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*RESEARCH ARTICLE*

# LENGTH - WEIGHT RELATIONSHIP AND CONDITION FACTOR OF CLARIAS ANGUILLARIS(LINNAEUS, 1758) AT PEELÉ RESERVOIR, BURKINA FASO

**Siéfo Parfait Gnoumou**
Centre Universitaire de Banfora, Burkina Faso.

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## *Abstract*

Length-weight relationship (LWR) and condition factor of *Clariasanguillaris* of Peelé Reservoir (Burkina Faso) were studiedfrom April 2015 to Mars 2017.226 Specimens of *Clarias anguillaris*were collected monthly from traditional fishing.In each specimen,length (TL) and total weight were determined. The length-weight relationship was obtained by the equation: $W = a*L^b$.Value of regression intercept (a) and slope (b) was obtained by linearizing the equation using the least square method. Condition factor (K) was determined by the equation: $K= 100 (W/L^b)$.The length-weight relationship showed negative allometric growth. Values of condition factor showed that Peelé reservoir was favorable to the growth of *Clarias anguillaris*. Results of this study would be used to well management particularly of Peelé reservoir and generally of aquatic ecosystem in Burkina Faso.



## Introduction:-

Fish plays an importance role in human's life. It provides proteins and essentials micronutrients to humans (Sikoki and Otobotekere, 1999; Dibala et al., 2018). In Burkina Faso, *Clarias anguillaris* is among fish species mostly caught and used in aquaculture (Ouédraogo, 2010; Compaoré et al., 2015).In spite of economically importance of *Clarias anguillaris* in Burkina Faso, there is little information on it biology. To manage fisheries in each water reservoir, knowledge in fish biology and ecology ought to be known. Indeed,the knowledgeof fish reproduction biology and length-weight relationship, per example, is essential for a good management of fisheries resources (Sylla et al., 2009). Length–weight relationship plays animportance role in fishery assessment (Gracia et al., 1998; Haimovici and Valesco, 2005). Length-weight relationshipcould be used for estimating fish stock and comparing fish populations in different areas (Ayoade and Ikuala, 2007). Inded, Length-weight relationship can provideinformation on the stock composition, fish population's growth rates and their dynamic such as life span, mortality and reproduction (Fafioye and Oluajo, 2005; Al Nahdi et al., 2006).Condition factor indicates the well-being of fish in it environment (Hile, 1936;Ndiaye et al., 2015).In Peelé reservoir, no study has been carried out in *Clarias anguillaris* biology and ecology; particularly on it, length-weight relationship and it condition factor.The aim of the present study was to estimate Length-weight relationship and condition factor of *Clarias anguillaris* in Peelé reservoir, Burkina Faso. The data of this study will form the basis for the management of *Clarias anguillaris* in Peelé reservoir.

**Corresponding Author:-Siéfo Parfait Gnoumou**
Address**:**-Centre Universitaire de Banfora, Burkina Faso.

## Material and Methods:-

### Study area

The present study was carried out in Peelé reservoir, Burkina Faso (Fig. 1). This reservoir was created in 1950 on the Nariale River. Fish were sampled in the downstream part of the reservoir (12°14'53,6"N & 1°11'82,4"W) located in Peelé village. Peelé is a small rural village located at 50 km, at the south-east, of Ouagadougou (Burkina Faso). This village islocated in the North Sudanian climatic zone. In that zone, the wet season occurs from June to October and the dry season from November to May. Socio-economic activities are dominated by agriculture, market gardening and fishing (Gnoumou et al., 2018).

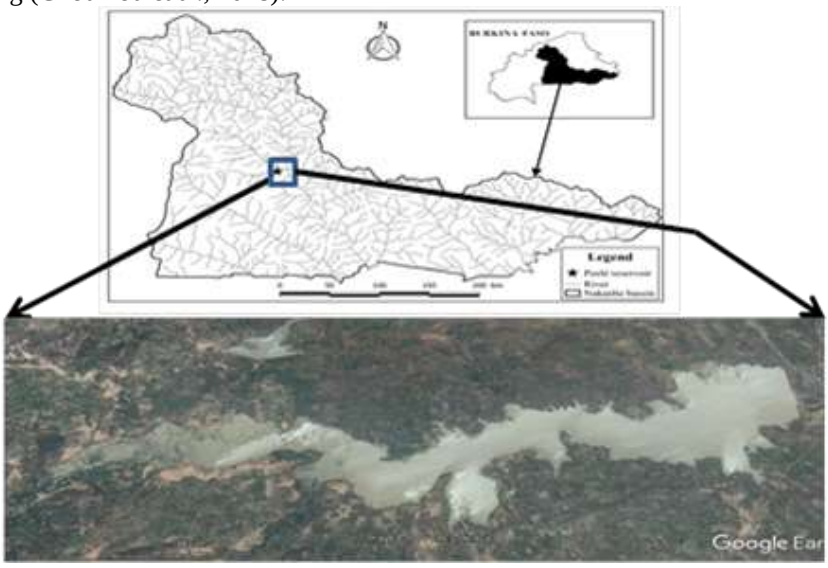


**Figure 1:-** study areas.

### Fish sampling and data analysis

In the zone of Peelé reservoir, the wet season occurs from June to October and the dry season from November to May (Gnoumou et al., 2018). Specimens of *C. anguillaris* were collected monthly from traditional fishing at Peelé reservoir, from April 2015 to March 2017. After sampling, fish were kept in a cooler with ice and transported to the "Laboratoire de Biologie et Ecologie Animales" (LBEA) of University Ouaga I Pr Joseph KI-ZERBO, Burkina Faso. At LBEA, standard length of specimens was measured to the nearest millimeters using an ichtyometer. The whole body weight was also measured on a digital balance to the nearest grams.

