Comparative condition factor of two Penaeid shrimps, Peneaus notialis (Pink shrimp) and Peneaus monodon (Tiger shrimp) in a coastal state, Lagos, South West Nigeria

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Abstract: Comparative condition factor of two Penaeid shrimps, *Peneaus notialis* (Pink shrimp) and *Peneaus monodon* (Tiger shrimp) in a coastal state, Lagos, Southwest Nigeria were studied. The condition factor is an indices used to investigate the state of wellbeing of fish, was used to assess the state of wellbeing of these Penaeid shrimps in Lagos Nigeria. During the study it was discovered that there was a total difference in the total number *Peneaus notialis* and *Peneaus monodon* sampled, this was due to the fact that the former is a local and indeginous species while the latter is an exotic species that invaded the Nigerian coastal waters . The highest mean condition factor 'K' of *P. notialis* (0.99) while that of *P. monodon* (1.05). The value for *P.mondon* were greater than 1 and implied that they were in good physiological state of wellbeing during the period of study.
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1.Introduction

Penaeid shrimps are the typical tropical shrimp, dominating the market and produced in many areas around Southeast Asia and Latin America.
They are highly priced seafood harvested from coastal tropical and warm-temperature waters throughout the world. Penaeid shrimps support commercially valuable fisheries in many areas of the world which lie between 35º north and south of the equator (Turner, 1977), at least 97 species in the family Penaeidae are of commercial interest (Holthuis, 1980). They have been the focus of a major global fishery industry that developed rapidly during the second half of the twentieth century, and have become central to the shrimp farming industry (Padian, 1989). Pink shrimps are typically found in both estuaries and inhabiting the inner littoral zone along the coast. Ansa (2005) reported that they live on muddy bottom by day and migrate upward by night from the region. The youngest size classes of *Peneaus notialis* seek out shallow less saline areas in the estuaries nursery habitats and are often found abundantly in sea-grasses with older shrimp more likely to utilize patchily distributed sea-grass areas (Adetayo and Kusemiju, 1994; Sanchez, 1997). The adult pink shrimp stock off Lagos coast has been reported by the juveniles and sub-adult from the adjacent Lagos lagoon (Adetayo and Kusemiju 1994).

The giant tiger shrimp, *P. monodon* is the world's most valued shrimp species and indigenous to south east Asia. Aquaculture has become the major source of its supply all over the world (FAO, 1999;). Significant catch of the fish from the wild exists in some of its native countries (Rahman, 2001). Currently the species has started appearing in the Nigerian shrimp trawls, which presents an invasion of the West African coastal waters. FAO, 1999 reported that 80.6% of *P. monodon* production world wide is accounted for by aquaculture; however the supply of *P. notialis* still depends mainly on capture from the wide in Nigeria and other parts of West Africa. In India, at least 10 potential penaeid species are available for coastal aquaculture, however *Penaeus monodon* is the only one species cultured and its constitutes 95-99% of total farmed shrimp production of the country (Soundarapandian, 2009). Thus the need for continuous stock assessment of the Penaid shrimps of Nigerian coastal waters in order to ensure sustainable exploitation of the living resources. A comparative study of these species will provide the well being of these recourse within their population.

This study was aimed at comparing the condition factors of indigenous pink shrimp, *P. notialis* and exotic giant tiger shrimp, *P. monodon* collected from Karflex Shrimper's company jetty in Apapa, Lagos Nigeria.

2.Materials and Methods

P. notialis and *P. monodon* were purchased monthly, from February to September 2011 from the landings site of the Karflex Shrimper's company at Apapa, Lagos Nigeria. The shrimps were transported in an insulated box containing ice to the Laboratory of the Department of Biological Oceanography, Nigerian Institute for Oceanography and marine

Research, Ahmadu Bello Way, Victoria Island, Lagos, where the total length, standard length and weight of the species were determined as described by Nwadiaro and Okorie (1985).

The condition factor is the degree of well-being or relative robustness of the fish is expressed by coefficient of condition (also known as factor or length weight factor). The condition factor has an indicator to aquatic species (fish or shrimp) welfare in their habitat (Gomiero and Braga, 2005). It is represented by letter K; when species are measured and weighed, as in the following equation. This 'K' value can be basically and directly interpreted as the higher value, the better condition of aquatic species.

$K = 100W/L^3$

Where

K= condition factor

W= the weight of shrimp in grams

L= the total length of shrimp in centimeters (Fulton, 1902)

The total length (TL) of each shrimp was measured from the tip of the rostrum to the tip of the telson to the nearest 0.01mm using an Absolute digital caliper, while the weight of each shrimp was taken and recorded to the nearest 0.1g using Ohaun digital weighing balance.

