A NEW SPECIES OF *HEMICHROMIS* (PISCES, CICHLIDAE) OF SIERRA LEONE AND LIBERIA

By A. I. PAYNE AND E. TREWAVAS

INTRODUCTION

WHILE the junior author (A. I. P.) was making a general survey of the freshwater fishes of Sierra Leone, he found a hitherto undescribed species of *Hemichromis*. Some specimens were taken in baited plexiglass traps similar to that described by Breder (1960) as a fry-trap ; others were caught by hook and line.

Among earlier collections from Sierra Leone in the British Museum (Natural History) we found that those of Mr N. W. Thomas, received in 1915, and Mr T. S. Jones, agricultural officer in the territory in the 1950s, also contained examples of the new species. The juveniles from Mr Jones had been found sufficiently striking to have been labelled with a query as to species. Two from Liberia presented by Mr E. Roloff in 1972 and provisionally labelled '*Hemichromis* sp.' also belong to the new species.

The description below is based mainly on preserved material, but the colour is described from life.

DESCRIPTION OF NEW SPECIES

Hemichromis fugax sp. n.

HOLOTYPE. ♂, 72+19 mm, from a forest stream, Kassewe Forest Reserve, Sierra Leone.

PARATYPES. Five specimens, 41–76 mm in SL from Kassewe, the Gbangbar system near Moyamba and from a small stream with muddy bottom near Njala, as listed on p. 166.

DESCRIPTION. Details of these specimens (except the smallest), two from Victoria, Sierra Leone, and one from a stream about 50 km from Monrovia, Liberia (coll. Roloff), are given in Table 1. The 41 mm paratype, having been preserved with the mouth thrust forward, is unsuitable for measurement of proportions.

Upper profile of head straight, lower jaw slightly projecting.

Cheek with 3 or 4 horizontal rows of scales, in some 1 or 2 small scales in addition.

Teeth of jaws unicuspid, in one row in lower jaw (rarely 1 or 2 inner teeth), one and a short second row in upper jaw, the lengths grading smoothly from longer anterior to shorter posterior.

Gill-rakers short, 2+1+5–7 on the first arch, the 1 or 2 lowest often abruptly smaller than the others.

TABLE 1

Proportions and some meristic characters in *H. fugax*

	Holotype	Paratypes						
	Kassewe	Kassewe		Moyamba	Njala	Victoria		Liberia
SL (mm)	72	76·5	66·5	70	43	80	53·5	59
As % SL								
Depth	36·1	34·6	34·6	35·7	34·8	34·4	34·6	35·6
Head	36·8	38·5	39·8	39·3	38·8	38·2	39·8	39·2
sn	11·5	11·8	12·9	12·2	10·5	12·1	13·1	12·0
int	9·15	9·3	9·8	9·45	8·6	9·25	9·35	8·5
l.j.	15·3	15·9	15·8	16·5	17·0	15·3	16·8	16·1
c.p.l.	13·9	14·4	13·5	11·7	11·9	12·5	14·0	12·9
c.p.d.	16·8	15·7	15·0	16·8	16·6	16·4	16·8	16·3
P	24·6	25·5	22·6	25·0	26·0	23·7	25·6	24·6
As % head								
sn	31·8	30·6	32·5	31·0	27·0	31·7	32·8	30·2
eye	26·8	22·0	23·0	22·5	28·8	22·8	26·3	28·1
pr	11·5	15·9	15·1	12·7	12·0	16·35	15·5	11·7
int	25·3	24·0	24·5	24·0	22·0	24·0	23·5	21·3
u.j.	34·8	33·9	34·0	33·0	30·6	32·7	35·2	31·1
l.j.	42·5	41·4	39·7	41·8	43·7	39·9	42·2	39·4
Sc.l.l.	26	27	26 ?	26	25	26	—	27
Sc.D–l.l.	3½	3½	3	3½	3½	4	4	4
D	XIV 11	XIV 12	XIV 11	XIV 11	XIV 11	XIII 12	XIII 12	XIV 11
A (III+)	8	9	8	8	8	8	8	8

Head = length of head ; sn = snout, from middle of upper lip to edge of orbit ; pr = depth of pre-orbital bone ; int = interorbital width, the roof of the skull between the eyes ; u.j. = upper jaw, from middle of upper lip to end of maxillary ; l.j = lower jaw, from middle of lower lip to end of retro-articular ; c.p.l. and c.p.d. = length and depth of caudal peduncle ; P = length of pectoral fin ; Sc.l.l. = no. of scales in lateral line series, resuming at the end of the upper lateral line with the lower lateral line scale (pierced or not) in the oblique row behind, the row used sloping downwards and forwards ; D = dorsal fin-rays ; A = soft anal rays. SL = Standard Length.

