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Seasonal Variation in Condition Factor of Some Important Fish Species from Ikoli Creek, Niger Delta

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Abstract

This study investigated seasonal variation in condition factor of five important fish species Ikoli creek, Niger Delta Nigeria. The fish samples were obtained from the creek with the assistance of local fishermen. The condition factor was determined using standard biometric method. Results showed that condition factor ranged from 0.81 – 2.09 and 0.81 – 1.87 for wet and dry season respectively. *Synodontis clarias* and *Schilbe mystus* has condition factor greater than 1 and *Gnathonemus deboensis* and *Citharinus citharus* had condition factor less than 1. This suggests that seasons affect well-being of a fish. Also, well-being of a fish differs between different species. Lower condition factors observed for *Gnathonemus deboensis* and *Citharinus citharus* also suggest that anthropogenic activities in the creek is having impact on fish-well-being.

Keyword: Aquaculture, Condition factor, Fisheries, Ikoli creek

1 Introduction

Fisheries are important source of animal protein [1-2]. Fish is also a source of essential including omega 6 oil and low in cholesterol level [3], nutrients and vitamins. Fish also have health benefits. For instance, Dan-Kishiya [4] reported that fish are often recommended for cardio-vascular disease patients because of Omega- 3 polyunsaturated fatty acid they contain. The fisheries are essential resources in countries with several surface water. For instance, it has useful economic importance in Nigeria contributing to national food security and as well source of livelihood [5].

Fish resources are obtained from wild and reared in ponds. The fish resources from is depleting globally [3]. As such, several studies have been carried out on status of some significant fish species, so as to regulate it [3]. Several indices have been widely studied with regard to growth condition including length-weight, length-length relationship, growth factor and condition factor [6-8].

Length-weight relationship and condition factor are essential aspect of fish biology as such the population dynamics are also vital [3]. According to Abu and Agarin [3], Kouamé et al. [9], length-weight relationship allows the conversion of growth-in-length equations to growth-in-weight which a biometric model is used in the estimation of biomass from length and condition. Typically, fish can attain either isometric growth, negative allometric growth or positive allometric growth [3, 8, 10-13].

According to Abowei [14], Oribhabor et al. [15], Abu and Agarin [3], Kumolu-Johnson and Ndimele [16], the condition factor is of a fish is used to assess its general well-being in fisheries studies. Condition factor is useful in assessing growth rate, age and feeding intensity [3, 17]. Condition factor can also be used to assess the status of the aquatic ecosystem in which fish live [18]. According to Abowei [19], Abu and Agarin [3], various ecological and biological factors (including degree of fitness, gonad development and feeding condition) are assessed based on condition factor of a fish.

Condition factor in fisheries have been widely reported globally. However, some studied have been carried out in surface water in Nigeria including Nkoro River, Niger Delta [14, 19], Lower Reaches of the New Calabar River Niger Delta [3], river Benue [20], Lake Akata, Benue State [21], Ologe Lagoon, Lagos [16], Dadin Kowa Dam, Gombe State [5], Odi River, Niger Delta [22], River Okura, Kogi State [17], Sangana river [10], Brass river [8], Igbedi creek, Bayelsa state [11]. However, information about condition factor of fishes found in Ikoli creek is scanty in literature. Hence, this study focus on the five fish species frequently caught from Ikoli creek, Niger Delta, Nigeria.

2 Materials and Methods

2.1 Study area

Several creeks are found in the Niger Delta. Ikoli creek is one of the major creek in Bayelsa state, which is tributary

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of river Nun. The creek is located in Yenagoa, the Bayelsa state capital. Several economic activities are frequently carried out in the area including fishing and navigation, dredging, market activities. Vegetation cover found around the creek includes grasses, shrubs and trees such as raffia palm, oil palm etc [23]. Like other climatic condition in the Niger Delta. The climate of around Ikoli creek have been documented by Seiyaboh et al. [24], Ogamba et al. [23, 25].

