

# The Length weight Relationship and Condition Factor of the Banded Jewel Fish (*Hemichromis fasciatus* PETER'S) from Kainji Lake, Nigeria

By

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## ABSTRACT

The length weight relationship and condition factor of *Hemichromis fasciatus* from Kainji Lake was studied. One hundred and twenty seven fish samples of total length ranging from 6.50cm to 15.50cm and weigh between 4.00g and 60.00g collected between August 2006 and June 2007 were analyzed. Results showed that  $a$ ,  $b$  and  $r$ -values were 0.0042, 3.442 and 0.966 respectively, while the condition factor (CF) values varied from 0.67 to 2.42 with mean of 1.203. The fish exhibited positive allometric growth pattern. The condition of the lake is favourable for the survival of the fish species.

**Keywords:** Length weight relationship, Condition factor, Banded Jewel fish, Kainji Lake, Nigeria

## INTRODUCTION

Fishes found in tropical and sub tropical water systems experience frequency growth fluctuations due to factors such as food composition changes, environmental changes, rate of spawning to mentioned but a few. Length weight relationship can be used to assess the influence of these factors in fish. Kulbicki *et al.* (1993) and King (1996a) reported that fish growth, mean weight of given body length of fish estimation and the relative well being in fish can be known through this relationship.

Length weight relationship studies have been done in different water bodies and on different fishes. Notably among these are the reports of King (1996a) on some Nigerian freshwater fishes, Taiwo and Aransiola (2001) on *Chrysichthys* species in Asejire Lake, Fafioye and Olujo (2005) on five fish species in Epe Lagoon, Nigeria and Leleye (2006) on *Oreochromis niloticus* in Ocumbe River in Benin.

*Hemichromis fasciatus* is a common fish in African freshwaters (Ita, 1978; Loiselle, 1979). It is very important in many fisheries because of its great commercial values as food and aquarium fish. However, there is dearth of information on the length weight relationship of the fish species from the lake.

This study presents information on the length weight relationship and condition factor of this valuable fish species in order to aid its management in the lake.

## MATERIALS AND METHOD

Fish samples were identified and collected monthly from fishermen catches using gill nets and malian traps between August 2006 and June 2007.

Total length (cm) and weight (g) were taken using measuring board and top loading balance.

Length weight relationship was calculated using the formula

$$W = aL^b$$

which was transformed to Logarithm of the form

$$\text{Log } W = \text{Log } a + b \text{ Log } L$$

Using Instat Statistical Package

Where  $W$  = body weight of fish (g),  $L$  = total body length of fish (cm),  $a$  and  $b$  = values estimated by regression

The condition factor (K) was calculated using the formula

$$K = \frac{100 W}{L^3} \quad (\text{Pauly, 1984})$$

Where  $K$  = condition factor,  $L$  = Total body length of fish (cm)

$W$  = Body weight of fish (g)

## RESULTS AND DISCUSSION

A total of one hundred and twenty seven species of *Hemichromis fasciatus* were collected for the study. The

total length range between 6.50cm and 15.50cm with mean length of 11.10cm and weigh between 4.00g and 60.00g with 18.70g as mean weight (Table 1). This shows that the species used for the study were relatively mature.

Condition factor (CF), parameters of a, b and r of the length weight relationship of *Hemichromis fasciatus* is shown on table 2 and figure 1. The exponent (b) value of 3.442 shows that *Hemichromis fasciatus* exhibits positive allometric growth that is, as the fish increases in length it becomes heavier. Pauly (1983) reported that a slope greater than 3 denotes allometric growth. This is similar to the findings of Entsua Mensah *et al.* (1995) Volta River and King (1996a) in Mfangmfang pond that recorded b values of 3.22 and 3.23 respectively but contrary to that of King (1996a) in Adadama Lake (b = 2.61) and Imo River (b = 2.50), then Laleye (2006) in Oueme River (b = 2.95). This could be due to the condition of fish caught during the different seasons, location, sex, sample size and nature of the water body. Lagler *et al.* (1977) reported b values of 2.5 to 4.0, while that of Pauly and Gayannilo (1997) range from 2.5 to 3.5, which suggest that the findings of this study is valid.

Condition factor relates to well being and degree of fatness of fish (Pauly, 1984). The calculated c.f values range from 0.67 to 2.42 with mean of 1.203. This value is greater than 1, which is an indication that the fish is doing well in the environment, but less than 2.94 to 4.8 documented by Bagenal and Tesch (1978) for mature freshwater fish fresh body weight. This could be due to difference in weight of individual fish sampled and period of sampling.

## CONCLUSION

The results of this study show allometric growth pattern and the condition of the lake is favourable for the survival of *Hemichromis fasciatus*.

### *Hemichromis fasciatus* from Kainji Lake

Table 1: Size ranges of

Parameters	Minimum	Maximum	Mean	SD
Total Length (cm)	6.50	15.50	11.10	1.84
Weight (g)	4.00	60.00	18.70	10.31

Table 2: Length weight relationship and condition factor of *Hemichromis fasciatus* From Kainji Lake

