PRELIMINARY OBSERVATIONS OF SOME SMALLER FISH OF THE FRESHWATERS OF THE CALABAR AREA

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ABSTRACT

About 43 species of fish from sites within approximately 50 km north and 100 km northeast of Calabar are listed. Brief ecological and taxonomic data for some of the species are given.

INTRODUCTION

The author collected, when and as convenient, over the last four years, fish from some of the freshwaters or this area, partly in trying to develop an overall understanding of the area and secondly to contribute to a collection of representative fauna of the area in the Department of Biological Sciences of the University of Calabar.

About 28 sites were visited within about 50 km north on the road to Ikom and within about 100 km generally north east on the Ekang/Mamfe (MCC) Road. Some of the sites are described in general terms to indicate the habitat of some species.

Much of the collection was examined to try and identify the specimens using descriptions and or keys in Welman (1948), White (1956), Sterba (1962), Reed et al (1967), Reynolds (1969), Holden (1972), and for rivulins, Scheel (1975). Two references important for this area: Daget (1954) and Daget and Stauch (1963), were unfortunately inaccessible.

It is hoped this report, although preliminary, can be useful in ecological studies of freshwaters of the area or as an aid in distinguishing these species among commercial species.

MATERIALS AND METHODS

Nearly all collections were made at night using a powerful light and a rigid hand net, with a 40cm diameter hoop and a bag of green plastic mosquito netting with mesh approximately 2mm. The same bag endures after three years of heavy use.

Specimens were fixed in approximately 5 per cent formalin and preserved in this or in 70 per cent industrial methylated spirit. Maps by Talbot (1912) and the Cross River State Survey (1978) were used to know the drainages sampled.

Sites, except for one in Calabar labelled "GKR" and in the floodplain of the Great Kwa River near the UNICAL campus, are labelled by whether they are north on the road to Ugep (U), or generally northeast on the road to Ekang (E). They are further labelled by the approximate distance in kilometres from Calabar to the point where the highway must be left to reach the site.

RESULTS AND DISCUSSION

Sites

The sites can be roughly classified into four types:

1. EO7 is the west bank of the Great Kwa River.

2. GKR and EI7 are at culverts in swamps of the Great Kwa River, UO7' is at a culvert about 50m upstream of a small swamp draining into UO7.

3. U49 is a pond probably draining to the Calabar River.

4. The remainder are streams and their associated pools:

U07 drains about two kilometres downstream into the Calabar River; others, most probably U29, U31, U36, U40, E21, E25, E26, E28, drain into the Great Kwa River. E80 is a conglomerate of several tributaries draining via the Akpan to the Akpa Yafe and E85 is a more homogenious set of tributaries draining into the Akpa Yafe by way of the Eku River.

Table 1 lists the species by sites.

Species for which sites not entered in Table 1 are Eleotris africana and Eleotris sp. purchased in Watt market, Calabar, and Gnathonemus petersi purchased at Ikot Okan (U13), alongisde the Great Kwa River.

Only three species were caught in the edge of the river at E07. Periophthalmus and Aplocheilchthys sp. 2 appear not to occur in the other habitats.

There were 19 species in the swamp sites. Pantodon, Polycentropsis, Papyrocranus, Thysia, a species in an indetermined family and probably Channa africana were not found elsewhere.

The only pond, U49, was inadequately sampled but had Tilapia zillii found in no other site.

The stream sites, U29, U31, U36, U40, E80 and E85, have fairly similar faunas, but E80 and E85 have Barbus sp. 2 not found further south. U29 and U36 are 2 - 4 metres wide and seemingly have depleted faunas of U31 and U40 to which they are respectively close. All the above streams flow in part over rocks or stones with emergent Anubias lanceolata (Araceae) usually present. E26 appears similar to those streams but Calamoichthys and Pantodon were here and not at any other stream.

Collections were made frequently at E28 but only eight species were found. For long stretches the bed of the stream is of grey mudstone from which sedimentary material is easily washed. Ceratopterus, the water fern, is found occasionally in backwaters but there is little vegetation, plant litter or stones. This might be exmained as the reason for the low species abundance.

