Parasites of Blue Crab (*Callinectes amnicola*) in the Cross River Estuary, Nigeria

Albert P. Ekanem, Victor O. Eyo, Imaobong E. Ekpo, Blessing O. Bassey

**ABSTRACT**
A four months study was carried out to investigate the parasites of blue crab (*Callinectes amnicola*) in the Cross River estuary and the possible health implications to crabs consumers. Two hundred live crabs were collected for a period of 5 months (May to September, 2012) using plastic buckets and transported to Fish Pathology Laboratory, University of Calabar for identification and examination for both ecto and endoparasites. Scrapings from cuticle, skin and gills were examined microscopically as wet mounts for ectoparasites, while squash from internal organs (muscle and gut) were examined for endoparasites. The overall prevalence of parasites was 12.38%; parasites recovered were *Trichodina* and nematodes scantily distributed on the skin and gut of *C. amnicola* respectively. Prevalence of parasite in relation to carapace width (cm) was highest in width class 5-9.9 cm (61.54 %) followed by 10-14.9 cm (38.46 %) and 0.00 % for 15-19.9 cm. Parasites isolated were normal intestinal and gut flora of aquatic animals. It was concluded that *C. amnicola* from the Cross River Estuary is not infested with parasites of zoonotic importance and could be recommended for human consumption.

**Keywords:** Blue crab, Parasites, Cross River Estuary.

1. **Introduction**
Crab belongs to the family of crustacean and the order decapods [1]. Crab hunting is one of the valuable components of small-scale coastal fisheries in many countries in the tropics [2].

The blue crab *Callinectes amnicola* is one of the most common swimming crabs found in brackish wetland and lagoons in Nigeria [3]. These crabs inhabit muddy bottoms in mangrove areas and river mouths [4]. It is one of the most important food organism caught in the coastal (inshore) fishery and lagoons of West Africa [9].

Amnocola was more abundant among the shell fishes caught in a Lagos Lagoon Creek and was more abundant during the rainy season (May – October). According to Chindah *et al.*[4] *C. amnicola* of the new Calabar River feeds on different food items like algae, shrimps, brachyuran bivalves, gastropods, fish, polychaetes and other plant materials.

Crab meat is a good source of protein, vitamins and essential minerals substances. It contains phosphorus, Zinc, calcium, iron and little amount of fat, especially saturated fat substances. However, it contains a high content of cholesterol and most of the health organizations in the world have suggested that people should eat no more than 300mg of crab meat per day. Hence, crabs are exploited by man for food [7].

Vogan *et al.*[8] reported on the disease of crab and also demonstrated histopathological alterations to several organ and tissue systems. Powell and Rowley [9] noted an apparent dissociation between the prevalence of shell disease and organic load (related to sewage pollution) in *C. pagurus*.

Sprague [10]; Couch [11], reviewed many microsporidian parasites, some of which are responsible for economic and ecological impacts in commercial hosts, have been described as infecting decapods crustaceans. According to Childers *et al.*[12], the prevalence of the parasite can reach 40 % and is highest in male crabs than the females.

There has been no report on the diseases or parasites of crabs from the Cross River Estuary. The objective of this study was to investigate the parasites of blue crab (*C. amnicola*) from the Cross River Estuary and its suitability for human consumption.
2. Materials and Methods

2.1 Study Area
The crabs used in this study were collected from the Great kwa River, Calabar. It is one of the major tributaries of the Cross River Estuary. It takes its course from the Oban Hills in Aningeje, Cross River State, Nigeria. It flows south wards and discharges into the Cross River Estuary around latitude 4°45’N and longitude 8°20’E [13].

2.2 Sampling Collection
Sampling duration for this study was five months. Sampling was done twice weekly, in the morning hours. Samples were randomly collected for the study. Only mature adult crabs were collected and sorted into carapace width classes in centimeters. Samples collected were stored in plastic buckets and transported to the Fish Pathology Laboratory of the University of Calabar for identification and examination.