Parameters	Values
a	0.004
b	3.442
r	0.966
Mean condition factor (C.F)	1.203

a, b = regression coefficient; r = correlation coefficient

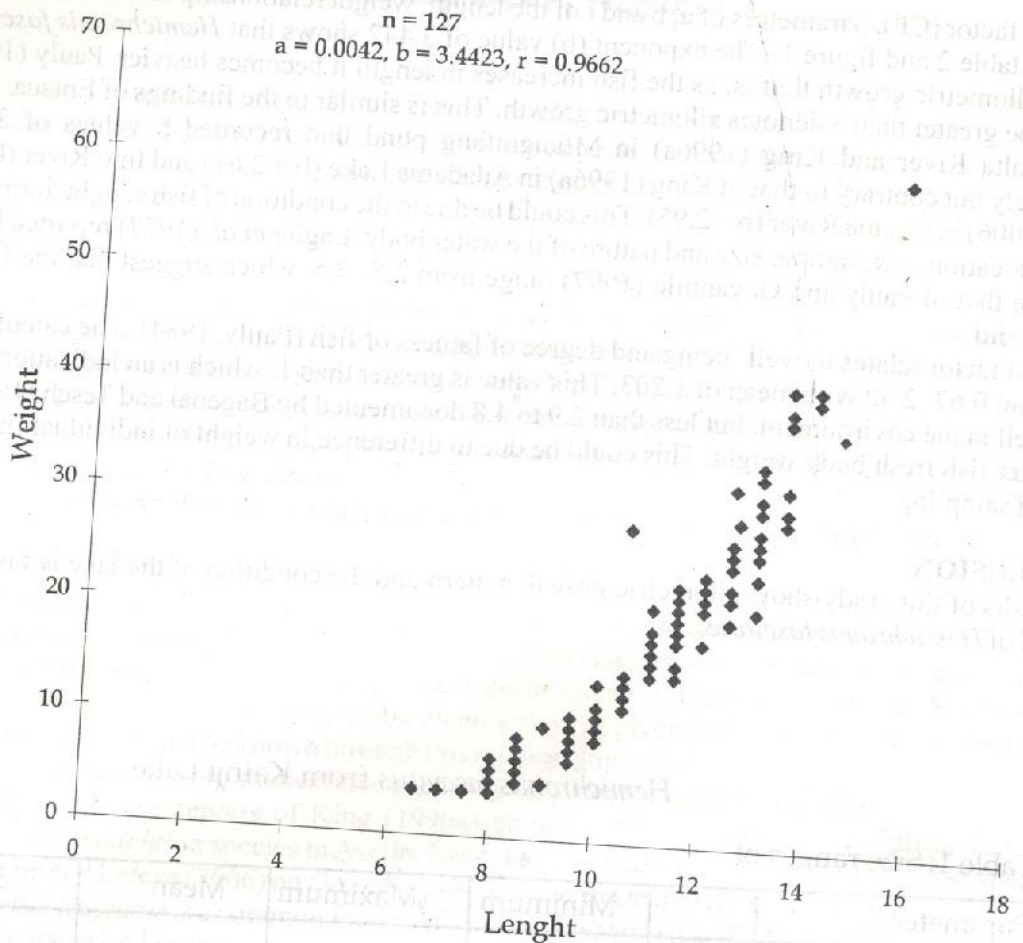


Figure 1: Length weight relationship of *Hemichromis jascidius* from Kainji Lake

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### ABSTRACT

Just like other animals and humans, fishes are prone to diseases and parasites. Diseases can be caused by one or more of the following agents: e. g. bacteria, fungi, viruses, protozoans, etc. Diseases have become a primary constraint to aquacultural development which has led to the development of the fish farming industry. The impact of diseases on fish farming is significant. It causes high mortality, reduced growth, reduced fecundity, loss due to control measures and loss due to social factors associated with the farmer. This review has reviewed the diseases that are associated with integrated fish farming including the control of water quality, pond water fish farming, waste water fish farming, recirculating fish farming, etc. The control of diseases associated with fish farming requires a multi-disciplinary approach including the use of genetic selection, immunoprophylaxis, vaccination, and the use of antibiotics. The treatment and prevention of fish diseases follow the same principles used in chemotherapy of humans.

### INTRODUCTION

Disease is an unwholesome condition manifested by the departure of the body from the normal healthy state causing discomfort that may lead to death. In fish farms, the outbreak of disease is generally associated with ill-effective husbandry, because the disease causing agents present little problems until the fishes are stressed due to improper feeding and/or other adverse environmental conditions and production. In aquaculture, disease tends to spread relatively easily because of the high density of stocking and intensity of feeding in limited water areas, the proliferation of disease-causing agents through the common water source between ponds, farms and the stocking of fish fry/broodstock transported from other fish farms without adequate quarantine, can spread disease as well.

Disease problems could result in financial losses under intensive culture. As a result, the risk of complete loss of crop tends to be higher than in other agricultural activities. Mortality also tends to be high especially during the first week after stocking because of the likely disease causing agents carried by the fingerlings from the hatcheries to the rearing ponds. A case study has shown a wide spread of infectious diseases in Africa including viral, bacterial, fungal, ectoparasites, protozoans, myxospores, trematodes, nematodes etc. One of the greatest problems in handling fish disease is its treatment (Ibiwoye, 1994). This explains why many fish disease experts advocate for prevention and control methods. This is in fulfillment of the saying "prevention is better than cure". However, disease has become a primary constraint to aquacultural growth and is now severely impacting both economic and socio-economic development in many countries of the world (Ojiambo and Barmah, 2000; Wooster, 1997) suggests that diseases do not only cause mortalities, but also causes loss of growth, reduction in fecundity as well as loss of product quality.

The rapid development of fish culture in Nigeria may not achieve the desired influence due to diseases that could affect the growth of fish and the achievement of maximum production potentials in fish farms. Therefore prevention and control are paramount in fish farming. The preventive approach in the context of fisheries development denotes guarding the health of the fish farm against the ever present danger of disease that prevent high yield of fish (Kabala, 1985). The principles of preventive measures for microbial and parasitic diseases are directed towards elimination or reduction in number of pathogenic organisms, increasing the resistance to disease, adjustment of the environment, prophylactic medication and upgrading of sanitary level of establishment.

Dramatic financial outbreak in intensive fish farming has never been experienced in Nigeria