U07 also flows over sedimentary material. Sampling here has probably been sufficient to show that Barbus and Pelmatochromis species are absent, but further sampling may increase the list to beyond the 7 species collected.

Stream sites has a total of 31 species, 19 of which were not found in swamp sites.

Sites were not sufficiently studied for discussion of factors important to their species diversity or the zoogeography of the species. The study suggests that characteristic associations of species occur in particular sites and it would be of interest to examine some of the reasons for this.

Taxonomy

All determinations, but a few, should be verified before this is taken as a final checklist of the species found. Species where there are problems of identification include: Alestes chaperi Sauvage 1882 and/or A. longipinnis (Gunther 1864). One or both of these very similar species may be represented by individuals from seven sites. The species are distinguished by the longer dorsal in A. longipinnis males and by the front of the dorsals being inserted behind the ventral bases in A. chaperi and level with them in A. longipinnis. Specimens appear to be variable in position of the dorsal and might be either species, and some (e.g. No. 254) appear to combine features of both species.

Micralestes. Characids for which morphometrics are shown in Table 2 belong to a single species that may be Micralestes acutidens (Peters 1825).

Table 2. Fin ray and longitudinal scale numbers for a Micralestes sp. from three sites in Cross River State.

Site	Specimen number	D (number of dorsal fin rays)	A (number of anal fin rays)	LL (number of scales longitudinally
U31	114	10	18	ca.25
E26	119	10	ca.17	24
E26	263	10	ca.18	24
Cross R.))- Itigidi)	148	10		ca.23
	149	10		ca.25

Sterba (1962) gives: D:10, A:17-19 and LL: 23-28 for Micralestes acutidens.

Colours for number 263 were: lateral stripe reddish from anterior view: yellow - mainly in proximal 2/3rds - of dorsal, adipose and caudal; otherwise no colour in fins except black on some rays of all fins and at the top of the dorsal.

Inner-row, upper-jaw teeth from numbers 114 and 182 have seven points from which the posterior outline drops smoothly to the jaw without the cusps present on teeth from this position in Alestes chaperi and/or A. longipinnis.

Barbus sp. 1. A specimen from E85 much resembles Fig. 389 showing B. nigeriensis by Sterba (1862) and may be compared by these measurements from Sterba (1962): D: 3/8, A:3.5, LL: 25-29, TR:3-4/3; and for number 248: D: 3/8, A: 3/5, LL: 28, TR: 4.5/4, SL: 58mm. Unbranched rays in D have approximate lengths of 1.5mm, 7mm and 14mm, for the first to third respectively. A large branch of the fifth branched ray in A seems to resemble a sixth ray. The ventrals begin about under D3.

The species, recognisable by its checkered appearance due to the dark scale bases, was observed at four sites. At E80 one had orange on the front edge of the pectorals and ventrals, metallic black-tinged scales and a reddish and dusky caudal fin. My methods are inadequate for catching this species.

Barbus sp. 2. Distinctly-shaped and coloured specimens, with two large black marks on the side key to B. macrostoma (Pellegrin 1909) from tropical West Africa. The specimens might be in one of these species.

AMPHILIDAE. There are two species key in White (1965) to this family. One species with a narrow caudal peduncle and striated barbels might be Amphilius grammatophorus (Pellegrin) but the description by Reed et al (1967) is too brief. The second species, adults about 50mm total length, coloured pinkish-brown with about 7 dark bands, from gentle rapids at U31 and U40, is not described in my sources.

Clarias. The collection contain at least two species awaiting identification.