2.2 Fish Sampling

Sampling was carried out in two seasons between March and August (wet season) and (November to December (dry season) 2014. Fish samples were collected by local fishermen using gillnets, long lines, traps and stakes. The fishes were conveyed in thermos cool boxes to the laboratory on each sampling day. Fish specimens were identified using monograph descriptions, checklists and keys [26-34], The total length of each fish was measured from the anterior tip of the fish to the caudal fin using the metre rule calibrated in centimeter. Fish weight was obtained after drilling water from the buccal cavity and blot drying with a dry piece of clean hand towel, weighing was done in a table top weighing balance to the nearest grams.

2.3 Condition Factor

The condition factor (K) of the experimental fish was estimated from the relationship:

$K=100W/L3$

[11, 35]

Where;

K= Condition Factor

W= Weight of Fish (g)

L= Length of Fish (cm)

3 Results and Discussions

The condition factor of five fish species for both dry and wet seasons in Ikoli creek is presented in Figure 1. The condition factor ranged from 0.81 – 2.09 (during wet season) and 0.81 – 1.87 (during the dry season). Apparent difference was observed between both species during the season, which varies according to the species. The trend in this study is slightly different from different study. Akombo et al. (2014) reported higher condition factor during wet season compared to dry season. *Synodontis clarias* and *Citharinus citharus* representing 40% of the fish species showed similar trend with the work of Akombo et al. (2016). This suggests that season could have effect on the condition factor of fish depending on species. During both seasons of study, *Gnathonemus deboensis* and Citharinus *Citharinus citharus* had condition factor less than 1 suggesting that the fish are not in good condition. This is contrary to the observation made for *Synodontis clarias* and *Schilbe mystus*. Typically, high condition factor indicates the well-being of the species [36]. The apparent difference in the condition factor could be due to anthropogenic activities in the area and behavioral response and adaptation strategies among different species. Typically, Abu and Agarin [3] reported that difference in condition factor of a fish could be due to seasonal influence, degradation caused by anthropogenic activities.

The condition factor in fisheries observed in this study has some similarity with the observation of other authors from different fish species in different surface water. Abu and Agarin [3] reported condition factor *Chrysichthys nigrodigitatus* from New Calabar river in the range of 0.85-1.98 (mean K=1.34). Prasad et al. [37] reported condition factor of *Carinotetraodon travancoricus* from Kallar stream, Neyyar Wildlife Sanctuary of southern part of Kerala in the range of 2.98 to 3.307. Akombo et al. [20] reported condition factor of 2.874, 2.838 and 2.855 for the females, males and combined sexes respectively of *Synodontis schall* from river Benue at Makurdi. Ikongbeh et al. [21] reported mean condition factor of 1.53 (combined sexes), 1.53 (male) and 1.52 (female) of *Auchenoglanis occidentalis* from Lake Akata, Benue state. Seiyaboh et al. [8] reported mean condition factor for dry and wet season of fishes from Brass River was 0.58 and 0.65 respectively (*Pomadasys Peroteti*), 0.65 and 0.70 respectively (*Micropogonias undulates*), 0.60 and 0.88 respectively (*Mugil cephalus*), 0.61 and 0.65 respectively (*Polydactylus quadrifilis*) and 0.49 and 0.68 respectively (*Caranx latus*). Onimisi and Ogbe [17] reported condition factor of 1.2, 1.13, 0.8, 1.0, 1.4, 1.28, 1.15, 1.8 for *Heterobranchus longifilis, Ctenopoma petherici, Brycinus longipinnis, Pellonula leonensis, Marcusinius cyprinoides, Oreochromis niloticus, Tilapia zillii* and *Chromidotilapia guntheri* respectively River Okura, Kogi State. Higher condition factor have been reported in shelled fish. Okon and Sikoki [36] reported condition factor West African Fiddler Crab (Ucatangeri) in Mbo River, Akwa Ibom State in the range of 8.4819 – 10.7942 between April, 2012 – March, 2013. The variation could be due to difference in behaviour, habitant and adaptation strategies.

4 Conclusion

The condition factor of a fish is used to show the well-being of the particular fish in its habitant. This study assessed the condition factor of five fish species from Ikoli creek, Niger Delta, Nigeria. The study found that higher condition of factor (>1) were observed for *Gnathonemus deboensis* and *Citharinus citarius*. This suggests that condition factor of different fish species differs in the same habitats. Again lower condition factor (<1) for >40% of the fish species under study suggest that anthropogenic activities in the creek is having an impact on the fish well-being.