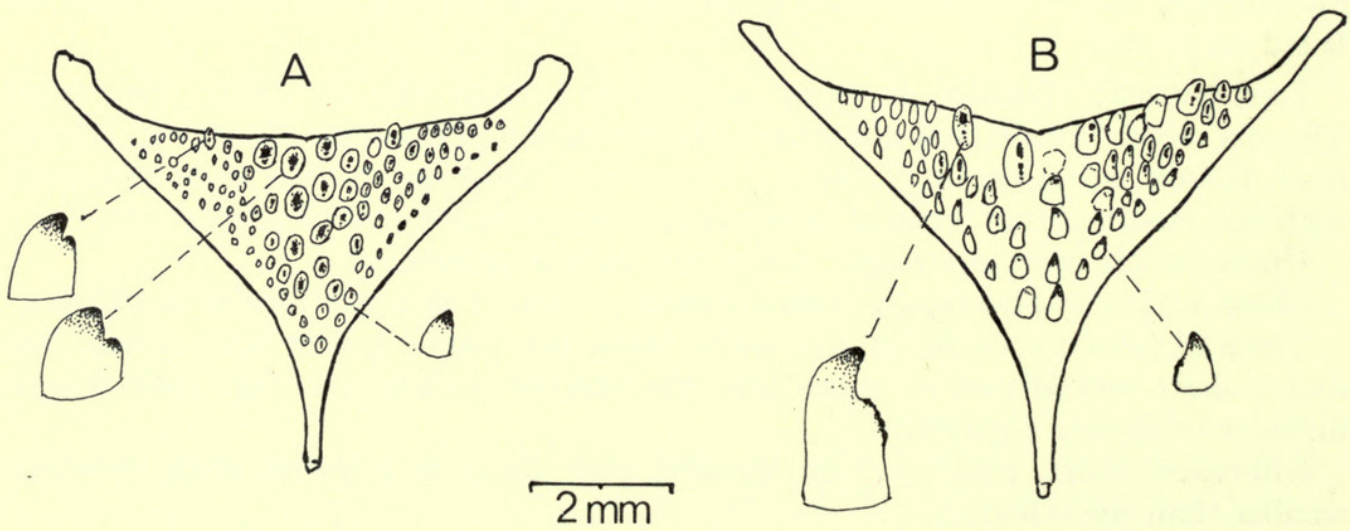

FIG. 1. The lower pharyngeal bones of *H. bimaculatus* (left) and *H. fugax* (right).

Scales cycloid with gothic circuli, 25 to 27 in the lateral line series, 3, $3\frac{1}{2}$ or 4 from origin of dorsal to lateral line.

Caudal fin rounded. Length of caudal peduncle 0·75–0·9 of its depth.

Lower pharyngeal bone hastate (Fig. 1) with rather long lateral apophyses. Teeth slender, but the posterior ones of the middle rows may be worn down ; lateral posterior and several others with a crest of 1–4 small brown points in front of the main cusp. In the Liberian specimen some teeth with crest not divided into points, others with one, two or three in addition to the main cusp ; anterior teeth unicuspid. Teeth of posterior row 16–20.

Colour in life (taken straight from the water). General appearance olive brown with three approximately equidistant black blotches on each side, the first on operculum, the third at base of caudal ; much red on the fins.

Head with variable gold and red streaks on cheek and gill-cover and a greenish gold rim to the opercular spot. A circumpupillar gold ring, rest of iris grey or (in two of four observed) with red lower quadrant. Lips and chin sometimes tinged red. Lappets of dorsal fin, apex of soft fin and often also its upper edge bright red ; a clear submarginal band ; rest of fin membrane golden-yellow to pinkish with clear or pale blue spots. Anal fin clear proximally, reddish distally. Caudal fin with distal quarter to three-quarters bright red, proximally yellowish ; a clear submarginal streak underlining the red upper corner. Pectoral transparent, colourless or yellow. Pelvics clear with red or black leading edge.

After a minute or two out of water small pale turquoise spots may appear on the flank, but these are much smaller and less iridescent than those of *H. bimaculatus* Gill. With time reddish centres to the scales may also appear.

After two days in a tank one fish became much more sombre and the middle flank spot disappeared. A dark bar through the eye became pronounced and eight faint vertical bars could be switched on.

Preserved specimens show the three lateral blotches and often traces of the vertical bars.

Diagnostic features. Distinguished from *H. bimaculatus* by the long, acute snout and narrow interorbital space, giving the ratio of Table 2 (p. 164) and from *H. fasciatus* by lower numbers of scales (29–30 in *H. fasciatus*) and the fact that the anterior teeth are not abruptly contrasted in length with the rest but grade smoothly into the series.

Ecology. The fish has been caught in fairly fast-flowing forest streams, where it tends to lie in the lee of weed-beds, stones or logs, and also in swampy areas. In five localities sampled it was accompanied by *H. thomasi* (Boulenger) (three places) or *H. fasciatus* Peters (two places), but not by *H. bimaculatus*. Although both species were sent by N. W. Thomas in 1915 from 'Victoria' we have no details of the locality or localities in which they were taken.