Aphyosemion and Epiplatys Scheel (1975) gives an extensive review of these rivulins. From his locality and scant biotope data, possibly the following might be found in this area:

A. arnoldi (Boulenger 1908)
A. calliuram (Boulenger 1911) or
A. ahli Myers 1933
A. gardneri (Boulenger 1911)
A. ndianum Scheel 1968 and/or
A. cameronense (Boulenger 1903)
A. sjoestidae (Lonnberg 1895)
A gulare (Boulenger 1901)
A. bivitattum (Lonnberg 1895)
E. longiventralis (Boulenger 1911)
E. sexfasciatus Gill 1862
E. grahami (Boulenger 1911).

Aphyosemions remain to be identified that will probably enter one of the first six species. Aphyosemion sp. 1 has a rounded caudal and belongs to none of these species.

Aplocheilchthys: A. sp. 1 is possibly the species Reed et al (1967, Fig. 138) describe. A. sp. 2 is most probably one of the species Sterba (1962) describes under Micropanchax. He lists M. flavipinnis (Meinken 1932) from Lagos; M. loati (Boulenger 1901), Nile and Northern Nigeria; M. macrophthalmus Meinken 1932, Lagos and M. macrurus (Boulenger 1904), Angola and Calabar. He gives for M. macrurus: D:7-8, A:12-15, LL:24-27 and TL:50mm. Measurements are for number 257: D:8, A:12, LL:27, SL:32mm. The first dorsal ray is above about the 7th anal ray.

Pelmatochromis. The following forms are represented by specimens with unicuspid teeth, a mucous pad and the lower lateral line confined to the caudal region: features which Burchard, in Reed et al (1967), gives to Pelmatochromis: P. sp. 1, from E85, is coloured greyish with about 5 dark vertical bars sometimes visible. The ventrals usually reach to the anal and the species is larger, maximum SL71mm, than P. sp. 2 Pelmatochromis sp. 2 includes smaller cichlids, with a lower profile and ventrals not reaching the anal, that may belong to more than one species. Forms with longitudinal dark stripes and no spot in the dorsal were collected at E85. Similarly-shaped specimens but having a black spot in the dorsal were collected at U36 and U40. One specimen with a larger mouth and with neither stripes nor a spot was collected at each of the sites U31, U36 and E80. In addition, a cichlid from U40, with SL: 36mm, has a shape and colour approximately like P. sp. 1 but also has a black spot in the dorsal.

Eleotris. All specimens but one key to E. africana or E. vittata by measurements Sterba (1962) gives for West African species Table 3).

Specimen number 256, purchased in Watt Market, Calabar, has LL: ca. 63, TR: ca. 21 and SL: 85mm and may be E. monteiri, although it resembles E. vittata in colour, shape and possession of a spine on the operculum.

Channa. Paler specimens from possibly E21 northeastward to E29 are seemingly C. obscura because of their colouration but fin rays of these forms have not been counted.

Sterba (1962) gives these data to separate two West African species - C. africana: D:42-49, A:30-34, LL:74-82, TR:6/12-15; C. obscura: D:40-45, A:26-31, LL:62-76, TR:6-7/12-15.

Indetermined families. Larger and better-preserved specimens are needed to identify two species additional to those above.

Table 3. Number of rays in anal and dorsal fins and number of scales in longitudinal and transverse rows as given by Sterba (1962) for West African Eleotris species.

Species	D_1	D_2	A	LL	TR
E. africana	VI	1/9	1/8	90-95	32-35
E. monteiri	VI	1/8		60-70	21-22
E. vittata	VI	1/8		40-50	15-17
E. lebretonis	VII-VIII	1/8-9	1/9-10	28-32	8-10
E. pleurops	VII	1/8	1/10	32	10
E. omesema	VII	1/8	1/10	30	9

SUMMARY AND CONCLUSIONS

The study indicates the commoner fish species to be found away from the larger rivers in the Calabar area. It provides an introduction to the general literature and a reference collection previously not readily available to local workers. This information may be of interest for the following reasons:

It acquaints workers with some of the species to be expected when trying to recognise individuals, particularly juveniles, of consumable species.

Some of the species may be important as food for consumable species, so that knowledge of their presence and habitat preferences may be useful in studies such as gut content analyses or distribution surveys.

