



INTRODUCTION

- *Macrobrachium* prawn species are crustaceans of decapod order and they belong to the family of Palaemonidae.
- These prawns have been discovered to have high economic importance all over the globe. According to Jimoh *et al.*, (2005).
- *Macrobrachium* prawns are found all over the West African coastal areas. *Macrobrachium* species has been reported to have wide distribution all over the southern axis of Nigeria (Akintola and Bakare, 2011).
- Four species of *Macrobrachium* (*M. macrobrachion*, *M. felicinum*, *M. vollehovenii*, and *M. dux*) have been reported with *M. vollehovenii* as well as *M. macrobrachion* being the largest considering their abundance (Bello-Olusoji *et al.*, 2004).
- Moreso, Jimoh *et al.*, (2013) and Makombu *et al.*, (2019) showed that both *M. vollehovenii* and *M. macrobrachion* have aquaculture potentials based on their nutritional values.
- There was the need for comparison between these two species that are predominant in the Lagos state. A very good way to compare or differentiate between them is to examine their Morphology and their microbial load which is the major motivation for this research study.



Figure 1: Map of Lagos Lagoon Complex Showing the Sampling Locations

Source: Field work (2024)

- Total samples is 1229 (693 samples of *M. macrobrachion* and 536 samples *M. vollehovenii*).
- samples were collected at Badagry creek, Epe Lagoon and Lagos Lagoon with the assistance of fishermen.
- Means of harvest is Prawn basket traps used by fishermen.
- The specimens were preserved immediately in ice and later transferred into a cold freezer at temperature of -20°C prior to further analysis.
- Identification of the specimens was done using Marioghae (1990) and Holthius (1980) as guide.

Morphometric Measurements:

Body Characteristics measured include Body Weight, Standard Length, Carapace Length, Rostrum Length, Abdomen Length, Telson Length, Number of Spines on Rostrum, Carpus Length

Length - Weight Relationship and Condition Factor

The total length and weight of *M. macrobrachion* and *M. vollehovenii* was studied across Badagry, Lagos and Epe lagoon and presented with the equation:

$W = aL^b$ (According to Le Cren, 1951)

where W is given as body weight (in g),

L = Length of sample (in cm),

a = regression constant

b = regression coefficient.

The condition factor (K) was also calculated using the formula

$K = 100W/L^3$ (Fulton, 1904)

Where W = Weight

L = Length

MICROBIOLOGICAL ANALYSIS (FAO, 2018)

Total load was estimate as:

Total load (cfu/g) = Colony units x Dilution Factor x 10 x V/W,

Where; V = Volume of physiological saline or peptone water,

W= Weight of the sample taken.

RESULTS AND DISCUSSION

Table 1: Summary of the mean values for Morphological characteristics of *Macrobrachium vollehovenii* obtained from Badagry creek, Epe and Lagos Lagoons.

Morphology	MALE (Mean ± SD)	FEMALE (Mean ± SD)	COMBINED SEX (Mean ± SD)
Body Weight(g)	15.91±11.70*	15.78±7.09*	15.83±9.22
Length(cm)	9.13±2.07*	9.37±1.57*	9.27±1.79
Carapace Length(cm)	2.85±0.72*	2.99±0.53*	2.93±0.62
Rostrum Length(cm)	1.53±0.41*	1.48±0.43*	1.50±0.42
Abdomen Length(cm)	4.99±1.31*	5.02±1.16*	5.01±1.23
Telson Length(cm)	1.29±0.35*	1.38±0.32*	1.34±0.34
No of Rostral Spine	11.83±2.47*	12.68±1.82*	12.34±2.15
Carpus Length(cm)	1.82±1.11*	1.45±0.49*	1.60±0.82
Merus Length(cm)	1.39±0.67*	1.34±0.32*	1.36±0.49

Mean ± SD with different superscript in the row means significant difference (p<0.05)

Table 2: summary of the Mean values for morphological characteristics of *Macrobrachium macrobrachion* obtained from Badagry creek, Epe and Lagos Lagoons.

