



Morpho - Edaphic Indices Of *Heterobranchus longifilis* (Valenciennes) In A Nigerian Basin

ANIBEZE¹ C.I.P. AND INYANG² N.M.

Dept. Of Anatomy, Abia State University, Uturu¹

Dept. Of Zoology University of Nigeria, Nsukka²

ABSTRACT

Data on the morphometric indices and habitat preferences of *Heterobranchus longifilis* from Idodo river were obtained from monthly samples collected between April 1992 and September, 1993. In contrast with the observed ubiquitous distribution of other clariids by other workers, *H. longifilis* preferred the main river channel and grassy floodplain habitats. The morphometric measurements and meristic counts of 32 parameters are generated for the field identification of the species. Seasonal population structure showed a preponderance of females in the rainy season which coincided with the breeding season of the species.

The clariids are important species in high demand because of their tasty flesh (Ezenwaji 1992) and importance in aquaculture. Teugels *et al.* (1992) observed that among the clariid species, *Heterobranchus* are the most cherished both as food fish and culture species. Not until the presentation of an alpha-level revision of the genus *Heterobranchus*, Geoffroy-st-Hilaire 1809 by Teugels *et al.* (1990), the taxonomy of this genus has been confused. Two of the valid species *H. longifilis* Valenciennes 1840 and *H. isopterus* Bleeker 1863 are extremely closely related and difficult to identify by ordinary identification keys. Thus, *H. isopterus* which was quoted by Sydenham (1970) to occur in a locality in northern Nigeria had later reviews by Teugels *et al.* (1990) indicating that an erroneous libelling might have occurred. Teugels *et al.* (1992) used karyological studies to produce a dendrogram of relationships and identities in the clariids. However, standard morphometric and meristic keys still appear to be elusive especially for the benefit of the field worker.

In terms of distribution, specimens examined by Sydenham (1970), Teugels (1983), Legendre (1986), Teugels *et al.* (1990) and Anibeze (2002) have shown the distributional range of the species. It has been quoted to occur in the Nile, Niger, Senegal, Gambia, the Volta and Chad

basins. Roberts (1975) mentioned the species to be a typical Nilo- Sudanic species.

The present study focused on the morphometric measurement and meristic counts of *H. longifilis*. It also provides information on the species distributional range and habitat preference in the middle reaches of the Idodo River ecology.

MATERIAL AND METHODS

H. longifilis samples were collected from three randomly selected sampling locations in the middle reaches of Idodo River (Anibeze, 2000). Samples were taken each month between April 1992 and September, 1993 using 80 baited hook (No17) and line which was quoted by Willoughby (1979) to be ideal for the catching of the clariids. Fishing was carried out at different times of the day but the experimental gear set overnight (18.00- 06.00h) was taken as the unit of effort. Based on the ecology of the basin as described by Anibeze (2000) each sampling location was divided into three main river (mr), grassy floodplain (gf) and forest floodplain vegetation (ffv). The experimental gear was set in each of these locations to determine the distributional range and habitat preference of the species.

The total length (mm), length (mm) and body weight of each catfish was measured and sex determined by the observation of

the genitalia.

Twenty randomly selected specimens of varied sizes and weights were used for the measurements of morphometric indices and meristic counts. Cranial region measurements were expressed as a percentage of head length while body measurements were expressed as percentage of standard length.

RESULTS

Distribution and Habitat Choice:

Table I showed that *H. longifilis* was most abundant in the grassy floodplain adjoining the river with 156 (41.9%). This was closely followed by catches from the main river channel with 154 (41.4%) while the forest floodplain habitat had 62 (16.7%). The forest floodplain habitat showed significant reduction ($P < 0.05$) in catch when compared with the main river channel and the grassy floodplain habitats.

In the three sampling locations, catches were highest in Iyionu (203 or 54.6%) followed by Imburu Idodo (115 or 30.9%) and lastly by Amechi Idodo (54 or 14.9%). Catches were significantly different ($P < 0.05$) in the three locations throughout the period of sampling.

H. longifilis displayed changes in numerical abundance following changes in seasons (Fig.

1). Peak catches were observed between May and October and a smaller peak was evident in January/February. The lowest catches were made in March.

Morphometric and meristic Measurements:

The result of the morphometric measurements and meristic counts of *H. longifilis* in Idodo river is presented in Table 2. General physical observation showed that specimens had long and broad head which appeared rectangular in dorsal outline. The occipital fontanelle is oval in shape and in small specimens (<50g) situated in the occipital process. The dorsal colour outline is deep grey.

DISCUSSION

The preponderance of *H. longifilis* in the main river channel and grassy floodplain is an indication of their preferred habitat.