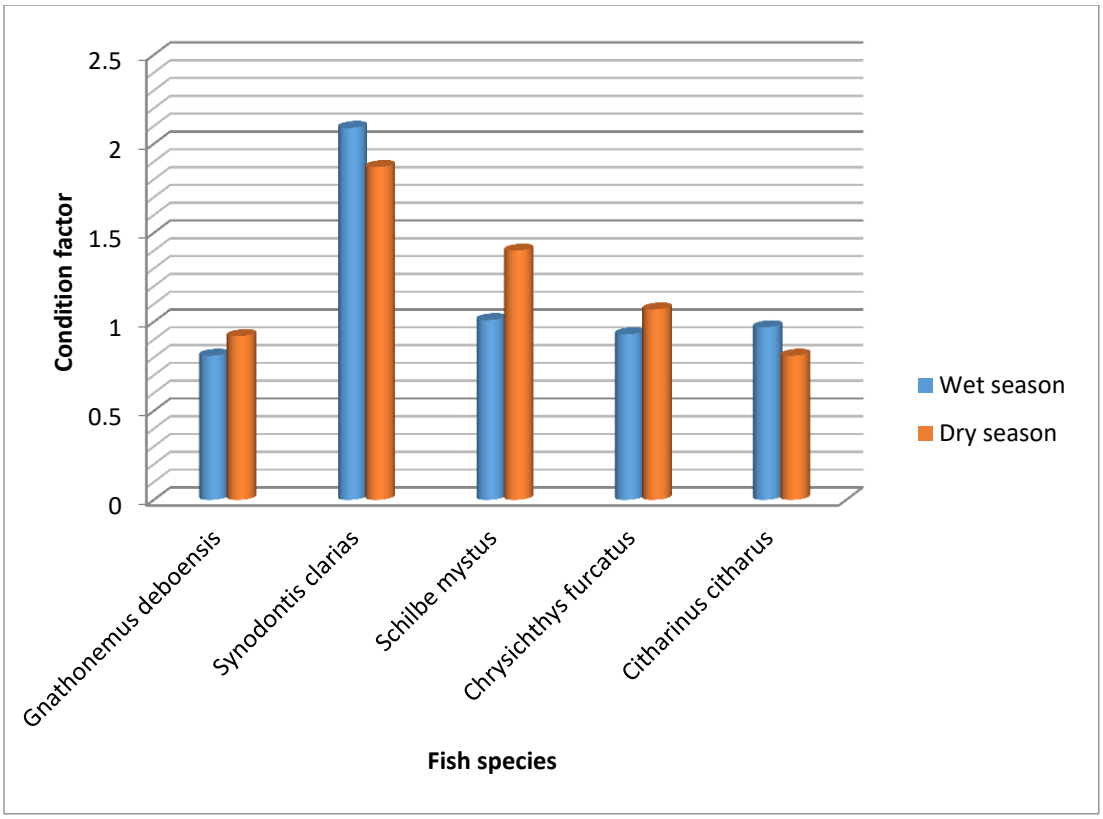

Figure 1: Condition factor of five important fish species from Ikoli creek, Niger Delta Nigeria.