It shows the presence of a diverse fish fauna, some of which are consumable species (e.g. Channa), away from areas of concentrated fishing activity. There seemingly have been no tagging or other studies to measure whether these minor waters are important as refuges or nursery areas for exploited species.

The study contributes to the biogeography of species in the area. For example, Aphyosemion ndianum appears to be known previously only from Osomba (near E80) and Barbus camptacanthus - although included by Welman (1948) - has been recorded very infrequently, if at all, from Nigeria.

The study gives an indication of the status of species which are important in mosquito control. Scheel (1975) has emphasised the importance of this role for the cyprinodonts. Six species from this family were found in the present study. Mostly these were living in shallow waters including temporary pools and it seems likely that in the absence of these fishes such waters would be a serious source of mosquitoes.

Ecologists may find the study useful in that it gives a preliminary indication of wide differences between habitats. This knowledge might assume importance should these or similar habitats become subject to environmental impact from, for example, industrial usage or control of Simuliidae (blackflies). These latter presently constitute a considerable nuisance and presumably a health hazard at U31, E28, E80 and especially E85.

The study makes available subject matter for demonstrating basic biological priciples; e.g. mophological adaptations, niche division, taxonomy and biosystematic methods; to students at UNICAL and other educational institutions.

Finally, it is of interest that a pair of Aphyosemion ndianum obtained from close to U31 sold for £15 in Britain in 1980, while Nigerian national newspapers are now frequently carrying advertisements of fish and equipment for aquarists.

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Table 1. Taxa to which are assigned fish collected in the Calabar Area and their collection sites. Abbreviations and symbols are explained at the foot of the table.

SPECIES	SITES														
	GKR	U07	U07	U29	U31	U36	U40	U49	E07	E17	E21	E25	E26	E28	E80	E85
1. Calamoichthys calabaricus	*-*									---			---			
Smith 1865 POLYPTERIDAE	---									I--			---			
2. Pantodon buchholzi Peters	---									*--			*--			
1876. PANTODONTIDAE	---									--*			---			
3. Papyrocranus afer (Gunther	---									*--						
1868. NOTOPTERIDAE	---									---						
4. Gnathonemus petersi																
(Gunther 1862) MORMYRIDAE																
5. Brienomyrus longinalis					---	---	-**			*--						---
(Boulenger 1904)MORMYRIDAE					*--	---	---			---						*--
6. Isichthys henryi	-*-															
MORMYRIDAE	---															
7. Alestes sp. CHARACIDAE		*-*			---		-*-			---	--*			*--	---	
		---			-*-		--*			*--	---			---	---	
8. A. nurse (Ruppel 1832).		*--							--*							
CHARACIDAE		---							---							
9. Micralestes sp. CHARACIDAE					---		-*-						**-			
					*--		---						---			
10. Hepsetus odoe (Bloch 1794).		*--			--I		-*-			*--				--*	---	
HEPSETIDAE		---			*--		---			---				---	---	
11. Barbus callipterus				-*-	--*	-**	-*-	--*							--*	---
Boulenger 1907. CYPRINIDAE				---	*--	---	---	---							---	***
12. Barbus sp. I. CYPRINIDAE				---	---										*--	--*