The observations on the habitat preferences of other clarids seem to contrast this view. Ezenwaji (1993) mentioned that members of the subgenera *Clarias* (*Claroides*) and *Clarias* (*Anguilloclarias*) were fewer in number in the open river than the grassy and forest floodplain habitats. *H. longifilis* could therefore be said to prefer open habitats which are not necessarily associated with dense forest vegetation. Ezenwaji (1993) identified five different ecology habitats for *Clarias* species as against three identified for *Heterobranchus* in the present study.

These observations support the view that *Heterobranchus* which is the largest genus in Clariidae is less ecologically hardy than members of the *Clarias* (*Clarias*), *Clarias* (*Anguilloclarias*) and *Clarias* (*Claroides*) (Ezenwaji 1993, Teugels 1992, Awachie 1975). It would appear that the large sizes of *H. longifilis* restricts the movement of the species into so many impregnable marshes in the forest floodplain which accounted for the catches observed in this habit. The larger sizes are also less likely to make them tolerant to low oxygen levels in the forest especially in the dry season.

The seasonal population structure which showed more females in the rainy season is associated with the breeding months of the species when Anibeze and Inyang (2000) reported *H. longifilis* to be on spawning migration. This situation predisposes the females to be more vulnerable to the experimental gear (Anibeze, 1998).

Of the 32 parameters measured in the present study, 18 characteristics corroborate the existing keys listed in Teugals *et al.*, (1990).

Table 1: Distribution and habitat preference of *H. longifilis* from Idodo River, Nigeria.

Habitat	mr.		gf.		ffv		TOTAL	
Location	No	%	No	%	No.	%	No	%
Imburu Idodo	29	7.8	49	13.2	20	5.4	115	30.9
Amechi Idodo	46	12.3	16	4.3	9	2.4	54	14.9
Iyionu	81	21.8	89	23.9	33	8.9	203	54.6
Total	156	41.9	154	41.4	62	16.7	372	100

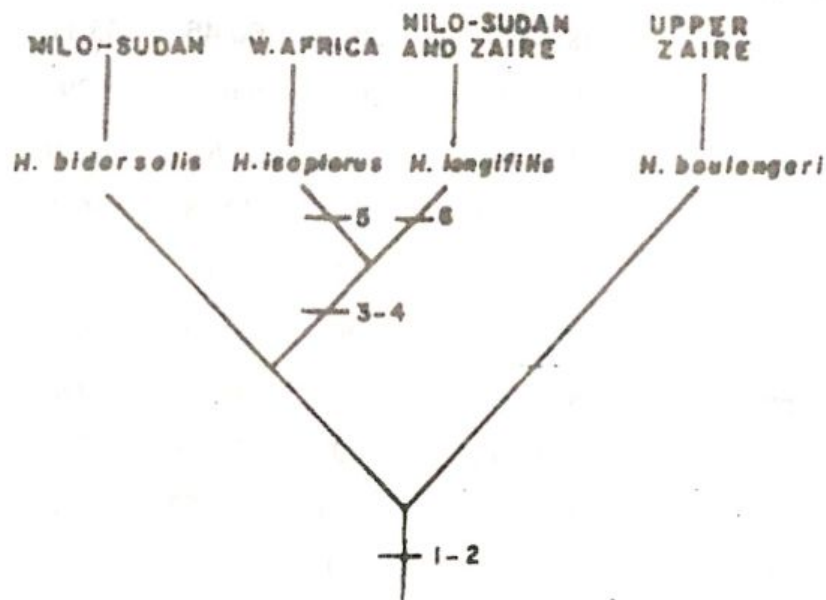


Fig. 1 Cladogram showing the most parsimonious hypothesis of relationship within the genus Heterobranchus

1. Increased length and depth of adipose fin, with correlated shortening of dorsal fin and reduced dorsal fin rays
2. Presence of 21—27 extended neural spines supporting adipose fin.
3. Pectorial spine serrations.
4. Increased number of neural spines.
5. Small toothplates.
6. Unique colour pattern

After Teugels et al (1990)

Table 2 Morphometric and meristic counts for specimens of *Heterobranchus longifilis* from Idodo river

