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PREVALENCE OF *Camallanus cotti* IN *Poecilia reticulata* OBTAINED FROM SOME WASTEWATER DRAINS IN LAGOS STATE.

AKINWALE, M-M.A[1]. and Adesola.A.HASSAN[2].

Fin and Shellfish Health and Disease Control Section, Aquaculture Department, Nigerian Institute for Oceanography and Marine Research, Lagos.

Parasitology Unit, Department of Zoology, Faculty of Science, University of Ibadan, Ibadan.

ABSTRACT

One way to diversify Nigeria's economy is to improve on agricultural activities with low import input but high export potential such as the promotion of the ornamental fish industry. *P. reticulata* is one such fish species that enjoys international acceptability. However, a potential bottleneck in its international trade is the decertification of exports from Nigeria in the uncertainty of standing parasite fauna of locally available stock of *P. reticulata*. Four Streets in different local government areas of Lagos State were identified with existing populations of *P. reticulata* where collection of samples with a scoop net was done before sorting into 60 male and 60 female individuals per wastewater drain from each Street was carried out monthly between March, 2004 and February, 2005. Temperature, pH, Dissolved Oxygen (DO), water transparency and drain depth were measured with mercury-bulb thermometer, ARH-1 CE electronic meter, Oxyguard electronic probe, secchi disc and calibrated pole respectively. Chi-square was used to test for sex-related differences in prevalence and ANOVA for differences in physicochemical analyses. Only 3.4% of the 4,320 samples examined were infected with *C. cotti*. There was no sex-related differences in the prevalence of *C. cotti* while only DO, transparency and drain depth were found to be significantly different among the wastewater drains on the four Streets. The highest prevalence of 15.0% was obtained in *P. reticulata* females obtained from Igi-Olugbin and Adenaike Alagbe Streets in September, 2004. High prevalence clustering correlated with receding rains. However, mean monthly temperature, transparency and drain depth were significantly different across drain ($p < 0.05$). *P. reticulata* obtained from these four Streets can be further exploited for import substitution and export market since this prevalence level can be managed and does not rival records of *C. cotti* in other popular export sources in Asia.

Keywords: *P. reticulata*, *Camallanus cotti*, Wastewater drains, Lagos State.

INTRODUCTION

Ornamental Fish industry (OFI) is currently valued at about 15billion United States Dollars (USD) according to Larkin, 2003; Wabnitz *et al.*, 2003; Pelicice and Agostinho, 2005; Prang, 2007; Wittington and Chong, 2007; Moorehead and Zeng, 2010. OFI grew from an annual USD 34million export business in the early 1950s (Conroy, 1975; Thurnberg, 1993) to a USD 282 million per annum export activity in 2006 (Chapman and Livengood, 2007). Considering sourcing, storage and conditioning of collected ornamental fish in the exporting countries where the industry has a ready poverty alleviating capacity; aquaria design and construction, specialized financing, retail and maintenance of resources in the destination countries estimations, as at 2006 indicated that global OFI was worth over USD 20 billion per annum (OFI, 2006). OFI is an aspect of agriculture that maximally involves rural populations in ornamental fish gathering, quarantine and culture activities.

In order for Nigeria to fully tap from the opportunities abundant in OFI, the efforts to currently explore locally available feral stock of ornamental fish species such as *P. reticulata* should be moderated by the proper assessment of existing parasite fauna of these feral populations, especially in the wastewater drains of Lagos State where they are currently abundant (Lawal and Samuel, 2010). The choice of *Camallanus cotti* as the parasite of interest in this study is because of its ability to display monoxeny when faced with reproductive or edaphic bottlenecks. Previously considered as only an Asian fish nematode, climate change realities that result in flooding of aquaculture holdings and ponds now delimit wastewater drains from regular commercial fish enclosures. This nematode employs copepods and other cladocerans that are food organisms to *P. reticulata* and that are readily available in wastewater drains as intermediate hosts. However, because international trade in OFI is a becoming better organized with the development of more stringent rules guiding trans-border rules with regards to quarantine and certification of imports from Nigeria to more developed economies of the world, there is the need to assess the suitability of wastewater stock of *P. reticulata* for import substitution and potential export market. Therefore, basal information on the prevalence of *C. cotti* in *P. reticulata* will go a long way in potentiating the drain on forex directed at the import of *P. reticulata* and improve Nigeria's forex revenue while keeping our teeming population in rural and urban areas gainfully employed.This study tests for sex-related differences in the prevalence of *C. cotti* in *P. reticulata* and the possible role of the physicochemical parameters of wastewater on the prevalence.

MATERIALS AND METHOD

A Street each was selected in four different local government areas of Lagos State for their variety in population density and residency types. These Streets were Igi-Olugbin Street in Bariga LGA, Basil Ogamba Street in Surulere LGA, Ahmadu Bello Road in Eti-Osa LGA and Adenaike Alagbe Street in Ikorodu LGA. Ten sampling points were

identified along the length of the wastewater drains for sampling *P. reticulata* that had been previously reconnoitred there. Sampling was done with a scoop net on the field before transportation of collected samples to the laboratory. 60 males and 60 females of *P. reticulata* were sorted out in the laboratory for dissection and microscopy. A mercury-bulb thermometer was used to measure temperature, pH was measured with ARH-1 CE electronic meter, Dissolved Oxygen (DO) with an Oxyguard, transparency with a secchi disc and drain depth with a calibrated pole. Sex-related differences were tested by chi-square analyses while ANOVA was used to test for differences in the physicochemical parameters measured.