References

1. Ineyougha, E.R., Orutugu, L.A. and Izah, S.C. (2015). Assessment of Microbial Quality of Smoked Trachurus trachurus sold in some Markets of Three South-South States of Nigeria. Inter. *J. Food Res.*, 2: 16 – 23.
2. Izah, S.C. and Angaye, T.C.N. (2015). Ecological perception of fish farmers in Yenagoa Metropolis, Nigeria. *Bulletin of Advanced Scientific Research*, 1(1): 26 – 28.
3. Abu, O.M.G and Agarin, O.J. (2016). Length-Weight Relationship and Condition Factor of Silver Catfish (Chrysichthys nigrodigitatus) from the Lower Reaches of the New Calabar River Niger Delta. *International Journal of Innovative Studies in Aquatic Biology and Fisheries*, 2(4): 1-7.
4. Dan-Kishiya, A. S. (2013). Length-weight relationship and condition factor of five fish species from a tropical water supply reservoir in Abuja, Nigeria. *American Journal of Research Communication*, 1(9): 175-187.
5. Nazeef S. and Abubakar U. M. (2013). Diversity and Condition Factor of Fish Species of Dadin Kowa Dam, Gombe State, Nigeria. *Greener Journal of Biological Sciences*, 3 (10): 350-356.
6. Kings, M. (2007). Fisheries biology, assessment and management. Wiley Black-well.
7. Mahmood, K., Ayub, Z., Maazzam, M. and Siddiqui, G. (2012). Length-weight relationship and condition factor of Ilesha melastoma (Clupeiformes pristigasteridae) off Pakistan. *Pakistan Journal of Zoology*, 44(1): 71 – 77.
8. Seiyaboh, E.I., Harry, G.A. and Izah, S.C. (2016). Length-Weight Relationship and Condition Factor of Five Fish Species from River Brass, Niger Delta. *Biotechnological Research*,2(4):187-192
9. Kouamé K.A., Kamelan, T.M., Nobah, C.S.K., Goore, B.G.. and Kouamélan, E.P. (2016). Length-Weight Relationship and Condition Factor of Synodontis koensis Pellegrin, 1939 in Sassandra River, Côte d'Ivoire. *Journal of Environmental Science, Computer Science and Engineering & Technology*, 5(2): 49-58
10. Seiyaboh, E.I., Izah, S.C. and Gijo, AH. (2016). Length-Weight Relationship and Condition Factor of some Important Fish Species from Sangana River, Niger Delta. *International Journal of Innovative Agriculture & Biology Research*, 4(4):37-44.
11. Seiyaboh, E.I., Ogamba, E.N., Utibe, D.I. and Sikoki, F.D. (2013). Impact of Dredging on the Fisheries of Igbedi Creek, Upper Nun River, Niger Delta, Nigeria. *IOSR Journal of Environmental Science, Toxicology And Food Technology*, 7 (5):38 – 44.
12. Keyombe, J.L., Waithaka, E. and Obegi, B. (2015). Length–weight relationship and condition factor of Clarias gariepinus in Lake Naivasha, Kenya. *International Journal of Fisheries and Aquatic Studies*, 2(6): 382-385.
13. Nehemia, A., Maganira, J.D. and Rumisha, C. (2012). Length-Weight relationship and condition factor of

