Relationship between Length, Weight and Fecundity of *Clarias gariepinus* in Ero Reservoir, Ikun- Ekiti, Ekiti State, Nigeria

Oso J A [1*], Odeyemi D F [2], Olarewaju O T [3]
[1] Department of Zoology and Environmental Biology, Faculty of Science, Ekiti State University. Ado Ekiti, Nigeria
[2] Department of Science Laboratory Technology (Biotechnology option), Faculty of Life Sciences, Ekiti State University, Ado Ekiti. Ekiti State, Nigeria

* Corresponding Author: **Oso J A**

Article Info

P-ISSN: 3051-3464
E-ISSN: 3051-3472
Volume: 02
Issue: 01
Received: 12-12-2025
Accepted: 14-01-2026
Published: 16-02-2026
Page No: 21-25

Abstract
The study of fish reproductive biology and fecundity is essential for effective management and conservation of fishery resources in an aquatic environment. *Clarias gariepinus* is a key fish species in Nigeria which contributes greatly to the nation's aquaculture sector as a result of its economical and nutritional values. Experimental trials were conducted to evaluate the fecundity and egg size of *Clarias gariepinus* brooders (60 - 120g) in Ero reservoir. Fifteen mature female fish were caught using gill nets and long-line gears. In addition, fishermen's catch was also sampled to increase sample size and fish size. Fish were dissected and their ova sac removed, weighed and preserved in 5% formalin to prevent quick egg-freezing action before counting. An ocular micrometer (Mg=0.019 mm) was used to obtain the egg size. A unit increase in the length of the fish led to 0.52g increase in the body weight. Between total length and fecundity, there is a significant connection with p-value less than the level of significance at ($p < 0.05$). Fecundity were found to be related to the body weight of the fish. The result indicates that the relative fecundity increased with increasing body weight and total length suggesting that the body weight of fish plays an essential role in fecundity of fish. Also, *Clarias gariepinus* has a significantly high fecundity in Ero Reservoir thus there is need for monitoring of the fish resource in Ero Reservoir to avoid over fishing of the species and enhance sustainable fishery management of the reservoir.

DOI: https://doi.org/10.54660/IJFAII.2026.2.1.21-25

Keywords: Catfish, Eggs, Fecundity, Length, Reservoir, Weight

Introduction

The African catfish, *Clarias gariepinus*, is a highly versatile and widely distributed freshwater fish species found in various water bodies across Africa (Teugels, 1986) [10]. This species is known for its hardy nature, adaptability to diverse environmental conditions, and rapid growth rate, making it a valuable resource for both capture fisheries and aquaculture (Adebayo & Popoola, 2008) [1].Understanding the reproductive biology and fecundity of fish species is crucial for effective fisheries management and conservation strategies (Mathewos *et al*., 2018) [5]. Fecundity, which refers to the number of eggs produced by a mature female fish is essential to understanding fish population dynamics. This information is a key parameter that provides insights in biomass, setting appropriate harvest quotas, and developing sustainable management plans to ensure the long-term viability of the fishery (Olaleye, 2005) [7].

The fecundity of *Clarias gariepinus*, commonly known as the African catfish, is a subject of considerable interest within the fields of fisheries biology and aquaculture. This interest is driven by the species' high reproductive capacity, adaptability, and significant economic value, particularly in regions like Nigeria where it forms a crucial component of local fisheries and aquaculture industries (Adewumi & Olaleye, 2011) [2].

Ero reservoir, located in Ikun Ekiti, Ekiti State, Nigeria, provides a vital habitat for *Clarias gariepinus*, making it an important site for studying the species' reproductive biology. High fecundity rates can indicate a healthy and thriving population capable of sustaining fishing pressures and environmental changes (Pitman *et al*., 2013) [9]. Conversely, low fecundity rates may signal underlying issues such as poor environmental conditions, overfishing, or inadequate nutrition, necessitating targeted interventions to enhance reproductive success and population sustainability.