	GKR	U07	U07	U29	U31	U36	U40	U49	E07	E17	E21	E25	E26	E28	E80	E85
13. Barbus sp. 2. CYPRINIDAE															--*	---
															---	*-*
14. Parauchenoglanis sp.			---											-I-	--*	
BAGRIDAE			---											I--	---	
15. Eutropius sp. SCHILBEIDAE												---				
												--*				
16. Amphilius sp. AMPHILIDAE																*--
																---
17. gen. & sp. indet.				---	--I		--*									
AMPHILIDAE				-*-	I--		*-*									
18. Clarias sp. spp.	-*-		---	---	---	--I	-*-			---			*--	---	--I	
CLARIDAE	---		---	---	---	---	--*			---			---	---	---	
19. Chiloglanis niloticus							*--									
MOCHOKIDAE							---									
20. Malapterurus electricus	-*-					---	-*-								---	---
(Gmelin 1789)MALAPTERURIDAE	---					---	---								---	I--
21. Aphyosemion gardneri														P-*		
(Boulenger 1911)														---		
CYPRINODONTIDAE																
22. A. ndianum Scheel 1968						*--	---								---	---
CYPRINODONTIDAE						---	--P								*--	--P
23. A. bivittatum (Lonnberg		---	---		-*-	-*-	-*-				-*-		-*-		-*-	
1895) CYPRINODONTIDAE		---	*-*		---	---	--*				---		---		---	
24. Aphyosemion sp. I					-*-											
CYPRINODONTIDAE					---											
25. Epiplatys sexfasciatus	**-	*--	---	---	**-	--*	**-			*--		-*-	-*-	-**	--*	*--
Gill 1862 CYPRINODONTIDAE	*-*	---	*-*	*--	*-*	*--	--*			*--		---	---	*--	--*	*--

	GKR	U07	U07	U29	U31	U36	U40	U49	E07	E17	E21	E25	E26	E28	E80	E85
26. Aplocheilchthys sp. I		*_*		_*_	___	_**	_*_				*__		_*_	__*		
CYPRINODONTIDAE		___		*__	*__	___	___				___		___	___		
27. Aplocheilchthys sp. 2									*__							
CYPRINODONTIDAE									___							
28. Polycentropsis abbreviata	*__									___						
Boulenger 1901. NANDIDAE	___									*__						
29. Thysia ansorgii	___		___							*__						
CICHLIDAE	___		*_*							___						
30. Hemichromis fasciatus	*__	___			___					*__			*__	III	_*_	___
Peters 1857. CICHLIDAE	_**	___			___					___			___	*__	___	*__
31. Pelmatochromis sp. I				___												___
CICHLIDAE				___												**_
32. Pelmatochromis sp. 2					_*_	__*	_**	__*							__*	___
CICHLIDAE					*__	- __	___	___							___	**_
33. Tilapia zillii (Gernais								__*								
1848) CICHLIDAE								___								
34. Eleotris africana Steindachner																
1880 ELEOTRIDAE																
35. E. vittata Dumeril 1860	___	*_*					_*_									
ELEOTRIDAE	__*	___					___									
36. Eleotris sp. ELEOTRIDAE																
37. Periophthalmus sp.									*__							
PERIOPHTHALMIDAE									___							

	GKR	U07	U07	U29	U31	U36	U40	U49	E07	E17	E21	E25	E26	E28	E80	E85
38. Channa africana (Steindachner 1879) CHANNIDAE	*** --I		--- ---							--- ---						
39. Channa obscurus (Gunther 1861) CHANNIDAE											-I- ---	--* ---		--* ---		
40. Ctenopoma kingsleyae (Gunther 1896) ANABANTIDAE	*-- ---									*-- *--			--- -*-			--- ---
41. Mastacembelus sp. MASTACEMBELIDAE					--- ---		-*- ---									
42. Family indet										-*- ---						
43. Family indet.													I-- ---			

Explanation of Table 1. In the body of the table the space in the intersection of each site and species is used as a bimonthly calender. Starting with January-February in the top left hand corner and going clockwise, the symbols, I or P indicate presence of the species during the bimonthly period in which the symbol is entered. "I" indicates that a sample contains immature fish (approximately 1/5 or less the size of adults normally observed). Absence of the symbol I does not necessarily denote absence of immatures, rather sites were not specifically sampled for immatures and not all samples were examined. However where a species has "I" for one or more sites all samples for the species were examined. The symbol P indicates that the fish was captured in a pool.

DISCUSSION

V. O. Sagua: The paper is important in the sense that it arouses the interest of Nigerian Biologists to their surrounding. How were the fishes collected, preserved and labelled?

J. C. Reid: Collection was by hand-nets at night with light. The fishes were killed by freezing and preserved finally in alcohol instead of 4% formalin.