ILL# -15311420

Processed: 10/21/19

SCIE
QH 84.5 .T8451 - 3rd

Journal Title: Tropical freshwater biology

Volume: 15
Issue: 1
Month/Year: 2007

Pages: - 83-94

Article Author: Elakhame, L A

Article Title: The Distribution, Feeding and Reproduction of Clarioid Species in Epie Creek Floodplain of the Niger Delta, Nigeria

Imprint:

ISSN: 0795-0101

Lender String:

Notes

Special Instructions:

Note to Scanner: SCAN THIS SHEET!!

Odyssey

Trans. # 3131465

LENDING ARTICLE

****

RAPID

Copy To:

RAPID:USD (1) - NEW: Main Library
a

Borrowed From: EYM / MIUG

Interlibrary Loan
University of Michigan
Phone: 734-764-0295
Email: ill-lending@umich.edu

Courier Reply

	1st Searched	2nd Searched
☐ NOS ☐ Volume ☐ Call #		
☐ NFC ☐ Vol/Year don't agree ☐ Other		
☐ Tightly Bound		
☐ Missing Pages		
☐ Bound w/o issue		
☐ Non-circ		
☐ Other		

Tropical Freshwater Biology, 15 (2006) 83-94
www.ajol.info

THE DISTRIBUTION, FEEDING AND REPRODUCTION OF CLARIOID SPECIES IN EPIE CREEK FLOODPLAIN OF THE NIGER DELTA, NIGERIA.

L.A. Elakhame

Dept. of Zoology, Ambrose Alli University,
P.M.B. 14, Ekpoma – Nigeria.

ABSTRACT

The distribution, feeding and reproduction of the members of the sub-genus ***Clarias (Clarioides)*** *in Epie Creek Floodplain was studied. Four species of the* ***Clarias: C. buthupogon***, ***C. agboyiensis***, ***C. macromystax***, *and* ***C albopunctatus*** *occurred in the ecosystem. The presence of* ***C. albopunctatus*** *is reported for the first time in the Niger Delta. Members of the* ***C (Clarioides)*** *constituted 52.8% of the total number of* ***Clarias*** *species caught in the creek, swamp channel and lake. They were omnivorous feeding on fish, crustaceans, insects, detritus and mud. Mean fecundity for* ***C. agboyiensis*** *ranged from 4941 to 7647 eggs;* ***C. buthupogon*** *ranged from 10567 to 12667 eggs;* ***C. macromystax*** *ranged from 5059 to 8824 eggs and* ***C. albopunctatus*** *ranged from 6600 to 9500 eggs. Breeding period was between April and June with the Peak in May.*

Key words: *Clarias (Clarioides)*, Epie creek floodplain, *C. buthupogon*, *C. agboyiensis*, *C. macromystax*, *and C. albopunctatus.*

INTRODUCTION

The catfish of the genus *Clarias* dominates the commercial catches in the freshwater swamps of the Niger Delta. These *Clarias* species are among the ichthyofauna that support a major fishery and serve as protein for many people in the area. The Niger Delta has 10 *Clarias* species out of 14 occurring in West Africa (Tengels, 1986). There is a high probability that more fish species could be added to the list of fish composition or new fish species recorded. Despite its

ichthyofauna of *Clarias* species, very little or no research work has been done in the numerous freshwater swamp forest ponds and lakes in the Niger Delta floodplains. The poor state of published information on the biology and ecology of the "small" *Clarias* species of the sub-genus *Clarias (Clarioides)* have been reported (Sydenham, 1980; Engels, 1982, 1986 and Tengels *et al.*, 1992; Akiri, 1987 and Ezenwagi, 1992).

Considering the great importance of the floodplain and the diverse fish species in freshwater swamp fisheries, its poor ecology and biology, it became imperative that ecological sties of relatively less perturbed natural rivers, ponds and lakes such as the Epie creek floodplain be carried out. This paper provides a comparative ecological study on the member of *C. (Clarioides)* David & Poll, 1937 in the ecosystem.