Morphology	MALE (Mean ± SD)	FEMALE (Mean ± SD)	COMBINED SEX (Mean ± SD)
Body Weight(g)	8.22±4.10*	6.55±2.65*	7.16±3.35
Length(cm)	8.01±1.02*	7.57±1.19*	7.79±1.15
Carapace Length(cm)	2.43±0.64*	2.31±0.48*	2.36±0.55
Rostrum Length(cm)	1.52±0.48*	1.34±0.47*	1.41±0.48
Abdomen Length(cm)	4.41±0.90*	4.17±1.01*	4.26±0.98
Telson Length(cm)	1.18±0.31*	1.13±0.61*	1.15±0.52
No of Rostral Spine	9.82±2.22*	9.49±1.68*	9.61±1.86
Carpus Length(cm)	1.97±0.72*	1.42±0.60*	1.62±0.70
Merus Length(cm)	2.16±0.81*	1.41±0.58*	1.68±0.76

Mean ± SD with different superscript in the row means significant difference (p<0.05)

Table 3: Mean data obtained for *M. vollehovenii* male from Badagry creek, Epe and Lagos Lagoons.

Morphology	Badagry (Mean ± SD)	Epe (Mean ± SD)	Lagos (Mean ± SD)	Combined sexes (Mean ± SD)
Body Weight(g)	8.78±4.52*	15.48±12.59*	20.56±11.42*	15.91±11.70
Length(cm)	8.10±1.32*	9.12±2.33*	9.75±1.89*	9.13±2.07
Carapace Length(cm)	2.42±0.53*	2.86±0.81*	3.10±0.59*	2.85±0.72
Rostrum Length(cm)	1.36±0.25*	1.43±0.47*	1.74±0.34*	1.53±0.41
Abdomen Length(cm)	4.53±0.90*	4.94±1.33*	5.32±1.37*	4.99±1.31
Telson Length(cm)	1.15±0.31*	1.32±0.42*	1.33±0.27*	1.29±0.35
No of Rostral Spine	9.89±2.19*	12.15±2.63*	12.59±1.77*	11.83±2.47
Carpus Length(cm)	1.22±0.28*	1.67±1.30*	2.35±0.93*	1.82±1.11
Merus Length(cm)	1.43±0.49*	1.17±0.72*	1.62±0.65*	1.39±0.67

Mean ± SD with different superscript in the row means significant difference (p<0.05)

Table 4: Mean data obtained for *M. vollehovenii* female from Badagry creek, Epe and Lagos Lagoons.

Morphology	Badagry (Mean ± SD)	Epe (Mean ± SD)	Lagos (Mean ± SD)	Combined sexes (Mean ± SD)
Body Weight(g)	9.80±3.75*	16.46±6.71*	17.98±7.48*	15.78±7.09
Length(cm)	8.63±1.26*	9.11±1.46*	10.32±1.53*	9.37±1.57
Carapace Length(cm)	2.56±0.37*	3.05±0.55*	3.11±0.45*	2.99±0.53
Rostrum Length(cm)	1.43±0.36*	1.34±0.41*	1.81±0.30*	1.48±0.43
Abdomen Length(cm)	4.78±0.93*	4.73±1.01*	5.76±1.24*	5.02±1.16
Telson Length(cm)	1.30±0.30*	1.37±0.33*	1.44±0.30*	1.38±0.32
No of Rostral Spine	12.79±1.60*	12.82±2.03*	12.32±1.45*	12.68±1.82
Carpus Length(cm)	1.09±0.24*	1.40±0.43*	1.78±0.53*	1.45±0.49
Merus Length(cm)	1.46±0.32*	1.32±0.32*	1.33±0.32*	1.34±0.32

Mean ± SD with different superscript in the row means significant difference (p<0.05)

Table 5: Mean data obtained for *M. macrobrachion* Male from Badagry creek, Epe and Lagos Lagoons.

Morphology	Badagry (Mean ± SD)	Epe (Mean ± SD)	Lagos (Mean ± SD)	Combined sexes (Mean ± SD)
Body Weight(g)	6.92±2.03*	7.97±4.32*	12.50±5.24*	8.22±4.10
Length(cm)	7.86±0.77*	8.02±1.24*	8.44±1.09*	8.01±1.02
Carapace Length(cm)	2.34±0.63*	2.46±0.74*	2.64±0.34*	2.43±0.64
Rostrum Length(cm)	1.55±0.45*	1.39±0.56*	1.70±0.33*	1.52±0.48
Abdomen Length(cm)	4.24±0.80*	4.42±1.02*	4.62±0.80*	4.41±0.90
Telson Length(cm)	1.21±0.36*	1.15±0.28*	1.18±0.15*	1.18±0.31
No of Rostral Spine	9.19±1.45*	9.45±2.04*	12.37±2.08*	9.82±2.12
Carpus Length(cm)	1.83±0.40*	2.00±0.84*	2.32±1.03*	1.97±0.72
Merus Length(cm)	2.17±0.51*	1.98±0.82*	2.48±1.27*	2.16±0.81

Mean ± SD with different superscript in the row means significant difference (p<0.05)

Table 6: Mean data obtained for *M. macrobrachion* Female from Badagry creek, Epe and Lagos Lagoons.