RESULTS AND DISCUSSION

A micrograph of *C. cotti* obtained from *P. reticulata* in this study is on Plate 1. Out of the total of 4,320 samples of *P. reticulata* obtained from the four selected Streets only 146 samples were infected giving an overall infection rate of 3.4%. Chi-square analyses indicated no sex-related differences in the prevalence of *C. cotti* in *P. reticulata* male and female samples obtained from the four selected Streets of Lagos State. However, *C. cotti* had the highest prevalence of 13.0% in *P. reticulata* males obtained from Igi-Olugbin Street in September, 2004 and this was followed by that of 11.0% obtained in August, 2004 from Adenaike Alagbe Street and September, 2004 at Ahmadu Bello Road. The lowest prevalence of 1.0% was observed in *P. reticulata* males obtained from Adenaike Alagbe Street in May, 2004, Basil Ogamba Street in September, 2004 and Ahamadu Bello Road in October, 2004 (Fig. 1).

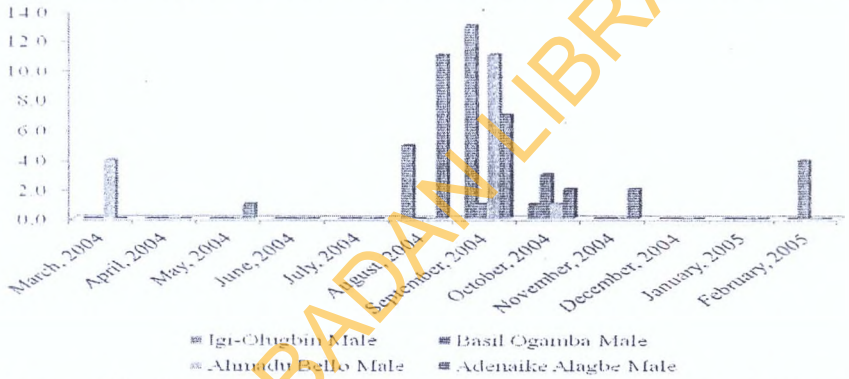

Fig. 1: Prevalence of *Camallanus cotti* in *Poecilia reticulata* male obtained from four selected Streets of Lagos State.

Plate 1. Lateral view of an adult *Camallanus cotti* obtained from *P. reticulata* with (a) buccal capsule; (b) oesophageal junction and (c) position of genital pore (Mag. x 40).

The highest *C. cotti* prevalence of 15.0% in *P. reticulata* females was observed in Igi-Olugbin and Adenaike Alagbe Streets in September, 2004 while the lowest prevalence of 1.0% was observed in *P. reticulata* female obtained from

Basil Ogamba Street in the same month (Fig. 2). In both *P. reticulata* male and female obtained from the four selected Streets, the height of *C. cotti* prevalence towards the end of rain season in August and September, 2004 becomes evident from both Fig. 1 and Fig. 2. The highest prevalence of 15.0% in this study is far less than the 71.0% prevalence of *C. cotti* obtained from *P. reticulata* by Kim et al. (2002) in Korean and Indonesian farms.

CONCLUSION

P. reticulata obtained from the wastewater drains of the four selected Streets of Lagos State qualify for further exploitation in the export because their *C. cotti* prevalence is low compared to those in exiting international sources.

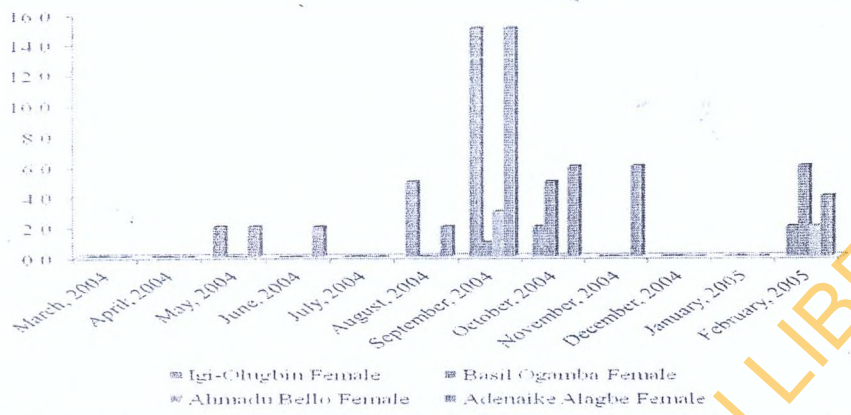

Fig. 2: Prevalence of *Camallanus cotti* in *Poecilia reticulata* female obtained from four selected Streets of Lagos State.

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