MATERIAL AND METHODS

Study Area

The study area is located between latitude 5^0 00' and 5^0 15'N and longitude 6^0 15' and 10^0 15'E in the freshwater swamps of the Epie Creek floodplain (Fig 1). The climate conditions are typically tropical as the area lies within the rain forest belt. The rainy season begins in March/April and lasts till October/November while the dry season spans from November to March.

Fish Sampling

Fish samples were collected with set gill nets (consisting of 25mm, 38mm, 51mm, 64mm and 102mm), hooks of various sizes (Nos. 12, 13, 14 and 15) and various kinds of fish traps, fish fences, cast nets and spears. Samples caught were either examined immediately or stored in 5% formalin until when needed. The *Clarias* species were identified using keys prepared by Teugels (1986).

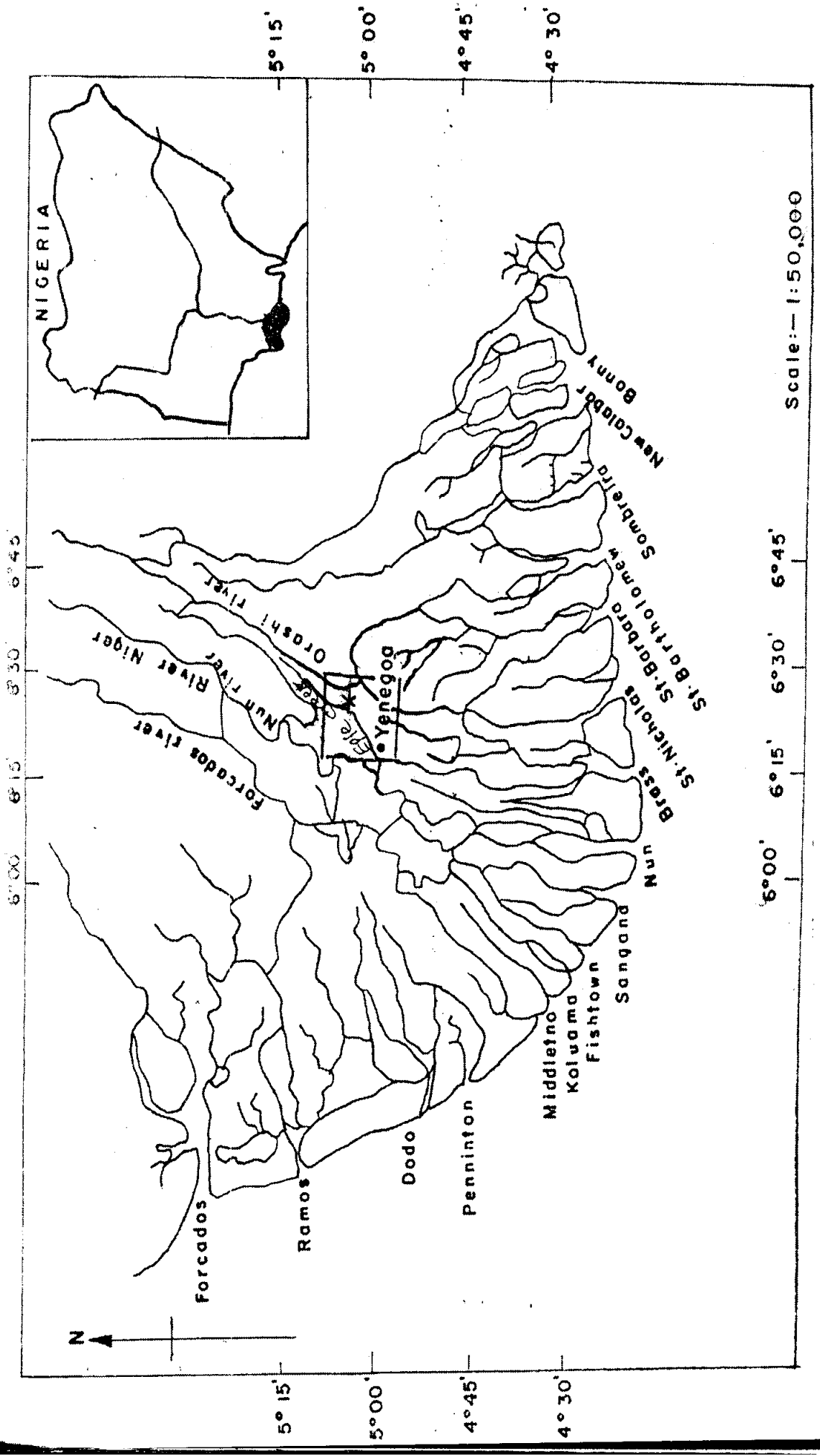

Fig. 1: Map of the Niger Delta. * Study Area.

RESULTS

Table 1 shows the list of *Clarias* species caught in the Epie Creek floodplain. The clariids were well distributed in the creek, swamp channel and lake. Seven species of *Clarias* were found in this ecosystem. The members of the sub-genus *C.* (*Clarioides*) constituted 52.8% (1258) of the total number of *Clarias* species caught in the ecosystem. The most abundant and dominant species was *C. buthupogon* followed by *C. agboyiensis* while *C. albopunctatus* was the least abundant.

TABLE 1

Clariid species caught in the floodplain

FAMILY AND SPECIES	CREEK	SWAMP CHANNEL	LAKE
CLARIIDAE			
Clarias camerunensis (Lonnberg 1997)		594	
C. ebriensis (Pellegrin, 1920)		55	434
C. pachynema (Boulenger, 1903)	39		