Morphology	Badagry (Mean ± SD)	Epe (Mean ± SD)	Lagos (Mean ± SD)	Combined sexes (Mean ± SD)
Body Weight(g)	6.03±1.86*	6.72±2.55*	9.33±4.84*	6.55±2.65
Length(cm)	7.27±1.03*	7.88±1.04*	8.44±1.85*	7.57±1.19
Carapace Length(cm)	2.31±0.48*	2.30±0.45*	2.37±0.59*	2.31±0.48
Rostrum Length(cm)	1.26±0.49*	1.37±0.42*	1.72±0.28*	1.34±0.47
Abdomen Length(cm)	3.89±0.93*	4.46±0.93*	4.93±1.15*	4.17±1.01
Telson Length(cm)	1.14±0.79*	1.11±0.17*	1.14±0.19*	1.14±0.61
No of Rostral Spine	9.38±1.38*	9.15±1.86*	11.51±1.37*	9.49±1.68
Carpus Length(cm)	1.53±0.59*	1.24±0.58*	1.42±0.56*	1.42±0.60
Merus Length(cm)	1.53±0.63*	1.19±0.44*	1.43±0.53*	1.41±0.58

Mean ± SD with different superscript in the row means significant difference (p<0.05)

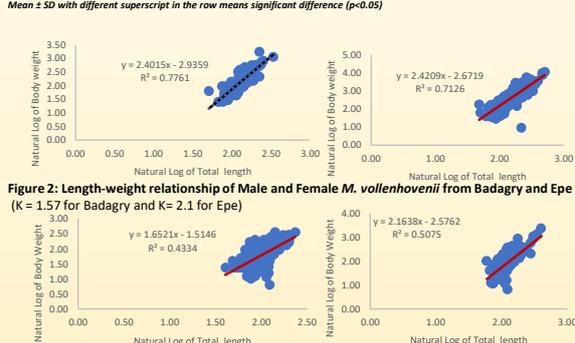


Figure 2: Length-weight relationship of Male and Female *M. vollehovenii* from Badagry and Epe (K = 1.57 for Badagry, K = 2.1 for Epe)

MICROBIAL LOAD IN MACROBRACHIUM VOLLENHOVENII AND MACROBRACHIUM MACROBRACHIUM

Table 7: Microbial Load in *M. macrobrachion* from Badagry creek, Epe and Lagos Lagoon.

MICROBIAL LOAD (cfu/g)	MM MALE Mean±SD	MM FEMALE Mean±SD	COMBINE Mean±SD
TOT PLATE CNT	45473.3 ±53220.7*	42603.3 ±41826.7*	44038.3 ±46458.4
TOT COLIFORM CNT	140.6 ±39.1*	92.6 ±58.1*	59.5 ±52.5
E COLI	6.6 ±3.8*	1.7 ±0.6*	4.2 ±3.7
SALMONELLA SP	0.0 ±0.0	0.0 ±0.0	0.0 ±0.0
TOT MOULD CNT	12.2 ±4.7*	7.9 ±3.6*	10.1 ±4.6

Mean ± SD with different superscript in the row means significant difference (p<0.05)

Table 8: Microbial Load in *M. vollehovenii* from Badagry creek, Epe and Lagos Lagoon.

MICROBIAL LOAD (cfu/g)	MV MALE Mean±SD	MV FEMALE Mean±SD	COMBINE Mean±SD
TOT PLATE CNT	44605.6 ±48413.3*	35503.3 ±40300.4*	40094.4 ±43469.7
TOT COLIFORM CNT	66.9 ±30.8*	24.2 ±11.3*	45.6 ±31.4
E COLI	2.5 ±1.5*	2.2 ±1.6*	2.3 ±1.5
SALMONELLA SP	0.0 ±0.0	0.0 ±0.0	0.0 ±0.0
TOT MOULD CNT	9.2 ±5.0*	7.0 ±4.9*	8.1 ±4.9

Mean ± SD with different superscript in the row means significant difference (p<0.05)

Table 9: Microbial Load in *M. macrobrachion* Male for Badagry creek, Epe and Lagos Lagoon.