Distribution. The sites where *H. fugax* has been found in Sierra Leone, along with the records for *H. bimaculatus*, are indicated in Fig. 3. *H. fugax* appears to be restricted to the river systems east of the Rokel and the Freetown Peninsula. Samples from the most easterly rivers of Sierra Leone, Moa and Mano, have not yet

been obtained, but some juveniles described below were taken not far west of River Moa and no doubt it will be found in suitable places between here and the Liberian locality.

H. bimaculatus also occurs in the east of Sierra Leone but in the territory so far it has been located only in the physiologically more demanding brackish water areas of Sherbro Island and the coastal region opposite, including Lake Kwarko, a lagoon in the waterways parallel to the coast into which Rivers Waanje and Sewa drain. *H. bimaculatus* may therefore be physiologically more adaptable than *H. fugax*. It is widespread in other African territories.

The Liberian specimen of *H. fugax* mentioned above and a smaller one collected by Herr Roloff at the same time show that the range of *H. fugax* must extend eastwards, but the limits have yet to be determined. We have not found it among the material from the rest of Africa in the BMNH.

JUVENILES OF THE SPECIES OF *HEMICHROMIS*

Young *H. fugax* of about 15 mm SL obtained at Kassewe have a black median longitudinal stripe from the operculum to the end of the caudal peduncle, in preserved specimens ending in a slightly darker blotch at the base of the caudal fin.

Seven young of 21·0–22·5 mm SL from Potoru (a few kilometres west of the expanded part of River Moa), preserved in the BMNH, show this broad band expanded at the position of the mid-lateral blotch. At the base of the caudal fin it ends as an intense black blotch, narrowly extended on the middle caudal rays to the tip of the fin (Fig. 2). These have the acute snout and triradiate pharyngeal bone characteristic of *H. fugax*, in contrast to young of *H. bimaculatus* of the same size.

Young of *H. bimaculatus* from Bonthe, Sherbro Island (where adults have also been collected), show in contrast separate opercular, mid-lateral and caudal blotches with no extension on to the caudal rays (Fig. 2). They have the more robust pharyngeal bone characteristic of this species. In Lake Kwarko (or Kwako) the young are similar.

The difference in the pigmentation of the caudal between the two samples of *H. fugax* suggests that this pattern may not be strictly specific ; or possibly the fact that those lacking the caudal streak were smaller may be significant. In *H. bimaculatus* too there is some variation. In a sample of thirteen, 15·5–44·5 mm in SL, from Kiyawa River near Katagum, Nigeria, the two smallest have the caudal blotch produced a short distance on the caudal fin and between the mid-lateral and caudal blotches is a dusky band. The same is true of a 20·5 mm juvenile from about 19 km north of Monrovia taken with two adult *H. bimaculatus*. It has the appearance of *H. bimaculatus*, but the pharyngeal bone is equivocal. (This sample suggests that a borderline between the distribution of *H. fugax* and *H. bimaculatus* may lie between 20 and 50 km from Monrovia.)

Some fry of *H. fasciatus* from Sherbro Island have the lateral band emphasized at the positions of the future lateral blotches and continued on the middle caudal rays. This caudal extension was not figured for young of this species at Yangambi,