C. macromystax (Gunther, 1864)		18	48
C. buthpogon (Sauvage, (1879)			672
C. albopunctatus (Nichlos & La Monte, 1953)		14	20
C. agboyiensis (Sydenham, 1980)	56	25	415
Gymnallabes typus (Gunther, 1867)	10	25	58
Heterobranchus longifillis (Valenciennes, 1840)	43		
Total	138	731	1647

Clarias agboyiensis

Clarias agboyiensis is recognized by its yellowish colouration. This colour makes it readily distinguishable from other species with which it is sold together in fish markets (Sydenham, 1980). The head is long and snout rounded.

Distribution and Abundance

Clarias agbonyiensis occurred in the creek, swamp channel and lake (Table 1). In the lake, they were found burrowing into the roots of the raphia palms that surrounded the lake margins and the muddy bottom of the lake. A total of 496 specimens of *C. agboyiensis* weighing 34.55kg were caught during the period of investigation. The overall monthly abundance by number (Fig. 2) varied between 5.84% in July and August to 11.67% in November. The overall monthly abundance by weight (Fig. 2) ranged from 5.70% in July to 11.29% in November. The catches were more abundant in the dry season than in the wet season.

Food and Feeding Habits

Food Composition: Table 2 shows the dietary composition of *C. agboyiensis*. Shrimps accounted for the highest percentage 45.3% by occurrence and 12.8% by number. Fish and fish remains showed a very high occurrence with over 30% except in *Brycinus spp.*, 18.4%. The overall percentages by number showed crustaceans with 47.5% followed by the insects with 37.2% and fish and fish remains with 15.3%.