tilapia species grown in marine and fresh water ponds. *Agriculture and Biology Journal of North America*, 3(3): 117-124.
14. Abowei, J.F.N. (2006). The condition factor length-weight relationship and abundance of *Ilishaafricana*(Block 1995) from Nkoro River, Niger Delta, Nigeria. *Advanced journal of Food Science and Technology*, 2(1):6-11.
15. Oribhabor, B. J, Ogbeibu, A. E and Udo, M. T. (2011). The Length-Weight Relationship of Brackish Water/Marine Fish Species Assemblage In Niger Delta Mangrove Creek, Nigeria. *Current Research Journal of Biological Science*, 3(6): 616-621.
16. Kumolu-Johnson, C.A. and Ndimele, P.E. (2010). Length-Weight Relationships and Condition Factors of Twenty-One Fish Species in Ologe Lagoon, Lagos, Nigeria. *Asian Journal of Agricultural Sciences*, 2(4): 174-179
17. Onimisi, M.M. and Ogbe, F. G. (2015). Length-Weight Relationships And Condition Factor For Fish Species Of River Okura, Kogi State, Central Nigeria. *International Journal of Scientific Research and Engineering Studies*, 2 (7): 1-3.
18. Atama, C.I., Okeke, O.C., Ekeh, F.N., Ezenwaji, N.E., Onah, I.E., Ivoke, N., Onoja, U.S. and Eyo, J.E. (2013.) Length-Weight Relationship and Condition Factor of Six Cichlid (Cichilidae: Perciformis) Species of Anambra River, Nigeria. *Journal of Fisheries and Aquaculture*, 4(2): 82-86.
19. Abowei, J. F. N (2009), The Abundance Condition Factor and Length-Weight Relationship of Some *Sardinellamaderensis* (Jenyms, 1842) from Nkoro River, Niger Delta, Nigeria, *Advanced Journal of Food Science and Technology*, 1(1):65-70
20. Akombo, P.M., Akange, E.T., Adikwu, I.A. and Araoye, P.A. (2014). Length-weight relationship, condition factor and feeding habits of Synodontis schall (Bloch and Schneider, 1801) In river Benue at Makurdi, Nigeria. *International Journal of Fisheries and Aquatic Studies*, 1(3): 42-48.
21. Ikongbeh, O.A., Ogbe, F.G. and Solomon, S.G. (2013). Length-Weight Relationship and Condition Factor of Auchenoglanis occidentalis (VALENCIENNES, 1775) from Lake Akata, Benue State, Nigeria. *IOSR Journal of Agriculture and Veterinary Science*, 3(6):11-17.
22. Ogamba. E.N., Abowei, J.F.N. and Onugu, A. (2014). Length-weight relationship and condition factor of selected finfish species from Odi River, Niger Delta, Nigeria. *Journal of Aquatic Science*, 29(1A):1-12
23. Ogamba, E.N., Izah, S.C. and Toikumo, B.P. (2015). Water quality and levels of lead and mercury in *Eichhornia crassipes* from a tidal creek receiving abattoir effluent, in the Niger Delta, Nigeria. *Continental Journal of Environmental Science*, 9(1): 13 – 25.
24. Seiyaboh, E.I., Inyang, I.R. and Izah, S.C. (2016). Seasonal Variation of Physico-Chemical Quality of Sediment from Ikoli Creek, Niger Delta. International Journal of Innovative Environmental Studies Research, 4(4): 29-34.
25. Ogamba, E.N., Izah, S.C. and Ofoni-Ofoni, A.S. (2016). Bioaccumulation of Chromium, Lead and Cadmium in the bones and tissues of Oreochromis niloticus and Clarias camerunensis from Ikoli creek, Niger Delta, Nigeria. *Advanced Science Journal of Zoology*, 1(1): 13 – 16.
26. Holden, M. and Reed, W. (1972). West African Fresh water fishes. Longmans Limited London 33p.
27. Jiri, C. (1976). A colour guide of familiar fresh water fishes. Octopus Books Ltd. London 25p.
28. Loveque, C., Pyugy, O. and Teugels, G. G ed (1991). The fresh and brackish water fishes of WestAfrica. Vol. 1 Musee Royale de. 1 Afrique Centrale. Tervurem, Belgique, Editions de IORSTOM: 384 p.
29. Otobo, A.J.T. (1981) Identification of fish species in a stretch of River Nun. HND Project Rivers State University of Science & Technology, Port Harcourt.
30. Poll, M. (1974): Synopsis and Geographical Distribution of the clupeidea in Africa Firewater. Distribution of three New species. Bull. De Ca Class Des Sci: 5 Sere Tom LX (2) 141- 161.
31. Reed, W., Burchard, J., Jennes, J. and Yaro I., (1967). Fish and fisheries of Northern Nigeria MOA 226pp. [AQF] [FISR].
32. Reid, G.M. and Sydenham, H. (1978). A check list of lower Benue River Fishes and on ichtho geographical review of the Benue River. *J. Nat. Hist.*, 13(1) 41-67.
33. Whitehead, P.J.P. (1984). Family clupeidae Daget, J. Gosse, J. P. Thys. Van den. Audennerede, D. F. S (eds). Checklist of the freshwater fishes of Africa vol. 1 ORSTOM: 11-20.
34. Whyte, S.A. (1975) Distribution, trophic relationship and breeding habits of the fish population in a tropic lake basin. Lake Busumtwi, Ghana. *J. Zool. Lond.* 177:25-56.
35. Pauly, D. (1983). Some simple methods for the assessment of tropical fish stock FAO Fish Tech. paper No. 234. 52p.
36. Okon, E. A. and Sikoki, F. D. (2014). Length-Weight Relationship and Condition Factor of the West African Fiddler Crab (Ucatangeri) in MboRiver, AkwaIbom State, Nigeria. *Journal of Natural Sciences Research*, 4(14): 33 – 41.
37. Prasad, G., Sabu, K. and Prathibhakumari, P.V. (2012). The first report of the Malabar puffer, Carinotetraodon travancoricus (Hora & Nair, 1941) from the Neyyar wildlife sanctuary with a note on its feeding habit and length-weight relationship. *Journal on New Biological Reports*, 1(2): 42-46.