Ero reservoir, located in Ikun Ekiti, Ekiti State, Nigeria, serves as a critical habitat for various fish species, including *Clarias gariepinus*, commonly known as the African catfish. The fecundity of fish in this reservoir is of significant interest due to its implications for fisheries management, aquaculture, and local food security.The study is necessary to generate empirical data on the fecundity of *Clarias gariepinus* in Ero Dam, which is currently lacking in the existing literature. This site-specific information contributes to a better understanding of the reproductive biology and population dynamics of this important fishery resource in the local context.The findings from this study provides information on fisheries management decisions, such as setting appropriate harvest quotas, monitoring stock abundance, and developing strategies to ensure the long-term sustainability of the *Clarias gariepinus* fishery in Ero Dam. This is crucial for the continued provision of food and livelihood security for the local community.

The importance of studying fecundity in Ero reservoir also extends to its implications for local aquaculture practices. *Clarias gariepinus* is a preferred species in aquaculture due to its rapid growth rate and high tolerance to diverse environmental conditions. By understanding the fecundity patterns and the factors that enhance reproductive success in this specific habitat, aquaculturists can develop more effective breeding and management practices to maximize production (Ogunji *et al*., 2012) [6].

Materials and method

Study area

The study was carried out in Ero reservoir located at Ikun-Ekiti in Moba Local Government Area of Ekiti State, Southwest, Nigeria. The area is known for being a habitat for various fish species attracting fishermen and supporting livelihoods.The ichthyofauna of the reservoir include *Hepsetus odoe, Oreochromis niloticus, Clarias gariepinus,Parachanna obscura* and *Sarotherodon galileus.*

Sample Collection

Fifteen samples of *Clarias gariepinus* were obtained at the landing site of fishermen at the reservoir from march 2024 to June 2024. The fishermen used traps, gill nets and cast nets with mesh sizes ranging from 38.10 mm to 180.00 mm to capture fish samples. Fish were captured between 06:00 am - 08:00 am. Water from the reservoir was added to the samples at the point of collection and transported to the laboratory for further investigations. The collected fish samples were identified using fish identification guide by Teugels (1986) [10]; FAO (1992); Skelton (1993); Olaosebikan and Raji (1998) [8].

Biometric Measurement of fish samples

This entailed the measurement of the fish weight using digital balance to the nearest 0.1g while standard length and total length of the fish were measured using standard procedures (Pauly, 1983).

Estimation of sex ratio of fish samples

Sexes were determined by visual observation of external openings. The sex ratio was determined by counting the number of male and female in the samples. The ratio of males and females was calculated as follows:

$$\text{Sex Ratio} = \frac{\text{number of males}}{\text{number of females}}$$

Estimation of fish fecundity

The female fish was dissected and its mature ovary was excised for fecundity examination as previously carried out by Idowu (2007) [4] The mature egg mass was weighed, then three subsections each of 1g was taken from the anterior, middle, and posterior regions of the ovary respectively. Ova from these subsections were seperated and counted. The fecundity of the sample was calculated according to Yelden and Avsar, 2000).

$$\text{Fecundity, F} = \frac{\text{Ovary weight x Number of eggs in sub sample}}{\text{Weight of sub sample}}$$

Statistical Analysis

Values of fecundity, weight and length were analysed into mean and standard error using spss version 28.

Results

Table 1.0 illustrates the differents samples of *Clarias gariepinus* collected from Ero Reservoir, their body weight, length and fecundity. The results showed that the fecundity of the fish samples increased in relation to their body weight and length. Samples 1 and 3 with the lowest body weight of 60g each with lengths 8cm and 9cm respectively had the lowest fecundity estimates of 8500 and 8300.