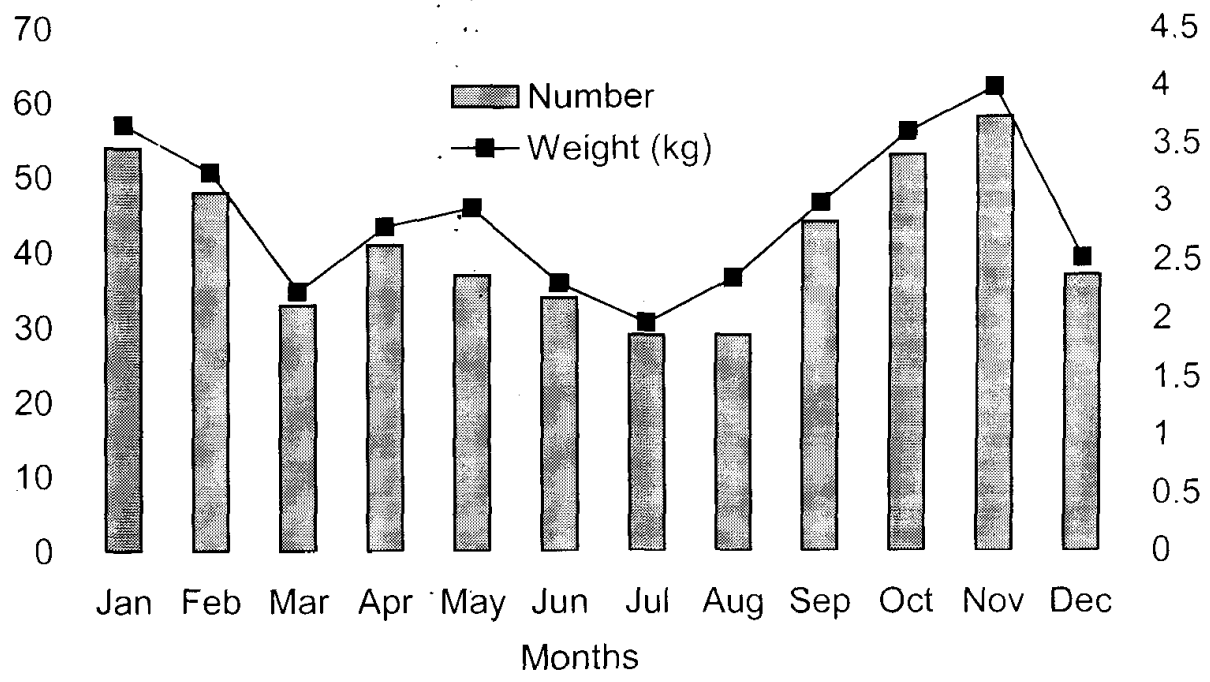

Fig. 2: Monthly variation in abundance by number and weight of *C. agboyiensis*

TABLE 2

Summary of food habits in *C.agboyiensis*

FOOD ITEM	OCCURRENCE METHOD		NUMERICAL METHOD	
	NUMBER	%	NUMBER	%
CRUSTACEAN				
Copepoda	33	17.4	309	12.6
Cladocera	27	14.2	255	10.4
Ostracoda	30	15.8	286	11.7
Shrimps	86	45.3	312	12.8

INSECTA				
Chironomid larvae	41	21.6	164	6.7
Odonata nymphs	63	33.2	146	6.0
Ephemeropteran nymphs	54	28.4	125	5.1
Hemiptera	57	30.0	90	3.7
Hymenoptera	39	20.5	98	4.0
Oligocaete worms	41	21.6	120	4.9
Coleoptera	28	14.7	34	1.4
Insect remains	49	25.8	132	5.4
FISH				
Tilapia spp	57	30.0	96	3.9
Brycinus spp	35	18.4	77	3.2
Cyprinodonts	61	32.1	82	3.4
Fish remains	80	42.1	118	4.8
Detritus	66	34.7	-	-
Mud	32	16.8	-	-

Number of fish examined	=	290
Percentage with food	=	65.5%
Percentage empty stomach	=	34.5%

Reproductive Biology

Fecundity: The mean fecundity of *C. agboyiensis* was 6095 ± 925 eggs (range 4941 to 7647 eggs). The Ova diameter of *C. agboyiensis* varied between 1.2 and 1.7 mm. (1.5 ± 0.1). Breeding period was between April and June with the peak in the month of May.

Clarias buthupogon

Clarias buthupogon is recognized by its very long maxillary barbells. A dark horizontal stripe is also seen on either side of the lower jaw. Irregularly placed while spots are on the body in addition to marbled colouration in some cases. The mean toothplate width in *C. buthupogon* is larger than in other Clarioides species. The head is long and broad with snout and squared.

Distribution and Abundance.

