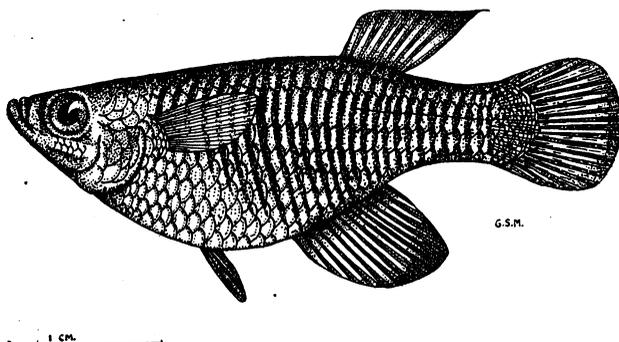


Fig. 4. Paratype of *Haplochilus platysternus* Nichols and Griscom. ♂.

#### AMERICAN GENERA

*Oxyzygonectes* Fowler (1916, Proc. Acad. Nat. Sci. Philadelphia, LXVIII, p. 425) seems to be a distinct valid genus. Its only species is *O. dovii* (Günther) from salt and brackish waters on the west coast of Costa Rica. All of the other flat-headed, *Panchax*-like fundulinids, of which type this form seems to be the epitome, are freshwater fishes not descending into brackish water. The salt-water Fundulinæ are usually more round headed and often chubby in form. However, in another sub-family we have the flat-headed marine and estuary *Anableps*.

*Fundulus balboæ* Fowler (*loc. cit.*, p. 423) is a puzzling form. It may eventually be found to form a separate subgenus, and is interesting in showing that another *Panchax*-like form besides *Oxyzygonectes* exists in Central America. It may be that it is what is left of the original stock from which that genus branched out. Its extreme rarity is attested by the fact that the single known specimen was collected many years ago

and none of those who have so thoroughly explored the waters of Panama in recent years have obtained any. I am inclined to believe, however, that the apparent rarity of this and other pœciliids (notably *Phallostethus* and *Neostethus* from the Malay States and Singapore, and *Fundulichthys virescens* from Japan) is due to specialized habits and habitat, ordinary collecting methods being of little use in obtaining some of these fishes.

It seems to me that the subgenus *Zygonectes* of *Fundulus* is a somewhat heterogeneous assemblage. *F. nottii*, *F. dispar*, and *F. notatus* form a well-marked group. Such species as *F. chrysotus* and *F. cingulatus* do not seem much more closely related to that group than to other subgenera. It has been said that *Zygonectes* is composed of "top-minnows" or surface swimming forms. This is certainly not true of *F. chrysotus* in the way it is of the group mentioned, as the fish spends much of its time at the bottom. The true *Zygonectes* never does this.

*Lucania ommata* Jordan (*Heterandria ommata* Jordan, 1884, Proc. U. S. Nat. Mus., VII, p. 323) does not appear to be very close to *Lucania venusta* and *L. parva*. These two are rather deep bodied, compressed, brackish or saltwater fishes with an anterior dorsal. *L. ommata* is a tiny, slender, *Zygonectes*-like top-minnow, found only inland, in swampy areas. The dorsal is distinctly posterior to the anal. While I do not at present believe that the anterior or posterior insertion of the dorsal fin, unsupported by any other character, is of full generic value in this family, I feel justified in forming a new subgenus for *omмата*.

#### LEPTOLUCANIA,<sup>1</sup> new subgenus

GENOTYPE.—*Heterandria ommata* Jordan.

The characters are discussed above.

*Chriopeops* Fowler (1916, Proc. Acad. Nat. Sci. Philadelphia, LXVIII, p. 425) is a distinct, valid genus approaching *Lucania*. The only species is *C. goodei* (Jordan). Its habits in the aquarium differ from those of *Fundulus*. It is not a "top-minnow."

*Fundulus cubensis* Eigenmann (1904, Bull. U. S. Fish. Comm., XXII, (1902), p. 222) does not seem to be a true *Fundulus*. Its general appearance, the dark lateral band, and Eigenmann's phrase "double row of teeth" would lead one to suspect a close relationship with *Chriopeops* from Florida.

*Fundulus paraguayensis* Eigenmann and Kennedy (1903, Proc. Acad. Nat. Sci. Philadelphia, LV, p. 530) has long been a puzzle. At my

<sup>1</sup>From λεπτός, slender, and *Lucania*.

request Dr. Eigenmann has kindly drawn up some notes on the type which are here reproduced: "*Fundulus paraguayensis* has no free orbital margin; the teeth of the upper and lower jaw similar, in bands; there is a small band of teeth on the vomer; pseudobranchiæ are not evident; the gill membranes are free from the isthmus and from each other; the premaxillary is protractile." These notes, added to the original description, and the poor figure in the Proc. U. S. Nat. Mus. (1907, XXXII, p. 432) enable us to form some opinion as to what this fish is. The character of the orbital margin bars it from *Fundulus*. The other characters indicate an undescribed genus.

**NEOFUNDULUS,<sup>1</sup> new genus**

GENOTYPE.—*Fundulus paraguayensis* Eigenmann and Kennedy.

This genus differs from *Cynolebias* in the less deep body and much shorter dorsal and anal; from *Cynopæcilus* (to which it seems closest) in the much shorter dorsal and anal; from *Pterolebias* in the entirely free gill membranes, the forward position of the dorsal, the subequal anal and dorsal, and the much smaller number of anal rays; from *Rivulus* in the forward position of the dorsal and the subequal dorsal and anal. I have seen neither *Cynopæcilus* nor *Pterolebias*. I have not found vomerine teeth in either *Rivulus* or *Cynolebias* and if this is correct and *Pterolebias* and *Cynopæcilus* similar, then *paraguayensis* is very distinct from all. Otherwise it differs sufficiently in the fins.

The excellent figures of *Aphyosemion castaneum* were drawn by Mr. W. Simmons.

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<sup>1</sup>From *pæcos*, new, and *Fundulus*.