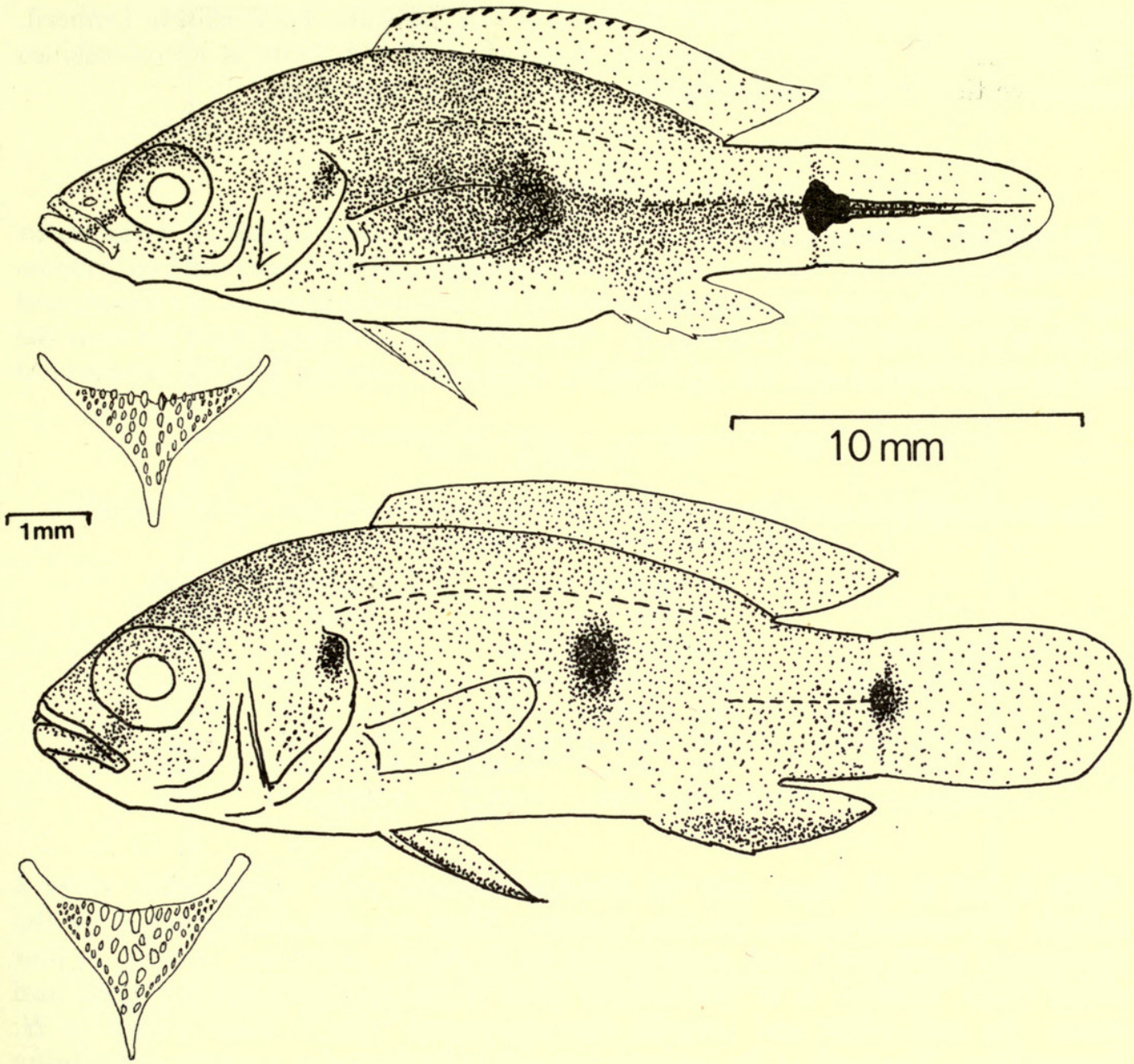

FIG. 2. Juveniles of (above) *H. fugax* from Potoru and (below) *H. bimaculatus* from Bonthe with their pharyngeal bones.

Congo, by Gosse (1963, fig. 17), but the two 'forms', A and B, of *H. fasciatus* are found in Sierra Leone and the fry may give a clue to their distribution there.

A recent account of the breeding and rearing of young of *H. fasciatus* from Liberia (Nieuwenhuizen, 1975) shows, among other handsome photographs, a shoal of 3-week-old fry. Their colour-pattern is almost exactly that of our fry from Potoru (Fig. 2), but with a more pronounced upper stripe on each side of the base of the dorsal fin. The identity of our juveniles with *H. fugax* has been confirmed by the meristic characters (scales in lateral line series 26–27, against 29–30 in *H. fasciatus*, both 'forms') and that of Nieuwenhuizen's fry by the photograph of the parent, which has five black blotches along the side behind the opercular spot.

This is probably the 'B form' of *H. fasciatus* (? = *H. elongatus* Guichenot in Duméril, 1859 cf. Loiselle, quoted in Trewavas, 1974) since the 'A form' is notoriously so aggressive that it is almost impossible to rear it in an aquarium.

RELATIONSHIPS OF *H. FUGAX*

In meristic characters this species cannot be distinguished from *H. bimaculatus* Gill, also abundant in Sierra Leone, but it is easily recognized by the different colouring, especially the lack (or lower brilliance) of the turquoise spots on the flanks, and by the acute snout (Pl. 1 and Fig. 2). The difference in snout length between the two species (Table 2 and Fig. 3) is slight, with some overlap, but the interorbital

TABLE 2

Length of snout (Sn) and interorbital width (Int) in *Hemichromis fugax* and *H. bimaculatus* and the ratio of snout to interorbital width

	H. fugax (N = 13)		*H. bimaculatus* (N = 19)	
	Range	Mean	Range	Mean
SL (mm)	40·7 –80·5	61·21	44·0 –100·0	61·45
Sn (% head)	26·0 –30·6	28·33	22·6 – 28·6	25·55
(% SL)	9·5 –11·9	10·88	8·45– 10·2	9·27
Int (% head)	20·0 –23·0	21·20	22·2 – 26·8	24·73
(% SL)	7·6 – 8·95	8·18	8·2 – 9·85	8·96
Sn/Int	1·23– 1·50	1·33	0·86– 1·19	1·04

width is less in *H. fugax* and the snout/interorbital ratio consequently gives a reliable difference between the two species. They are also distinguished by the pharyngeal teeth, fewer and more slender in *H. fugax*, sometimes with up to four minor cusps, whereas in *H. bimaculatus* some of the median teeth are stout and blunt. In both adult and juvenile the pharyngeal bone is more robust in *H. bimaculatus*. The teeth of the jaws are variable in both species, an inner series being present or absent, when present of a few teeth only. In neither species are the anterior so sharply contrasted in size with the others as in *H. fasciatus* Peters, but the shape of the snout and mouth in *H. fugax* approaches that in *H. fasciatus*.

