

LENGTH-WEIGHT RELATIONSHIP AND CONDITION OF FRESHWATER SHRIMPS *Atya gabonensis* AND *Macrobrachium felicinum* FROM THE MU RIVER, MAKURDI, NIGERIA

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ABSTRACT

*Length-weight parameters (a and b) of the equation: $W = aL^b$ were estimated for two freshwater shrimp species *Atya gabonensis* and *Macrobrachium felicinum* caught bimonthly from October 2001 to March 2002 using brush traps in the Mu river. The mean b values were 2.989 ± 0.328 and 3.003 ± 0.318 for *A. gabonensis* and *M. felicinum* respectively. The values did not differ significantly ($P < 0.05$) from 3, showing that their growths were isometric, *M. felicinum* where in better condition than *A. gabonensis*.*

Key words: Length-weight, Relationship, Condition factor, *Atya gabonensis*, *Macrobrachium felicinum*, Mu river

INTRODUCTION

In fisheries research, length-weight relationships are important for the estimation of weight where only length data are available and as an index of the condition of the fish (Pauly, 1993 and Goncalves, *et al.*, 1997). King (1996a) noted that only a few estimates of species length-weight relationship parameters are available for Nigerian fishes. Of the 149 species of fish in Nigeria's inland and coastal waters compiled by king (1996a, 1996b) from various studies, none of the papers contained information on the length-weight relationship of fin-fishes (shrimps) from the inland waters. Freshwater shrimp constitute one of the most desirable candidates for freshwater aquaculture in different parts of the indo-pacific region. Knowledge of the biology of these species is important, since they are highly demanded in both Nigerian domestic and export markets. They are therefore culture candidate in our local fresh and brackish water ponds.

This study presents information on the size distribution, length-weight relationship and relative conditions of *A. gabonensis* and *M. felicinum* in the Mu river, Fiidi-Makurdi.

MATERIALS AND METHODS

A total of one hundred and fifty (150) *A. gabonensis* and fifty five (55) *M. felicinum* were collected from two sampling sites in the Mu river between October 2001 and March 2002 using brush traps placed in water along the riverbank.

Total length (cm) and body weight (g) were taken after draining water and blotting out excess water on the body (king, 1996b). For each species, the parameter a (proportionality constant) and b (exponent) of the LWR of the equation $W = aL^b$ were estimated using base 10 logarithm transformation of L - W data pairs and ordinary least - square linear regression (i.e. log transformed versions of $W = aL^b$) as $\text{Log } W = \text{log } a + b - \text{log } L$. The condition factor was calculated using Fulton's condition factor, $K = 100W/L^3$ (Carlender, 1969), where L = length (cm), W = weight (g) and 3 derived from exponential b of $W=aL^b$.

RESULT AND DISCUSSION

The length of *A. gabonensis* ranged from 5.0 to 12.2 cm, with a mean value of 7.99 ± 2.12 cm and the weight ranged from 3.3 to 51.6 g with a mean value of 13.98 ± 10.36 g. The length of *M. felicinum* ranged from 3.1 to 8.2 cm with a mean value of 6.33 ± 1.003 cm while the weight ranged from 2.8 to 11.2 g with a mean value of 6.6 ± 1.67 g. The length-weight relationship *A. gabonensis* ranging from 5.0 to 12.2 cm was $W = 0.014L^{2.989}$. The corresponding relationship for *M. felicinum* ranging from 3.1 – 8.2 cm was $W = 0.0016L^{3.003}$. These values indicated isometric relationship with 98 % of the variation in body weight being accounted for by changes in length. The length – weight relationship obtained for *A. gabonensis* and *M. felicinum* revealed that the values of the slopes (b) for

Table 1: Length-weight relationship and condition of *Atya gabonensis* and *Macrobrachium felicinum* from Mu river, Fiidi, Makurdi, Nigeria

Species	Non-linear regression				
	N	a	b	SE(b)	r ²
<i>A. gabonensis</i>	150	0.014	2.989	0.329	0.990
<i>M. felicinum</i>	55	0.0016	3.003	0.318	0.998
Length (TL cm)					
	Max	Min	Mean	SE	
<i>A. gabonensis</i>	12.2	5.0	7.99	2.12	
<i>M. felicinum</i>	8.2	3.1	6.33	1.003	
Total Weight (g)					
	Max	Min	Mean	SE	
<i>A. gabonensis</i>	51.6	3.3	13.9	1.104	
<i>M. felicinum</i>	11.2	2.8	6.6	1.7	
Condition Factor K = 100W/L ³					
<i>A. gabonensis</i>	1.014				
<i>M. felicinum</i>	2.031				

both species were not significantly different from 3 ($p < 0.05$) (Table 1). The two species in Mu river exhibited a positive isometric growth, which means that all parts of the shrimps grow at similar rates. The b values suggested that Mu river has a better ecological condition for the species thus supports higher biomass. Values of the condition factor (k) for the species show that *M. felicinum* had higher condition factor

and were therefore in better condition than *A. gabonensis* in the river.

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