Character	Min- Max	Number	M	SD	%HL	% SL (m)
Total length (TL)	123 - 463	20	243.1	123.79	-	-
Standard length (SL)	105 - 394	20	208.2	105.13	-	-
Head length (HL)	36 - 128	20	62.67	29.00	-	31.0±2.6
Head width	22.4 - 88	20	43.57	20.04	-	20.5±1.3
Preanal distance	61 - 225	20	115.83	56.25	-	56.3±2.2
Prepelvic distance	56-196	20	101.47	48.74	-	49.5±2.5
Dorsal fin length	31-122	20	65.78	33.25	-	31.7±1.9
Anal fin length	41- 148	20	77.14	39.85	-	36.9±1.3
Dist. occ. and dor. Fin	6-35	20	17.37	11.78	-	7.7±1.9
Dorsal fin. depth	10-36	20	16.75	10.22	-	97.7±2.0
Dist.dorsal and caudal fin	30.3-123	20	66.26	36.94	-	31.1±2.1
Adipose fin.length	28.2-117	20	60.46	33.11	-	28.5±1.9
Adipose fin. depth	4.5 - 20	20	9.6	5.29	-	4.6±0.6
Pectoral spine length	11 - 49	20	23.62	12.39	-	11.3±0.8
Pectoral fin length	14.5 - 66	20	32.68	16.92	-	15.7±0.9
Pelvic fin length	11-51	20	25.06	13.14	-	122±0.9
Body depth at anus	13 - 55	20	27.86	16.21	-	13.0±0.3
Caudal peduncle depth	8.5 - 35.5	20	18.34	9.96	-	8.6±0.7
Predorsal distance	40.5 - 127	20	77.70	37.57	-	37.7± 2.0
Occ. pro. Width	5 - 24.5	20	12.03	6.17	18.7±2.4	-
Occ. fontanelle length	4 - 10	20	6.42	1.67	10.9±2.9	-
Occ. fontanelle width	1.2 - 4.9	20	2.63	0.97	4.4±0.8	-
Premaxillary width length	1.8-9	20	3.45	1.87	5.4±0.7	-
Premaxillary width	10.5-42	20	19.62	8.55	31.9±2.8	-
Eye diameter	3.5-10	20	5.57	1.99	9.3±1.1	-
Vomerine length	1.7-10	20	3.72	2.25	5.7±1.1	-
Vomerine width	10-35	20	17.2	7.35	28.8±2.8	-
Interorbital distance	14 - 56.8	20	26.72	12.81	41.9±2.6	-
Dorsal fin rays	26 - 34	20	30.4	1.93	-	-
Anal fin rays	38 - 47	20	42.7	2.45	-	-
Pelvic fin rays	5 - 7	20	6.0	0.45	-	-
Pectoral fin rays	8 - 11	20	9.25	0.62	-	-

REFERENCES

Anibeze, C.I.P 1998 Bioassay and ovulation in *Heterobranchus longifilis* using crude HCG from early pregnancy urine Orient J. Medicine 10 (1-4):37-39.

Anibeze C.I.P 2000. length Weight relationship and relative condition of *Heterobranchus longifilis* (Valenciennes) from Idodo River, Nigeria. NAGA, ICLARMQ. 20:34-35.

Anibeze, C.I.P. and N.M Inyang. 2000. Oocyte structure, fecundity and sex ratio of *Heterobranchus longifilis* (Valenciennes 1840) in Idodo river basin (Nigeria) with comments on the breeding biology. Journal of Aquatic Sciences 15: 59-61.

Awachie, J.B.E 1975. Fish culture possibilities on the floodplain of the Niger Benue drainage system CIFA Tech. Pap.4 (1)251-281.

Ezenwaji, H.M.G. 1992. The reproductive Biology of four African Catfishes (Osteichthys: Clariidae) in Anambra River basin, Nigeria. Hydrobiologia 242:155-164.

Ezenwaji, H. M.G. 1993. The distribution and abundance of *Clarias* Spp. (Osteichthys: Clariidae) in Anambra River Basin, Nigeria. Tropical Ecology 34(1) 102-112.

Inyang, N.M., C.I.P Anibeze, and B.O. Mgbenka 1997 Aspects of the reproductive biology of *Heterobranchus longifilis* in Idodo river, Southeastern Nigeria. J. Afr. Zool. 111:373-379.

Legendre, M. 1986. Seasonal changes in sexual maturity and fecundity, and HCG induced breeding of the catfish *Heterobranchus longifilis* Val (Clariidae) reared in Ebri Logoon, Ivory coast. Aquaculture 55:201-213.

Roberts, T.R 1975. Geographical distribution of African freshwater fishes. Zool. J. Linn. Society. 57:249-319.

Sydenham, D.J.H. 1970 A large catfish Nigerian Field 35: 189.

Teugels G.G 1983. Notes on the status of *Clarias ngamensis* (Casteleau 1861) *C. mellandi* (Boulenger 1905) *C. Prentissgrayi* (Fowler, 1930) as a subgenus of *Clarias* Cymbium, Ser 3: 15-28.

Teugels GGB Denayer and M. Legendre 1990. a systematic revision of the African catfish genus *Heterobranchus* Geoffroy Saint Hilaire, 1909 (Pisces: Clariidae) Zoology Journal of the Linn. Society 98: 237-257.

Teugels G.G R. Guyomard and M. Legendre 1992. Enzymatic variation in African Clariid catfishes. Journal of Fish Biology 40: 87-96.

Willongby, N.G 1979. The development and management of the Shire Valley Fishery, Malawi, Southern Africa. Pp 278-278 In. Proceedings of the International Conference on Kainji Lake and River basins in Africa Kainji Lake Research Institute, Nigeria.