The significance of the difference in colour-pattern between our samples of juveniles can only be judged after tests of variation between populations and developmental stages. Possibly the juvenile pattern is another feature in which *H. fugax* resembles *H. fasciatus* and differs from *H. bimaculatus*.

We have mentioned *H. thomasi* as though it were a species of *Hemichromis*, as Loiselle & Welcomme have treated it (1972). This is, in any case, an isolated species not liable to be confused with any of the currently recognized species of *Hemichromis* and certainly not with *H. fugax*, having a very short, blunt snout and smaller, more numerous pharyngeal teeth.

We have also examined syntypes (or topotypes) of *H. letourneuxi* Sauvage (1880a) from Lake Mareotis, Nile delta ; of *H. rolandi* Sauvage (1881) from Zibane,

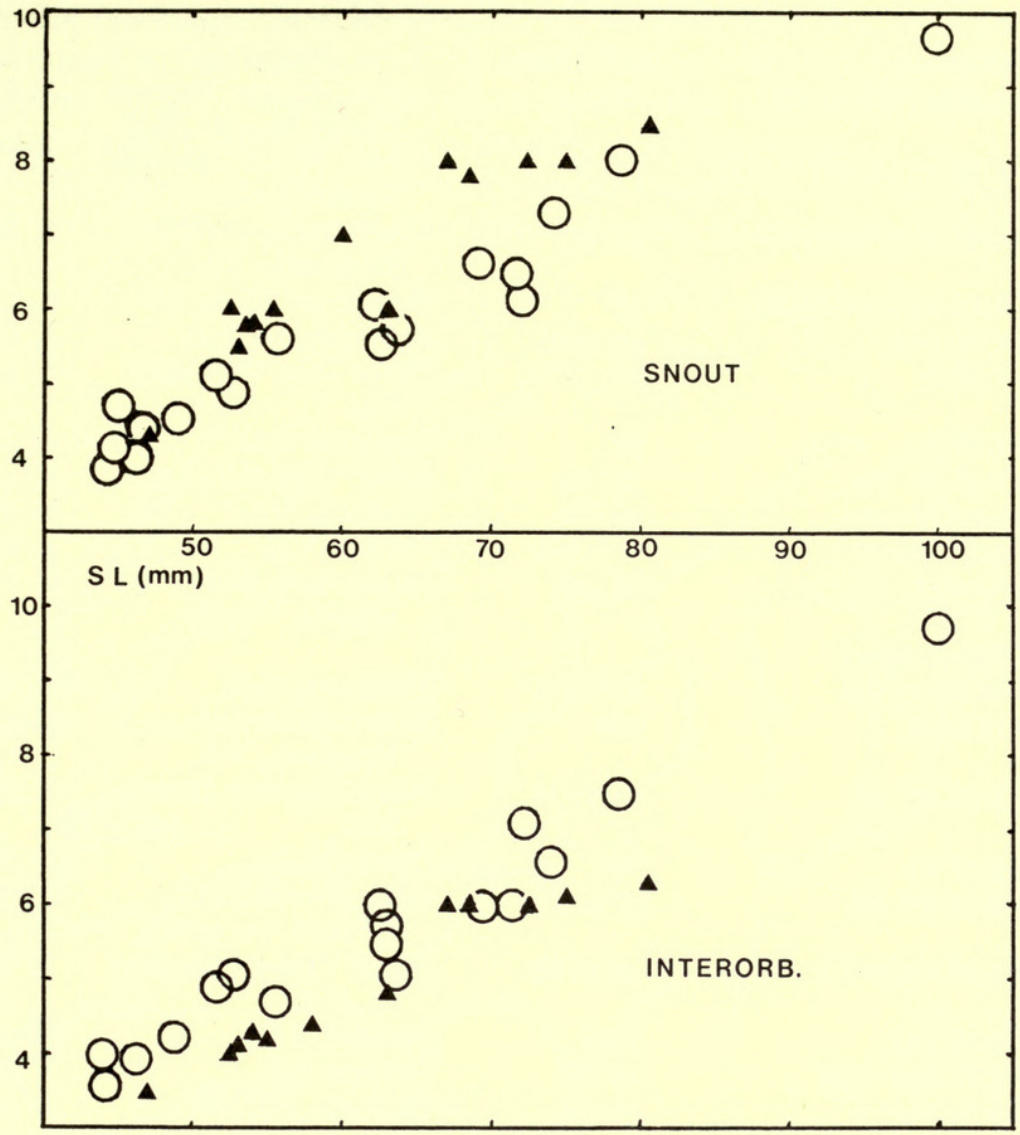

FIG. 3. Comparison between *H. fugax* (▲) and *H. bimaculatus* (○) in length of snout and interorbital width (in mm).