C. buthupogon occurred only in the lake (Table 1). They live in the muddy bottom of the lake and holes made in the roots of raphia palms that surround the lake. A total of 672 specimens of *C. buthupogon* weighing 57.15kg were caught during the period of investigation. The overall monthly abundance by number (Fig. 3) ranged from 4.46% in October to 12.95% in January. The overall monthly abundance by weight, ranged from 4.41% in October to 13.70% in January. The catches were more abundant in dry season than in the wet season.

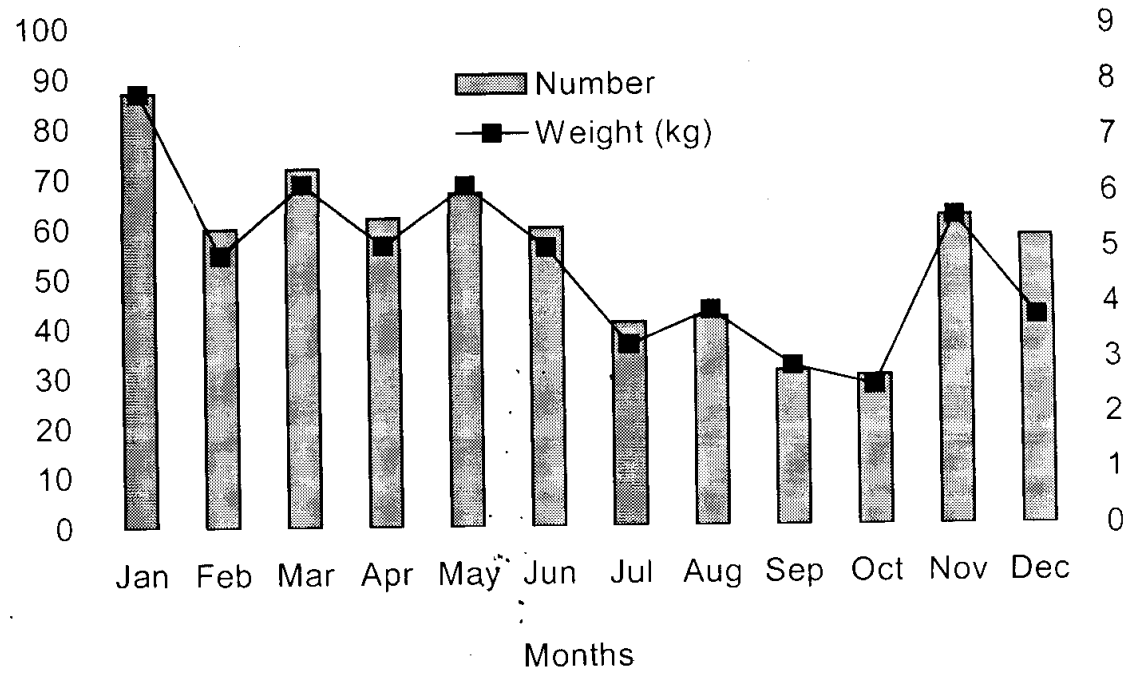

Fig. 3: Monthly variations in abundance by number and weight of C. buthupogon

Food and Feeding Habits

Food Composition: Fish remains accounted for the highest percentage 52% by occurrence and 9.8% by number (Table 3). Overall sum total by number shows that insects scored 39.3%, followed by crustaceans with 37% and fish with 23.7%. The least in occurrence was detritus and mud with 8.8% and 6.0% respectively.

Reproductive Biology

Fecundity: The mean fecundity of *C. buthupogon* was 11250 ± 665 (range 10567 to 12667 eggs). The Ova diameter ranged from 1.4 to 1.8mm (1.7 ±0.1). The breeding period is between April and June with peak in the month of May.

Other Clarias species

Other *Clarias sp.* found occurring in the ecosystem were *C. macromystax* and *C. albopunctatus*.

(i) ***Clarias macromystax*** is recognized by the irregularly placed while spots on the body and long maxillary barbells. Apical put of dorsal and caudal fins show a high coloured bond.