2.3 Examination of Samples for Ectoparasite
Scrapings from the skin (cuticle) and gills of the crab specimen was spread on clean glass slides, covered with cover slip and examined under light microscopes for ectoparasites [14]. Some parasites were collected and fixed in 4 % Phosphate Buffered formalin (PBF) for further processing and species identification [15, 16]. Each sample was examined independently for parasites according to the protocol outlined in Obiekezie and Ekanem [17]. Cuticle scrapings and wet mounts from skin (cuticle) and gills were also examined for abundance and distribution of ectoparasites. Identification of parasites was carried out according to Yamaguti [18]; Obiekezie and Enyenihi [19]; Roberts [20].

2.4 Examination of Samples for Endoparasites
The cavity of each crab was cut opened ventrally with a pair of scissors and the internal organs removed for examination. Some organs were examined as wet mounts under the microscope while other parts were fixed in PBF for isolation and identification of parasites [15, 16].

3. Results

3.1 Prevalence of parasite in relation to Carapace Width Class (cm)
Result from the present study showed that prevalence of parasite (Table 1.) in relation to carapace Width Class (cm) was highest in width class 5-9.9cm, followed by 10-14.9cm width class while there was no record of parasite in 15-19.9cm width class. In 5-9.9cm width class, 3 crabs were infested (75.00 %) with 4 (57.14 %) parasites. In 10-14.9cm width class, only 1 crab was infected (25.00 %) with 3 (42.86 %) parasite.

<table>
<thead>
<tr>
<th>Carapace Width Class (cm)</th>
<th>No. and % of crab Examined</th>
<th>No. and % of crab Infected</th>
<th>Total No. and % of Parasite Recovered</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 –9.9</td>
<td>70 (33.33)</td>
<td>12(60.00)</td>
<td>16(61.54)</td>
</tr>
<tr>
<td>10 –14.9</td>
<td>70 (33.33)</td>
<td>8(40.00)</td>
<td>10(38.46)</td>
</tr>
<tr>
<td>15 – 19.9</td>
<td>70 (33.33)</td>
<td>0(0.00)</td>
<td>0(0.00)</td>
</tr>
<tr>
<td>Total</td>
<td>210(100.00)</td>
<td>20(100.00)</td>
<td>26(100.00)</td>
</tr>
</tbody>
</table>

3.2 Parasite Type recovered in relation to Carapace Width Class (cm)
In the present study, all parasites recovered were protozoan and nematodes. In 5-9.9 cm width class, 12 trichodina and 4 nematode Species were recovered out of 16 (61.54 %) recovered parasites. In width class of 10-14.9 cm, 8 trichodina and 2 nematodes were recovered out of 10 (38.46 %) parasites. In 10-14.9 cm width class, only 1 crab was infected (25.00 %) with 3 (42.86 %) parasite.