Constantine, Algeria ; *H. saharae* Sauvage (1880b) from near Touggourt ; and the large specimens that are the syntypes of *H. guttatus* Günther, of unknown locality. These names have been regarded as synonyms of *H. bimaculatus* (by Pellegrin, 1904 : 219, and Boulenger, 1915 : 431) and we are satisfied that *H. fugax* is distinct from them all.

ACKNOWLEDGEMENTS

We are grateful to Mr Paul L. Loiselle for communicating to us his views on the species of *Hemichromis* and particularly his opinion that the type of *H. bimaculatus*, which he has seen, is the species to which we have attributed the name. We also thank Dr G. Corbet and Dr P. H. Greenwood for reading the script and suggesting improvements.

MATERIAL EXAMINED

Hemichromis fugax	SL (mm)	Locality	Collector
BMNH 1976.1.28.1 (holotype)	72	Forest stream, Kassewe Forest Reserve, S.L.	A. I. Payne
BMNH 1976.1.28.6–7 (paratypes)	66, 76	Forest stream, Kassewe Forest Reserve, S.L.	A. I. Payne
BMNH 1976.1.28.2–3 (paratypes)	41, 70	Gbangbar system nr Moyamba, S.L.	A. I. Payne
BMNH 1971.8.13.24 (paratype)	43	Stream nr Njala, S.L.	A. I. Payne
BMNH 1976.1.28.4–5	45, 46·5	nr Moyamba, S.L.	A. I. Payne
BMNH 1976.1.28.8	72	River Taia, nr Njala, S.L.	A. I. Payne
BMNH 1976.1.28.9	53	Kassewe, S.L.	A. I. Payne
BMNH 1976.1.28.10–13	52–65	River Tabé, S.L.	A. I. Payne
BMNH 1915.5.27.21–23	40–80	'Victoria, S.L.'	N. W. Thomas
BMNH 1958.9.18.224–9	21–22·5	Potoru, S.L.	T. S. Jones
BMNH 1972.3.16.11–12	28, 59	50 km from Monrovia, Liberia	E. Roloff
Hemichromis bimaculatus			
BMNH 1888.10.19.23–32	24–74·5	Freetown, S.L.	R. Dinzey
BMNH 1899.11.25.4	100	Mountain stream, Freetown, S.L.	Hopkins
BMNH 1915.5.19.28–30	48·5–72	North Sherbro District, S.L.	N. W. Thomas
BMNH 1915.5.27.24	63	'Victoria, S.L.'	N. W. Thomas
BMNH 1950.9.22.50–70	22·5–71	Lake Kwarko, S.L. (7°18′N, 11°59′W)	T. S. Jones
BMNH 1958.9.18.219–222	45·5–89	Black 'River', Sherbro Is., S.L.	T. S. Jones
BMNH 1958.9.18.223	25·3	Bonthe, S.L.	T. S. Jones
BMNH 1958.9.18.230–239	22–36	Bonthe, S.L.	T. S. Jones
BMNH 1958.9.18.240–1	27, 33	RoKupr, S.L.	T. S. Jones
BMNH 1969.11.19.20–21 (3 fishes)	20·5, 62·5, 68	19 km from Monrovia, Liberia	C. Steiner
BMNH 1928.7.3.112–116	29·5–45·5	Kiyawa River, nr Katagum, Nigeria	Ll. Lloyd
BMNH 1930.3.22.276–284 (13 fishes)	15·5–44·5	Kiyawa River, nr Katagum, Nigeria	Ll. Lloyd
BMNH 1884.5.2.3–4 (syntypes of *H. saharae*)	39·5, 41·0	'Oued Rhir Constantine'	Mus. Hist. Nat. Paris
BMNH 1884.5.2.5–7 (syntypes of *H. rolandi*)	41·2–44·0	'Oued Rhir, Constantine, Algeria'	Mus. Hist. Nat. Paris
BMNH 1898.2.15.1 (syntypes of *H. letourneuxi*)	47·5, 51·0	Lake Mareotis, Egypt	Mus. Hist. Nat. Paris
BMNH 1860.4.19.3–4 (syntypes of *H. guttatus*)	90·7, 95·5	?	Stevens (purchased)

NOTE ON THE LOCALITIES

Most of the localities mentioned can be found on a modern map and by reference to our Fig. 4, but with two we had difficulty.