TABLE 3

Summary of food habits in *C.buthupogon*

FOOD ITEM	OCCURRENCE METHOD		NUMERICAL METHOD	
	NUMBER	%	NUMBER	%
CRUSTACEAN				
Copepoda	36	14.4	281	10.2
Cladocera	34	13.6	243	8.8
Ostracoda	24	9.6	262	9.5
Shrimps	71	28.4	234	8.5
INSECTA				
Chironomid larvae	39	15.6	98	3.6
Odonata nymphs	47	18.8	107	3.9
Ephemeropteran nymphs	48	19.2	94	3.4
Hemiptera	50	20.0	132	4.8
Arachnids (water mites)	34	13.6	121	4.4
Hymenoptera (Ants)	60	24.0	139	5.0
Oligochaete worms	54	21.6	114	4.1
Coleoptera	27	10.8	54	1.9
Insect remains	106	42.4	226	8.2
FISH				
Tilapia spp	65	26.0	118	4.3
Brycinus spp	56	22.4	140	5.1
Cyprinodonts	43	17.2	125	4.5
Fish remains	130	52.0	269	9.8
Detritus	22	8.8	-	-
Mud	15	6.0	-	-

Number of fish examined = 370
Percentage with food = 67.6%
Percentage empty stomach = 32.4%

(ii) ***Clarias albopunctatus*** is recognized by its very short barbells. The irregular placed while spots are distinctly seen like 'pox' on the lateral sides.

Distribution and Abundance

C macromystax occurred in the lake and the swamp channel, hiding in the roots of the raphia palms and the muddy soil of lake edges. In the swamp channel, they hide in the muddy soil among dead leaves and debris and inside hollow tree trunks and branches.

C. albopunctatus occurred in the lake and swamp channels. A total of 56 specimens of *C. macromystax* weighing 5.21kg and 34 specimens of *C. albopunctatus* weighing 2.25kg were caught in the lake.

Food and Feeding Habits

Food composition: Table 4 shows overall dietary composition of the two other clariid species examined. The insects were the most important food items followed by the crustaceans. *C. albopunctatus* had insects accounting for 50.6% by number while in *C. macromystax*, insects accounted for 48.6% of the overall total of food items consumed by number. Fish remains occurred only in *C. macromystax* and it accounted for 60% by occurrence. No plant fragments occurred in the diet of *C. macromystax*

TABLE 4

Overall dietary composition of 2 other Clariid species examined

Food item	*C. macromystax*				*C. albopunctatus*			
	F	%F	N	%N	F	%F	N	%N
CRUSTACEAN								
Cladocera	2	20	8	5.7	2	20	8	8.2
Copepoda	3	30	12	8.6	3	30	5	5.1
Ostracode Shrimps	2	20	4	2.9	3	30	7	7.2
INSECTA								
Ephemeropteran nymphs	4	40	6	4.3	2	20	3	3.1
Hemiptera (water bugs)	6	60	10	7.1	3	30	4	4.1
Coleptera	3	30	3	2.1	2	20	2	2.0
Odonata nymphs	4	40	4	2.9	4	40	5	5.2
Chironomid larvae	5	50	13	9.3	6	60	18	18.6
Oligochaete worms	7	70	18	12.9	4	40	10	10.3
Diptera (Mosquito larvae and eggs)	-	-	-	-	-	-	-	-
Hymenoptera (Ants)	2	20	5	3.6	1	10	2	2.1
Isoptera (termites)	-	-	-	-	-	-	-	-
Insect remains	4	40	9	6.4	5	50	5	5.2
FISH								
Fish remains	6	60	14	10.0	-	-	-	-
Plant fragments	-	-	-	-	2	20	-	-
Detritus	3	30	-	-	5	50	-	-
Mud	2	20	-	-	4	40	-	-

N = 25, percentage with food = 40% and percentage without food = 60%.
F = frequency of occurrence
N = number
%F = % occurrence
%N = % Numerical count

Reproductive Biology

Fecundity: The mean fecundity for *C. macromystax* ranged from 5059 to 8824 (6684 ± 1549; n = 5). The mean fecundity for *C. albopunctatus* varied between 6600 and 9500 (7649 ± 1146; n = 4). The Ova-diameter for *C. macromystax* ranged from 1.4 to 1.6mm (mean 1.5 ± 0.1), while that of *C. albopunctatus* ranged from 1.2 to 1.5mm (1.3mm ± 0.07).