Table 2.0 presents analysis of the relationship between fish weight and fecundity across seven weight categories, ranging from 60g to 120g. The total number of fish sampled in each category varies from 2 to 3.The data shows a clear trend where the mean fecundity increases with the weight of the fish. For instance, fish weighing 60g have a mean fecundity of 8,400±141.4, with a range of 9,300-9,500, while fish weighing 120g exhibit the highest mean fecundity of 11,600±141.4, with a range of 11,500-11,700. The fecundity ranges within each weight category indicate some variability, but the overall trend suggests that heavier fish tend to produce more offspring. Furthermore, the significant differences in fecundity between weight categories, denoted by different superscripts (a, b, c) and a P-value of less than 0.01, highlight that weight is a critical factor influencing fecundity.

Table 1: Biometric Measurements of *Clarias gariepinus* samples from Ero Reservoir and their fecundity

Sample	Weight (g)	Length (cm)	Fecundity
1	60	8	8,500
2	80	11	9,400
3	60	9	8,300
4	100	12	10,205
5	70	11	8,800
6	80	11	9,200
7	110	13	10,500
8	110	12	10,300
9	70	10	8,750
10	90	12	9,700
11	120	14	11,700
12	100	12	10,150
13	80	12	9,500
14	90	13	9,600
15	120	15	11,500
Average	89.3	11.6	9,794

Table 2: Mean Weight Value of *Clarias gariepinus* and Mean Fecundity Values

Weight of fish	Total number of fishes	Mean fecundity	Fecundity range
60	2	$8,400\pm141.4^{c}$	9,300-9500
70	2	$8,783\pm35^{a}$	8,750-8,800
80	3	$9,366\pm152.7^{c}$	9,200-9,500
90	2	$9,650\pm70.7^{b}$	9,600-9700
100	2	$10,177\pm38.8^{a}$	10,150-10,205
110	2	$10,400\pm141.4^{c}$	10,300-10,500
120	2	$11,600\pm141.4^{c}$	11,500-11,700

Means in the same column with different superscript have significantly different fecundity ($P < 0.01$)

Figure 1.0 illustrates the relationship between fish weight and fecundity, visually reinforcing the trend observed in the table. The graph's trend line clearly indicates a positive correlation between fish weight and fecundity, suggesting that heavier fish tend to produce more offspring. This visual representation aligns with the data table's findings.