'Victoria, Sierra Leone.' The *Official Standard Names Gazetteer* gives the position of three such places, but in the maps consulted by us only those of an early *Handbook of Sierra Leone* (Goddard, 1925) mark any of them, and this only one,

nearest to the Gazetteer reference 7°39′N, 12°20′W. This is a very small place a short way inland at the latitude of the north end of Sherbro Island, north of the delta of River Jong. Among the other fishes sent from this address was one '*Psettus sebae*', which confirms it as a locality near the coast.

Potoru. This also has three references in the Gazetteer, but the probable one is some 8 km west of River Moa at its expanded part. This is the only one marked

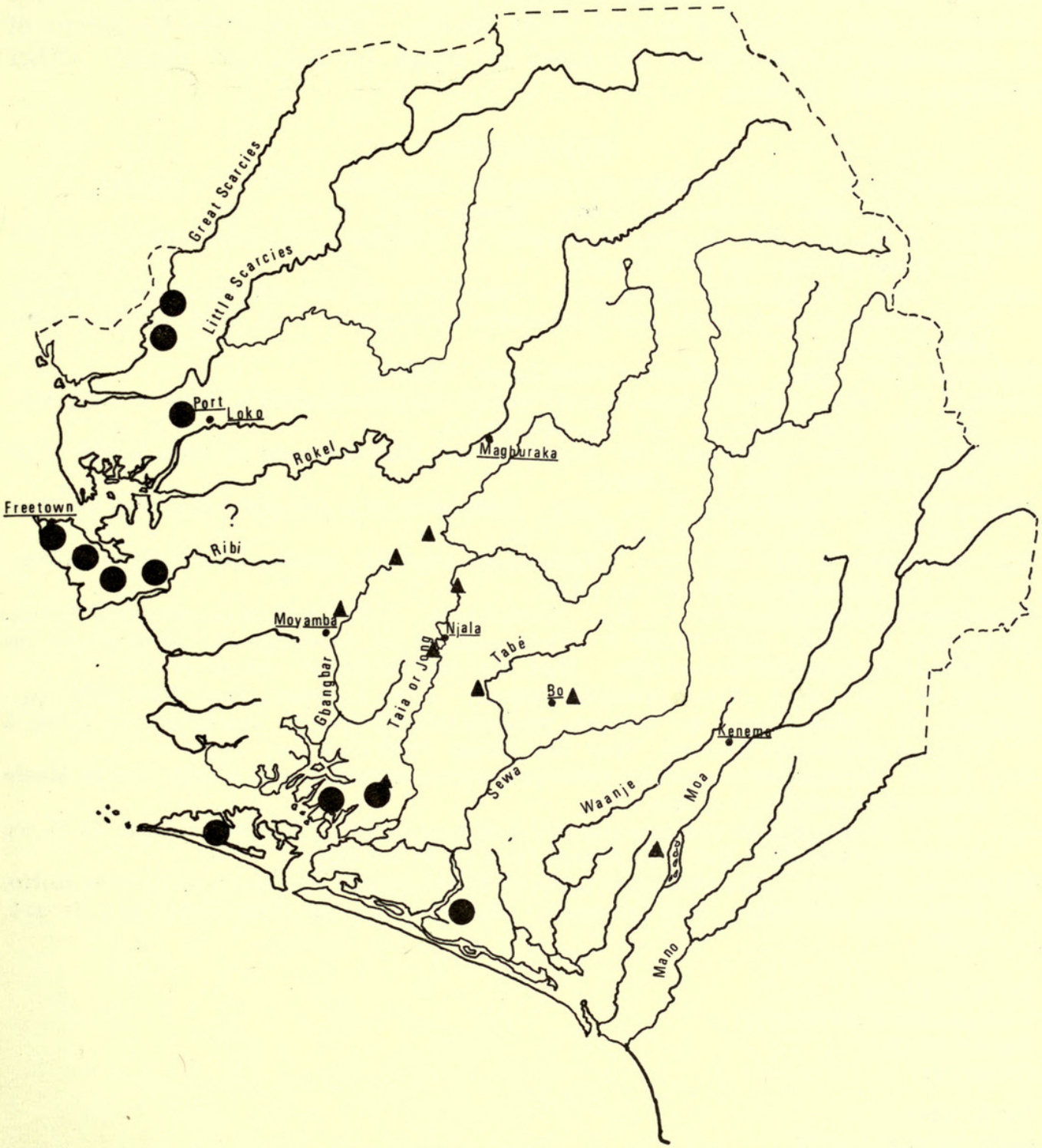

FIG. 4. The site records of *H. fugax* (▲) and *H. bimaculatus* (●) in Sierra Leone. At one site (?) fishes that were probably *H. bimaculatus* were observed but no specimens were taken.

on a map of 1950 (Director of Colonial Surveys, London), the period when Mr Jones was resident in Sierra Leone. It is also marked on the American 1 : 1 000 000 map NB 29 ser. 1301.