MICROBIAL LOAD (cfu/g)	BADAGRY MM MALE Mean±SD	EPE MM MALE Mean±SD	LAGOS MM MALE Mean±SD	COMBINE Mean±SD
TOT PLATE CNT	6153.3 ±162.6*	11623.3 ±4178.9*	14033.3 ±152.8*	45473.3 ±53220.7
TOT COLIFORM CNT	103.7 ±5.7*	128.8 ±6.3*	189.3 ±5.7*	140.6 ±39.1
E COLI	2.1 ±0.3*	7.6 ±2.3*	10.2 ±1.3*	6.6 ±3.8
SALMONELLA SP	0.0 ±0.0	0.0 ±0.0	0.0 ±0.0	0.0 ±0.0
TOT MOULD CNT	6.3 ±1.5*	16.1 ±1.6*	14.2 ±2.0*	12.2 ±4.7

Mean ± SD with different superscript in the row means significant difference (p<0.05)

Table 10: Microbial Load in *M. vollehovenii* Male for Badagry creek, Epe and Lagos Lagoon.

MICROBIAL LOAD (cfu/g)	BADAGRY MV MALE Mean±SD	EPE MV MALE Mean±SD	LAGOS MV MALE Mean±SD	COMBINE Mean±SD
TOT PLATE CNT	3556.7 ±484.4*	10833.3 ±577.4*	22166.7 ±642.9*	44605.6 ±48413.3
TOT COLIFORM CNT	37.3 ±24.0*	104.6 ±4.4*	58.9 ±3.8*	66.9 ±30.8
E COLI	0.9 ±0.3*	4.3 ±0.5*	2.3 ±0.6*	2.5 ±1.5
SALMONELLA SP	0.0 ±0.0	0.0 ±0.0	0.0 ±0.0	0.0 ±0.0
TOT MOULD CNT	3.3 ±1.5*	24.9 ±0.4*	14.2 ±2.0*	9.2 ±5.0

Mean ± SD with different superscript in the row means significant difference (p<0.05)

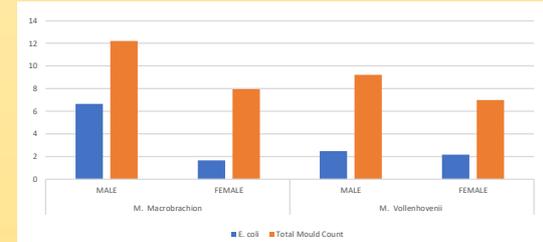


Figure 4: Mean values of Escherichia coli and total mould count in *M. vollehovenii* and *M. macrobrachion*.

DISCUSSION

- Results obtained implied that 56.4% of the total sample size was *M. macrobrachion* and the remaining 43.6% was *M. vollehovenii*.
- This result is in agreement with the research carried out by Marioghae (1990) when he reported that *M. macrobrachion* covered about 60% of total prawn caught from Lagos Lagoon. Jimoh *et al.*, (2005) highlighted the fact that *M. macrobrachion* is a prawn species that could be found in a wide range of salinity especially brackish environment, hence their abundance.
- This result implies that there is no significant difference (P>0.05) between the male and female of *M. vollehovenii* but for *M. macrobrachion*, the values obtained for male are significantly higher than values obtained for females.
- This conforms to the findings of Akinwunmi and Lawal-Are (198) who stated that this could be as a result of the females converting their weight gain into the development of gonads for reproduction.
- This result presents the variation levels of microbial load in the two prawn species. The values obtained also showed that there is no significant variation (P > 0.05) between male and female of *M. macrobrachion* (except for *Escherichia coli* and *salmonella* that is not present).
- *Escherichia coli* (*E. coli*) is often used as an indicator to check levels of contamination in shell fish (FAO/WHO, 2011).
- It is however important to note that the mean values of microbial loads are significantly higher in *M. macrobrachion* than in *M. vollehovenii*.

RECOMMENDATION

- *Macrobrachium macrobrachion* and *Macrobrachium vollehovenii* has microbial load that could be harmful to human health is not taken with caution
- However, drying/heating at high temperature should be considered before consumption since most microbes would not survive when the moisture content is very low or when high heat is already applied.

CONCLUSION

Aspects of morphology results indicated that this two prawn species still consider their environment habitable but the survival of *Macrobrachium macrobrachion* and *Macrobrachium vollehovenii* is highly dependent on the management measures put in place to ensure continued production of these fisheries resources while the microbial load in these two prawns could be a major concern due to its effect on consumers, if proper care is not taken.

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