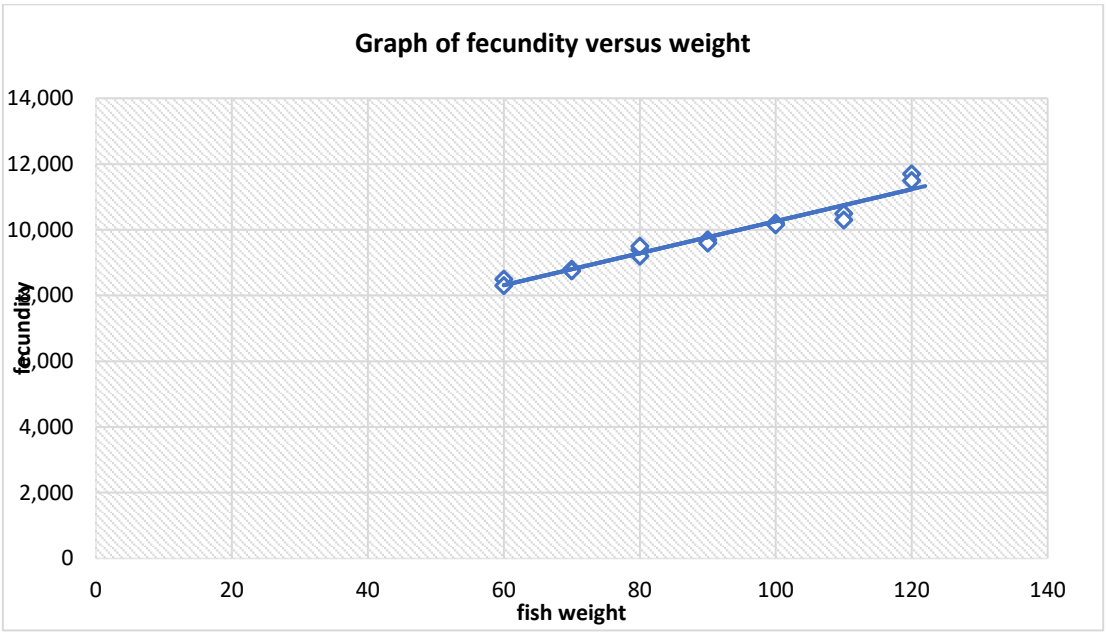

Fig 1: Graph showing the linear relation between Fecundity and weight of *Clarias gariepinus*