For each species, the mean total length and weight as well as the standard error were calculated for each species. The data were subjected to unpaired t-test at 95% confidence level to determine the significance of differences in values between the two species (Ogbeibu, 2005).

3.Results

Total numbers of 420 *P. notialis* and 139 *P. monodon* samples were collected during the study period (Table 1). The total length of *P. notialis* sampled ranged from 21.60 - 110.88mm (Table 1) while that of *P. monodon* ranged from 73.66 - 168mm. The body weight (Table 2.) of *P. notialis* ranged from 0.11 – 9.60 while that of *P.monodon* ranged from 4.50 – 42.45 (Table 1). The body weight of *P. monodon* is significantly (P<0.05) higher than that of *P. notialis.*

Table 1: Total length and weight values for *P. notialis* and *P. mondon*

Species	Sample Size (n)	Total Length (mm)	
		Range	Mean ± SE
Peanus notialis	420	21.60 -110.88	70.27 (1.21)
Peanus mondon	136	73.66-168.10	99.20 (4.86)

Table 2: Total weight values for *P. notialis* and *P. mondon*

Species	Sample size	Total Weight	
		Range	Mean± SE
Penaeus notialis	420	0.11-9.60	2.41 (0.23)
Penaeus monodon	136	4.50-42.45	16.95 (1.17)

The monthly mean condition factor (K) for *P. notialis* (Table 3). The highest value was obtained in the month of March (0.99± 0.05) with a steady decrease down to the month of June (0.07 ± 0.04) , the values throughout the sampling period were less than 1 implying that these species were not in good state of well being. However the mean k value for *P. monodon* (Table 4) the highest value was obtained in the month of September (1.05 ± 0.05) and the month of March has the lowest mean condition factor value (0.70± 0.05) the values were greater than 1 and implied that they are in good physiological state of wellbeing.

Table 3: Mean monthly variation in condition factors of *P. notialis*

Month	Range	Mean (± SE)
February	0.701-1.084	0.84 (0.03)
March	0.441-1.563	0.99 (0.05)
April	0.643-1.182	0.95 (0.02)
May	0.481-1.171	0.80 (0.03)
June	0.392-1.012	0.70 (0.04)
July	0.411-1.134	0.89 (0.03)
August	0.823-1.151	0.94 (0.02)
September	0.581-1.102	0.91 (0.02)

Table 4: Mean monthly variation in condition factors of *P. monodon*

Month	Range	Mean (± SE)
February	0.611-1.082	0.74 (0.05)
March	0.451- 1.023	0.70(0.05)
April	0.531-1.045	0.95 (0.02)
May	0.931-1.261	0.91 (0.02)
June	0.711-1.322	0.84 (0.03)
July	0.632-1.524	0.95 (0.02)
August	0.754-1.286	1.04 (0.03)
September	0.643-1.301	1.05 (0.05)

However, the overall mean condition factor K, values appear to be significantly (P<0.05) higher in *P. monodon* than in *P. notialis* during the period of study.

4.Discussions

The condition factor is a quantitative parameter of the wellbeing state of a fish and reflects recent feeding condition of the fish. Moreso, Bagenal and Tesch, 1978 are of the opinion that heavier fish of a given length are in better condition. Fagade, 1980 reported the use of the condition factor as an index of growth and feeding intensity, which can be reveal from the monthly mean K value of *P. monodon,* which can be attributed to the fact that this species can grow bigger and at a faster rate than other Penaeid shrimps. Though *P. monodon* is euryhaline animal it is comfortable when exposed to optimum

salinity but works has shown that it can adapt quite well in freshwater conditions because of its wide range of salinity tolerance (Ramakrishnareddy, 2000; Collins and Russel, 2003, Yakub and Ansa, 2007). The lower K value for *P. notialis* could be as a resultant effect of adverse environmental factors (Anene, 2005).

The marked difference in the total numbers of *P. notialis* and *P. monodon* sampled during the study is due to the fact that the former is an indigenous species while the latter is an exotic species that invaded the coastal water of Nigeria and other parts of West Africa, the species in terms of size and biomass is bigger than *P. notialis* (Abowei et al., 2006; Yakub and Ansa 2007; Zabbey 2007). It has also been identified as a good candidate for farming due to its high growth rate and market value (Soundarapandian, 2009).

Though *P. monodon* is an exotic species, it has invaded Nigerian waters (Zabbey, 2007) and its gaining prominence in terms of abundance and distribution with anticipated negative impact on local shrimp, its genetics and general biodiversity needs to be investigated.

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