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<tr>
<th>Carapace Width Class (cm)</th>
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<th>Type of parasite and No. recovered</th>
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</thead>
<tbody>
<tr>
<td>5-9.9</td>
<td>12(60.00)</td>
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<td>Tichodina (12) Nematode sp (4)</td>
</tr>
<tr>
<td>10 – 14.9</td>
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</tr>
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3.3 Numerical Abundance and percentage incidence of parasite in relation to Carapace Width Class (cm)
Numerical abundance and percentage incidence of parasite (Table 3.) in relation to Carapace Width Class (cm) showed that in 5-9.9 cm width class, 12 Trichodina had percentage incidence of 46.15 % and 15.39 % for 4 Nematode isolated. In 10-14.9 cm width class, percentage incidence was 30.77 % obtained for 8 trichodina and 7.69 % for 2 nematodes recovered. In 15-19.9 cm width class, there was no incidence of parasite.
Mexico as reported by Jeffrey and Overstreet were isolated in the Cross River Estuary. The parasites isolated from crab included a variety of disease causing agents such as viruses, bacteria, fungi, protozoa, helminths, and other crustaceans in the Gulf of Mexico. Although most of these agents caused little or no pathological alteration in the crab host, some were responsible for a considerable alteration and mortalities in affected hosts. However, unlike dead fish that float, dead crabs generally sink; hence large mortalities often go unnoticed or underreported. The true influence of several diseases, therefore, may be difficult to assess without intensive sampling. According to Jeffrey and Overstreet, blue crabs were exposed to a variety of disease causing agents such as viruses, bacteria, fungi, protozoa, helminths, and other crustaceans in the Gulf of Mexico. Parasites isolated from C. amnicola in this study were scanty protozoan (Trichodina) and nematodes which intensity poses no health risk to crab consumers. However, Jeffrey and Overstreet reported heavy presence of protozoan in the skeletal muscle blue crab. This suggests that distribution of parasites varied from one habitat to the other which could be due to host parasite relationship and abiotic factors like dissolved oxygen, temperature and pH. According to Jeffrey and Overstreet, blue crabs were exposed to a variety of disease causing agents such as viruses, bacteria, fungi, protozoa, helminths, and other crustaceans in the Gulf of Mexico. Although most of these agents caused little or no pathological alteration in the crab host, some were responsible for a considerable alteration and mortalities in affected hosts. However, unlike dead fish that float, dead crabs generally sink; hence large mortalities often go unnoticed or underreported. The true influence of several diseases, therefore, may be difficult to assess without intensive sampling. Although the present study focused strictly on parasites of C. amnicola, only few parasites with no disease implications were isolated in the Cross River Estuary. The case of Gulf of Mexico as reported by Jeffrey and Overstreet has confirmed that diseases of blue crabs varies from one location to the other and may be dependents on the prevailing environmental conditions.

### 4. Discussions

Results from the present study showed overall prevalence of parasite as 12.38% whereas prevalence of parasite in relation to carapace width was highest in 5-9.9 cm width class (61.54%), followed by 10-14.9 cm width class (38.46%), indicating that Blue crab (C. amnicola) between 1-10 cm are more susceptible to parasites. This finding is similar to Anderson, Ekanem et al. who reported that parasites cause diseases to fishes of lower width class (cm) in the Cross River Estuary. Parasites in crabs have been a great concern since they often produce disease condition thereby increasing their susceptibility to other diseases, causing nutritive devaluation of crabs, a highly cherished delicacy for coastal inhabitants of Cross River. Parasitic infection have some negative influence on commercially important crustaceans, by influencing their growth, reproduction, egg survival, longevity, and marketability. The parasites isolated from C. amnicola in this study were scanty protozoan (Trichodina) and nematodes which intensity poses no health risk to crab consumers. However, Jeffrey and Overstreet reported heavy presence of protozoan in the skeletal muscle blue crab. This suggests that distribution of parasites varied from one habitat to the other which could be due to host parasite relationship and abiotic factors like dissolved oxygen, temperature and pH. According to Jeffrey and Overstreet, blue crabs were exposed to a variety of disease causing agents such as viruses, bacteria, fungi, protozoa, helminths, and other crustaceans in the Gulf of Mexico. Although most of these agents caused little or no pathological alteration in the crab host, some were responsible for a considerable alteration and mortalities in affected hosts. However, unlike dead fish that float, dead crabs generally sink; hence large mortalities often go unnoticed or underreported. The true influence of several diseases, therefore, may be difficult to assess without intensive sampling. Although the present study focused strictly on parasites of C. amnicola, only few parasites with no disease implications were isolated in the Cross River Estuary. The case of Gulf of Mexico as reported by Jeffrey and Overstreet has confirmed that diseases of blue crabs varies from one location to the other and may be dependents on the prevailing environmental conditions.

### 5. Summary and Conclusion

The blue crab, *C. amnicola* is a very popular food item in the diet of coastal inhabitants of Cross River State, Nigeria. The study shows that blue crabs from the river system were infested by few protozoan and nematodes which could pose no health risk to crab consumers. We concluded that blue crabs from the Cross River Estuary are fit for human consumption on the basis of the number and types of parasites isolated during our study.

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