Specimen's sex was determined either by external examination of the genital papilla and has been confirmed after dissection by macroscopic examination of gonads (Chikou et al., 2007). The sex-ratio was determined by doing the numerical ratio between males and females.

Length-weight relationship was estimated as $W = a^* L^b$, where: W= body weight; L= length; a= regression intercept and b= slope. a and b were calculated by linearizing thisrelation using the least square method (Alhassan et al.,2015). The value of b was then used to determine the kind of growth: if the value of b is equal to 3, the growth is isometric; if the value of b is different to 3, the growth is allometric negative (b<3) or positive (b>3). Length-weight relationship was estimated for combined specimens (males and females) and separately for males and females. Condition factor (K) expresses the conditions on fish population and was calculated using the relation (Karrar et al., 2016): $K = 100*Wg / L^b$,where K= condition factor, Wg= body weight, L= length and b = slope. Fishes with condition factor values greater than one (≥ 1) were considered as high while those less than one (< 1) were low (Alhassan et al.,2015; Ndiaye et al., 2015). It was calculated for all specimens and for males and females separately

## Results:-

### Sampled population structure and sex-ratio

Sex-ratio of Clarias anguillaris in Peelé reservoir during the study period has been estimated on 226 specimens constituted by 116 males and 108 females.The estimated value of sex-ratio was 1.04.

**Table 1:-** Structure of the population of Clarias anguillaris in Peelé reservoir between April 2015 and March 2017.

| Sexe | Number of specimens | Length (mm) | | | Body total weight (g) | | |
|---|---|---|---|---|---|---|---|
| | | Min | Mean | Max | Min | Mean | Max |
| Females | 108 | 147 | 245.61 | 475 | 27 | 174.18 | 1032 |
| Males | 116 | 163 | 273.53 | 490 | 46 | 239.13 | 1026 |
| Unsexed | 2 | 170 | 183.5 | 197 | 49 | 64.5 | 80 |
| Total | 226 | 147 | 257.27 | 490 | 27 | 201.83 | 1032 |

Values of slope and condition factor are given in the table 2. Length-weight relationships showed a negative allometry's growth in sampledpopulation of *Clarias anguillaris* in Peelé reservoir during the study period. Therefore, females showed isometric growth (table 2).The estimated mean value of the slop was 2.93 while the mean condition factor was 1.11 (table 2). Analysis of Covariance test (ANCOVA) showed that there was no statically difference in Length-Weight relationship between males and females (p=0.75).Table 2 analysis showed that specimens of *Clarias anguillaris* in Peelé reservoir were in a better environmental condition.

**Table 2:-** Parameters of length-weight relationship and condition factor of Clarias anguillaris in Peelé reservoir.

| | b | K |
|---|---|---|
| Males | 2,86 | 1.21 |
| Females | 3.04 | 4.05 |
| All specimens | 2.93 | 1.11 |

b=slope; K =condition factor

## Discussion:-

In the current study, there was no statiscaly difference between males and females number ($\chi$ 2= 0.08; P=0.75). That mean that in Peelé reservoir, there is one male for a female. Indeed, for Marconato et al. (2000), in freshwater, sex ratio of fish's natural population is generally close to one but could be much-altered according season of theyear or locally. Offem et al. (2009) observed similar results in *Clarias gariepinus* (sex ratio =1.1) and *Clarias aboinensis* (sex ratio =1.07), two species of genus Clarias, in a tropical flood river, Nigeria.

The present study provides informations on length-weight relationship and condition factor of *Clarias anguillaris* in Peelé reservoir, Burkina Faso. In the present study, the value of the slop of *Clarias anguillaris* was within the range of normal values: 2.5 to 3.5 (Froese, 2006).However, were lower than the Bayesian confidence limits in FishBase by Froese et al. (2014).The length-weight relationship has a great interest in the determination of fish's well-being and could be affected by many factors such as the movements and nutritional conditions (Offem et al., 2009). Therefore, according to Muchlisin et al. (2010),active swimming fish may show lower slop value compare to passive swimming fish. Negative alometric growth observed in Clarias anguillarisin this study could be explained by the fact it is an active predator (N'guessan et al., (2010). A negative allometric growth has been observed to some species of genus Clarias in others areas. But, Contrary to this study, Niaré et al. (2012) found positive allometric growth to *Clarias anguilalris* in central delta of Niger.The condition factor values obtained in *Clarias anguillaris* in the present study seem to show that it would in good environmental conditions. Hower these values were close to one (1).Niaré et al. (2012) also obtained similar results for Clarias anguillaris in the central delta of Niger and by Chikou et al. (2008) for *Clarias gariepinus* in the Ouemé valley. Contrarary to the results of this study, Da et al. (2018) obtained in Clarias anguillaris values of factor condition lower than one (1) at Lake Bam (K=0.383) and Lake Kompienga (k=0.359) in Burkina Faso.

## Conclusion:-

It appears from this study that in Claria anguillaris in Peelé reservoir,there is a balance between the number of femelle and the male's one. The population of Clarias anguillaris had an allometry's negative growth pattern and better environment condition during this study. Knowledge of length-weight relationship and condition factor of Clarias anguillaris in Peelé could permit to managers to manage very well it fishery.

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