The breeding period was between April and June with the peak in the month of May. The Ova diameter for *C. macromystax* was found to range from 1.4 to 1.6mm (mean 1.5 ± 0.1). Ova diameter of *C. albopunctatus* ranged from 1.2 to 1.5mm (mean 1.3 ± 0.07).

The breeding period is between April and June with the peak in the month of May. *C. macromystax* and *C. albopunctatus* numbers were too few to make a meaningful interpretation. The presence of *C. albopunctatus* is reported here for the first time in the Niger Delta, Nigeria as confirmed by Teugels, G.G of Musee Royal de C' Afrique Centrale, Belgium.

DISCUSSION

Marked variation occurred in the number and weights of Clarias species in the ecosystem studied. Feeding habit, breeding patterns and fluctuation in water level are among the most likely reasons for the variation in the numbers and weights encountered. Ita (1978) reported a high yield during the low water level and a low yield during high water mark.

Similar results were reported by Bazigos (1972) who observed a significant correlation between commercial catches and water level fluctuations. Turner (1970) also observed that the catch rate was inversely related to water level with a probable explanation that there was higher concentration of fish during low water level. Changes in the behaviour of the fish and fluctuations in the area of the marsh, leading to enforced concentration or dispersion of the fish populations are reasons for the seasonal variation in the numbers and weights of *Clarias* species caught (Willoughly and Tweddle, 1978). The Clariid species in the Epie creek floodplain showed great diversity of feeding habits. Similar observations was made by Teugel (1986). Omnivorous feeding habits of Clariid species have been reported by (Greenwood, 1958; Willoughby and Tweddle, 1978; Olatunde, 1983; Ayinla, 1988 and Elakhame and Anaweokhai, 1991). Comparison of the dietary habits of the fish species showed that they exhibited differences in the dietary items selected. There were qualitative differences between the items selected. Although there was an overlay among food items, the main item in the diet of one species coincided with those, which were only of secondary important in another species. Therefore, intra and inter-specific competition would be reduced or prevented by the trophic divergence amongst them. The abundance of food organisms will also reduce competition where two fish utilize the same range of diets.

C. agboyiensis depends mainly on crustacean while *C. buthupogon* fed mainly on insects. Similar results were reported in Kainji Lake (Olatunde, 1977

and 1979). A comparison of fecundity of *Clarias sp* in Epie floodplain shows that fecundity varied from species to species and location to location. Nikolsky (1963), Bagenal and Braum (1978) and Nwa diaro (1987) attributed the differences in fecundity to differences in food supply, size of specimens examined and methods of estimation. In this study, breeding period (April to June) was observed during the period of investigation with breeding peak in May. This coincided with the rainy season as reported in most tropical fishes (Lowe – McConnel, 1975 and 1979, Bruton, 1979; Beadle, 1981; Baryley, 1988) Willoughby and Tweddle (1978) suggested that high water level was the main cause of the extended breeding season in the area.

REFERENCES

Akiri, P.J. (1987). Taxonomy of the genus Clarias (Pisces; Siluriformes) in Rivers State. Nigeria and the Ecology of Species in relation to selected freshwater habitats. Ph.D Thesis, Rivers State University of Science and Technology, Port-Harcourt.

Ayinla, O.A. (1988). The food and feeding habits of African mud catfish Clarias gariepinus (Burchell, 1822) caught from the wild. *Nig. Inst. Ocean and Mark Res. Tech. Pap.* No. **34,** 13p.

Bagenal, T.B. and Brahum, E. (1978). Eggs and early life history. *In Methods of assessment of fish production in freshwaters* (Ed. Ricker, W.E.) Blackwell scientific publication Ltd pp.160-169.

Bayley, B.P. (1988). The factor affecting growth rates of young tropical floodplain fishes; seasonally and density in dependence, *Env. Biol. Of Fishes* **21(2),** 127.