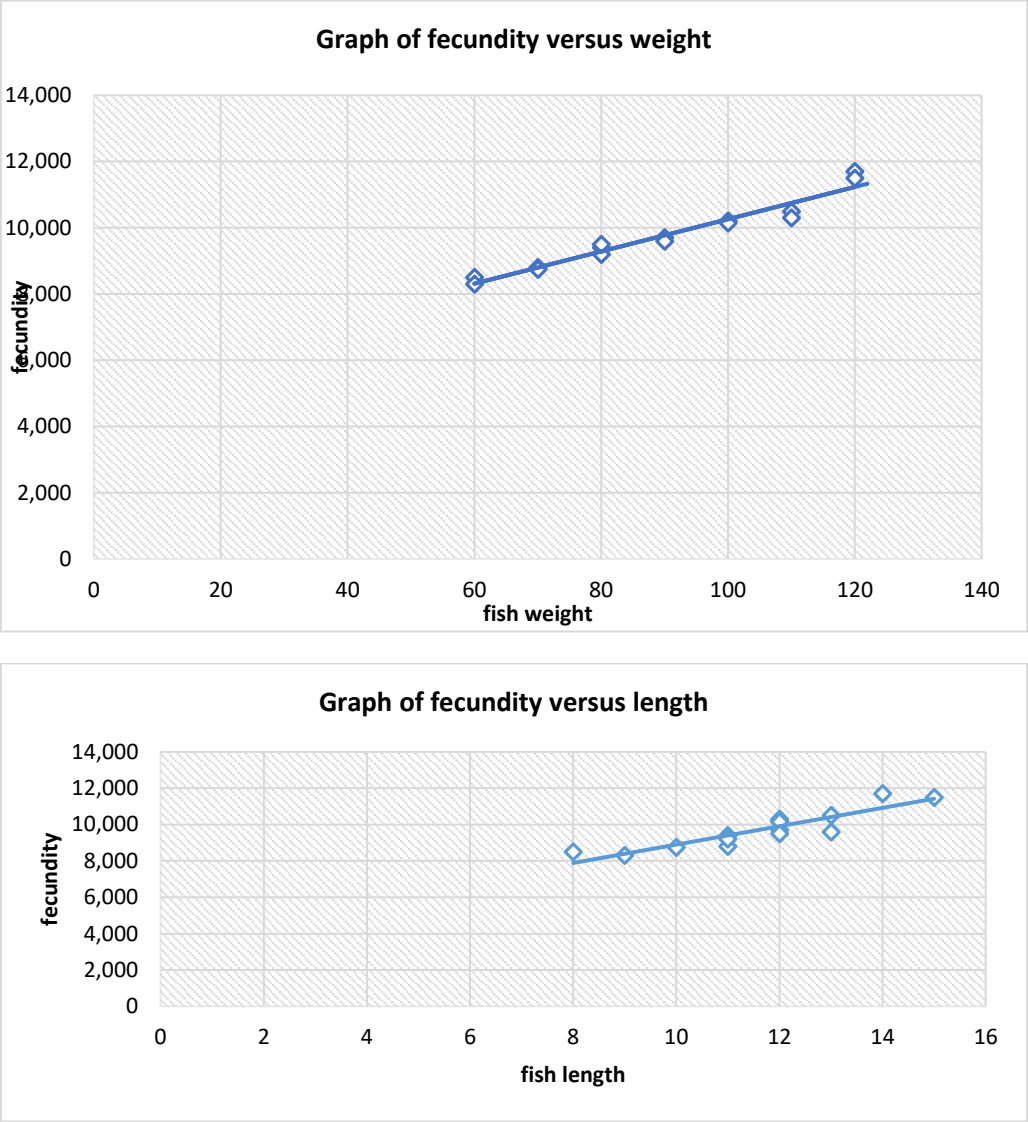

Fig 2: graph showing the linear relation between Fecundity and length of *Clarias gariepinus*

Discussion

The standard length of C.gariepinus ranged between 8cm and 15cm. The weight range from 60g to 120g. Table 2.0 showed a clear trend where the mean fecundity increases with the weight of the fish. For instance, fish weighing 60g have a mean fecundity of 8,400±141.4, with a range of 9,300-9,500, while fish weighing 120g exhibit the highest mean fecundity of 11,600±141.4, with a range of 11,500-11,700. The fecundity ranges within each weight category indicate some variability, but the overall trend suggests that heavier fish tend to produce more offspring.

Conclusion

The study showed that fish fecundity is directly proportional to fish weight and length suggesting that the body weight of fish plays an essential role in fecundity of fish. Also, *Clarias gariepinus* has a significantly high fecundity in Ero Reservoir thus there is need for monitoring of the fish resource in Ero Reservoir to avoid over fishing of the species so as to enhance sustainable fishery management of the reservoir.

Acknowledgement

We acknowledge the support of Tunji Olowolafe foundation and Ekiti State University towards the success of this study.

References

1. Adebayo OT, Popoola OM. Induced spawning of African catfish (Clarias gariepinus) using different hormones. Afr J Biotechnol. 2008;7(14):2400-2404.
2. Adewumi AA, Olaleye VF. Catfish culture in Africa: progress, challenges and prospects. Afr J Agric Res. 2011;6(6):1278-1287.
3. Bagenal TB. Aspects of fish fecundity. In: Gerking SD, editor. Ecology of freshwater fish production. Oxford: Blackwell Scientific Publications; 1978. p. 75-101.
4. Idowu EO. Aspects of the biology of Hepsetus odoe in Ado-Ekiti Reservoir, Ekiti, Nigeria [PhD thesis]. Ibadan: University of Ibadan; 2007.
5. Mathewos TK, Abebe G, Brook L. Reproductive biology of commercially important fish species in Lake Lageno, Ethiopia. Asian Fish Sci. 2018;31:319-339.
6. Ogunji JO, Nwakanma C, Ochang SN. The influence of environmental conditions on the fecundity and growth performance of Clarias gariepinus (Burchell 1822). J Appl Ichthyol. 2012;28(3):453-457.
7. Olaleye VF. A review of reproduction and gamete management in the African catfish, Clarias gariepinus (Burchell, 1822). Ife J Sci. 2005;7(1):63-70.

8. Olaosebikan BD, Raji A. Field guide to Nigerian freshwater fishes. New Bussa: Federal College of Freshwater Fisheries Technology; 1998.
9. Pitman LR, Haddy JA, Kloser RJ. Fishing and fecundity: the impact of exploitation on the reproductive potential of a deep-water fish, orange roughy (Hoplostethus atlanticus). Fish Res. 2013;147:312-319.
10. Teugels GG. A systematic revision of the African species of the genus Clarias (Pisces: Clariidae). Ann Mus R Afr Cent Sci Zool. 1986;247:1-199.

How to Cite This Article
Oso JA, Odeyemi DF, Olarewaju OT. Relationship between length, weight and fecundity of Clarias gariepinus in Ero Reservoir, Ikun-Ekiti, Ekiti State, Nigeria. Int J Fish Aquat Increment Innov. 2026;2(1):21–25. doi:10.54660/IJFAII.2026.2.1.21-25