'Oued Rhir, Constantine.' This is the locality given in the register of BMNH for specimens of both *H. saharae* and *H. rolandi*. The original descriptions give for *H. saharae* 'Sahara, aux environs de Touggourth' and for *H. rolandi* 'Zibans, Sahara, Province de Constantine.' Both these localities are probably in the catchment area of Oued Rhir and Chott Melrhir. These and the specimens of *H. letourneuxi* in the BMNH are listed as 'types' by Boulenger (1915). Other syntypes remain in Paris.

REFERENCES

Boulenger, G. A. 1915. *Catalogue of African freshwater fishes*. Vol. III. London.

Breder, C. M. 1960. Design of a fry trap. *Zoologica N.Y.* **45** : 155–159.

Duméril, A. H. A. 1859 Reptiles et poissons de l'Afrique occidentale. *Arch. Mus. nat. Hist. Paris* **10** : 137–268, pls xiii–xxiii.

Gill, T. 1862. On the West Africa genus *Hemichromis* and descriptions of new species in the museums of the Academy and Smithsonian Institutions. *Proc. Acad. nat. Sci. Philad.* **1862** : 134–139.

Goddard, T. N. 1925. *Handbook of Sierra Leone*. London.

Gosse, J. P. 1963. Le milieu aquatique et l'écologie des poissons dans la région de Yangambi. *Ann. Mus. r. Afr. centr.* no. 116 : 113–249, pls i–x.

Günther, A. 1862. *Catalogue of the Acanthopterygii Pharyngognathi in the collection of the British Museum*. Vol. IV. London.

Loiselle, P. L. & Welcomme, R. L. 1972. Description of a new genus of cichlid fish from West Africa. *Rev. Zool. Bot. afr.* **85** : 37–57.

Nieuwenhuizen, A. van den, 1975. *Hemichromis fasciatus* – gouden schoonheid uit Afrika. II. *Het Aquarium* Jg. **46** : 30–34, 7 figs.

Official Standard names Gazetteer No. 101. Sierra Leone. U.S. Board on Geographical Names.

Pellegrin, J. 1904. Contribution à l'étude anatomique, biologique et taxonomique des poissons de la famille des cichlidés. *Mem. Soc. zool. Fr.* **16** : 41–401, pls iv–vii.

Peters, W. C. H. 1857. Neue Chromiden Gattung. *Mber. K. preuss. Akad. Wiss.* **1857** : 403.

Sauvage, E. 1880a. Notes sur quelques poissons recueillis par M. Letourneux en Epire, à Corfu et dans le Lac Mareotis. *Bull. Soc. philom. Paris* (7) **4** : 211–215.

—— 1880b. Description de quelques poissons d'espèces nouvelles dans la collection du Musée d'Histoire Naturelle. t.c. 220–228.

—— 1881. Description de quelques poissons d'espèces nouvelles dans la collection du Musée d'Histoire Naturelle. *Bull. Soc. philom. Paris* (7) **5** : 101–107.

Trewavas, E. 1974. The freshwater fishes of Rivers Mungo and Meme and Lakes Kotto, Mboandong and Soden, West Cameroon. *Bull. Br. Mus. nat. Nist.* (Zool.) **26** : 331–419, 4 pls.

Dr A. I. Payne
Lanchester Polytechnic
Priory Street
Coventry

Dr E. Trewavas
Department of Zoology
British Museum (Natural History)
Cromwell Road
London SW7 5BD

PLATE 1

(A) *Hemichromis bimaculatus* from Bonthe. (B) *H. fugax* holotype. (C) *H. fugax*, a Liberian specimen. All to the same scale. Photo BMNH.


A


B


C

Payne, A I and Trewavas, Ethelwynn. 1976. "A new species of Hemichromis (Pisces, Cichlidae) of Sierra Leone and Liberia." *Bulletin of the British Museum (Natural History) Zoology* 30, 159–168. https://doi.org/10.5962/p.2378.

View This Item Online: https://www.biodiversitylibrary.org/item/19510
DOI: https://doi.org/10.5962/p.2378
Permalink: https://www.biodiversitylibrary.org/partpdf/2378

Holding Institution
Natural History Museum Library, London

Sponsored by
Natural History Museum Library, London

Copyright & Reuse
Copyright Status: In copyright. Digitized with the permission of the rights holder.
Rights Holder: The Trustees of the Natural History Museum, London
License: http://creativecommons.org/licenses/by-nc-sa/4.0/
Rights: http://biodiversitylibrary.org/permissions

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at https://www.biodiversitylibrary.org.

This file was generated 16 April 2022 at 19:33 UTC