Bazigos, E.P. (1972). The yield patterns at Kainji lake (Nigeria). UNDP/SF/NIR. 24. ST. s/2. 1-24. FAO. Rome. (Cited by Ita, E.O. 1978).

Beadle, L. C. (1981). *The inland waters of tropical Africa. An introduction to tropical limnology* (2nd Edn.) Longman, London, 475p.

Bruton, M.N. (1979). The breeding biology and early development of *C. gariepinus* in species in lake sibanja, African with a review of breeding in species of the-genus *Clarias (Clairas). Utrans. Zool. Soc. Land.* **35,** 1 - 45.

Elakhame, L.A and Anaweokhai, L.M. (1991). The food and feeding habits of *Synodontis eupterns* (Blache) fish family mockokide in Ilushi, Edo state, Nigeria. *Nig. Ann. Mat. Sci.* **1,** 31-36.

Ezenwaji, H.M.G. (1992). The reproductive biology of four African Catfishes (Osteichtyes: Claridae) in Anambra River Basin, Nigeria. *Hydrobiologia*, **242**, 155 - 164.

Green Wood, F.H. (1957). The reproduction of *Clarias mossambicus* in lake Victoria. In second symposium of African hydrobiologia and inland fisheries, 1956. CSA pub **25,** 77-78 (cited by clay, D, 1979).

Ita, E.O. (1978). An analysis of fish distribution in Kanji lake. Nigeria. *Hydrobiologia* **58 (3),** 233-244.

Lowe-McConnel, R.H. (1975). *Fish communities in tropical freshwaters: their distribution, ecology and evolution* Longman, London 337p.

Lowe-McConnel, R.H. (1979). Ecological aspects of seasonality in fishes of tropical waters. Symp. *Zool. Soc. Lond* **44,** 219-241 (cited by wine Miller, K.O, 1987).

Nikolsky, G.V. (1963). *The Ecology of fishes.* Academic press London 352p.

Nwadiaro, C.S. (1987). Fecundity of Cichlids fishes of the sombreiro River in he lower Niger Delta, Nigeria. *Rev. Zool Afri.* **101,** 433-437.

Olatunde, A.A. (1977). The distribution abundance and friends in the establishment of the family Schilbeidae in lake Kanji, Nigeria *Hydrobiologia*, **56,** 69-80.

Olatunde, A.A. (1979). The food and feeding habits of *Physailia pellucida* and *Schilbe mystus* with notes on the diets of S. *uranoscopns* and *Siluranodon auritus*, family schilbeildae in lake Kanji, Nigeria. *Fresh water Biology* **9,** 183-190.

Olatunde, A.A. (1983). Length weight relationships and the diets of Clarias Lazera (Cuv. Val.) Family Claridae in Zaria, Nigeria Proceedings of t he 3 rd A nnual c onference of the fisheries society of Nigeria (FISON): 183-192.

Sydenham, D.H.J. (1980). New species of Clarias from West African (Pieces: Clariidae). *Rev. Zool. Afri.*, **93**, 659-677.

Teudels, G .G. (1982). P reliminary Date of a systematic outline of the African species of the *Clarias* (Pisces: *Clariidae*). *Rev. Zool. Afri.*, **96 (4),** 731-747.

Teugels, G.G. (1986). A systematic revision of the African species of the genus *Clarias* (Pisces: *Clariidae*). Ann. *Mus. R. Afr.* Center. Belgium.

Teugels G.G. Mcried, G. and king, R.P. (1992): Fishes of the Cross River Basin (Cameroon Nigeria) Taxonomy, Zoogeography, Ecology and conservation. Musee Royal De L' Afrique Centrale, Belgium. *Annales Science Zoologiques*, **266,** 124pp.

Turner, J.L. (1970). The fish population of newly impounded Kanji lake, F.A.O. *Technical Report*, Fi: Sf'1 NIR 21.

Willoughby, N.G. and Tweedle, D. (1978): The Ecology of the Catfish Clarias gariepinus and Clarias ngamensis in the shire valley, Malawi. *J. Zool., Lond.* **16**, 507-534.