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Salinity variations and distribution of Copepoda:Crustacea in the Lagos harbour system

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ABSTRACT: The copepoda (crustacea) of Lagos harbour system was studied from October 2002 to September 2003. Eighteen copepod species were identified, three of which are being recorded in Nigeria for the first time. Thesze are: *Temora, Corycaeus* and *macrostella* species. The copepods comprise of three assemblages, namely: the brackish/marine assemblage, the brackish assemblage and the brackish/freshwater assemblage. Salinity values varied from 33.40% at Lagos harbour to 0.40% at Badagry.

Key words: Salinity variations, Copepoda species, Lagos water bodies.

Introduction

Studies on the copepoda (crustacean) and plankton sampling attract some interests worldwide because the copepods are one of the permanent zooplankton in the water bodies. Kiefer (1933) studied some free-living copepods from French speaking West African rivers and contributed to their taxonomy, Lindberg (1950) described a new copepod species collected from South-West Nigeria by Dr. S.D. Onabamiro, as *Thermocyclops onabamiroi*. In 1952, Onabamiro described four new copepod species which he collected from various inland rivers and water-bodies from Western Nigeria. Green (1962) identified nine copepod species from plankton samples he collected from the Sokoto river, Robinson and Robinson (1977) identified eight copepod species while studying the seasonal distribution of zooplankton in Lake Chad. Egborge (1981) reported the presence of six copepod species from the Asejire – Lake. Oronsaye and Okaka (2000) reported the occurrence of nine copepod species while studying the seasonal distribution of some Cyclops (crustacean) in a coastal river from south western Nigeria. Mollman and Koster (2002) studied the population dynamic of calanoid copepods in the central Baltic sea. Karanovic (2004) described two new copepod species from plankton samples in Australia.

A search on the internet showed that no work has been published on the salinity variation and the distribution of the copepoda in Lagos harbour system. This paper therefore intends to provide such an information, which would be very important for ecological and pollution based research.

Materials and Methods

Study Area:

The Lagos harbour system found within Latitude 6°25'N and Longitude 3°25'E is located at the South western coastline of Nigeria. Seven stations were chosen for monthly sampling from October 2002 to September 2003, namely: Lagos harbour (1); Tin can Island (2); FESTAC creek (3); Ibese (4); Agaja (5); Epe (6); Badagry (7); (Fig. 1). The vegetation along the water zone is mainly mangrove, reducing gradually to tall grasses towards Benin Republic.

Procedure

Zooplankton samples were collected by towing two plankton nets of 55µm and 100µm mesh sizes at 5 knots per minute for 5 minutes behind an engine boat. The samples were preserved in 4% buffered formalin. Salinity was measured in the field with an oceanographic salinity and temperature measuring bridge type MSC, while Silver nitrate method was used in the laboratory. Identification of the copepod species was made using the works and keys of the following authors: Kiefer (1933); Onabamiro (1952); Wells (1970); Robinson and Robinson (1977); jeje and Fernando (1986); Karanovic et al (2001).

Results

Salinity Variations

The result of the salinity variations at the station is shown on Table 1. This was also plotted into bar-charts to give a more comparative picture of the variations which is shown in Figure 2.

Occurrence and Distribution of the Copepod Species

Analysis of the plankton samples showed the occurrence and distribution of the following copepod species (see Table 2).

The Table shows the distribution of the copepod species at the stations. Stations 1, 2 and 3 are Lagos harbour, The can Island and FESTAC creek respectively which are the marine/brackish water environments. Stations 4 and 5 are Ibese and Agaja respectively which are brackish environments. Stations 6 and 7 are Epe and Badagry which are brackish/freshwater environments. Some of the copepod species were found to be highly abundant at the high salinity stations, others showed high abundance at the low salinity stations, while the rest were prevalent at the brackish water stations. Thus the distribution of the copepod species with the salinity variations at the stations.

Discussion

The occurrence of some of these copepod species have previously been reported from Nigeria water bodies, Onabamiro (1952) described *Halicyclops korodiensis* from water bodies in Ikorodu, near Lagos. Green (1962) reported the occurrence of *Microcyclops varicans* in the Sokoto river. Jeje and Fernando (1986) reported the occurrence of *Thermocyclops crassus* and *Thermodiaptomus yabensis* while analyzing zooplankton samples they got from various Nigerian water bodies during which they produced a practical guide to the identification of Nigerian zooplankton. Oronsaye and Egborge (1996) recorded the presence of *Nannopus palustris* and *Diarthrodes cf major* from the Warri River. But, available records show that *Temora, Corycaeus* and *Macrosetella* species have not been reported from Nigeria, thus this is their first record from Nigeria.

With regards to salinity variations and distribution, three different assemblages were found, namely: the brackish/marine assemblage, the brackish assemblage and the brackish/freshwater assemblage. The species that make up the brackish/marine assemblage were found in Lagos harbour, Tin can Island and FESTAC creek, and they are: *Centropages typicus, Coryaeus* and *Oncaea* species.

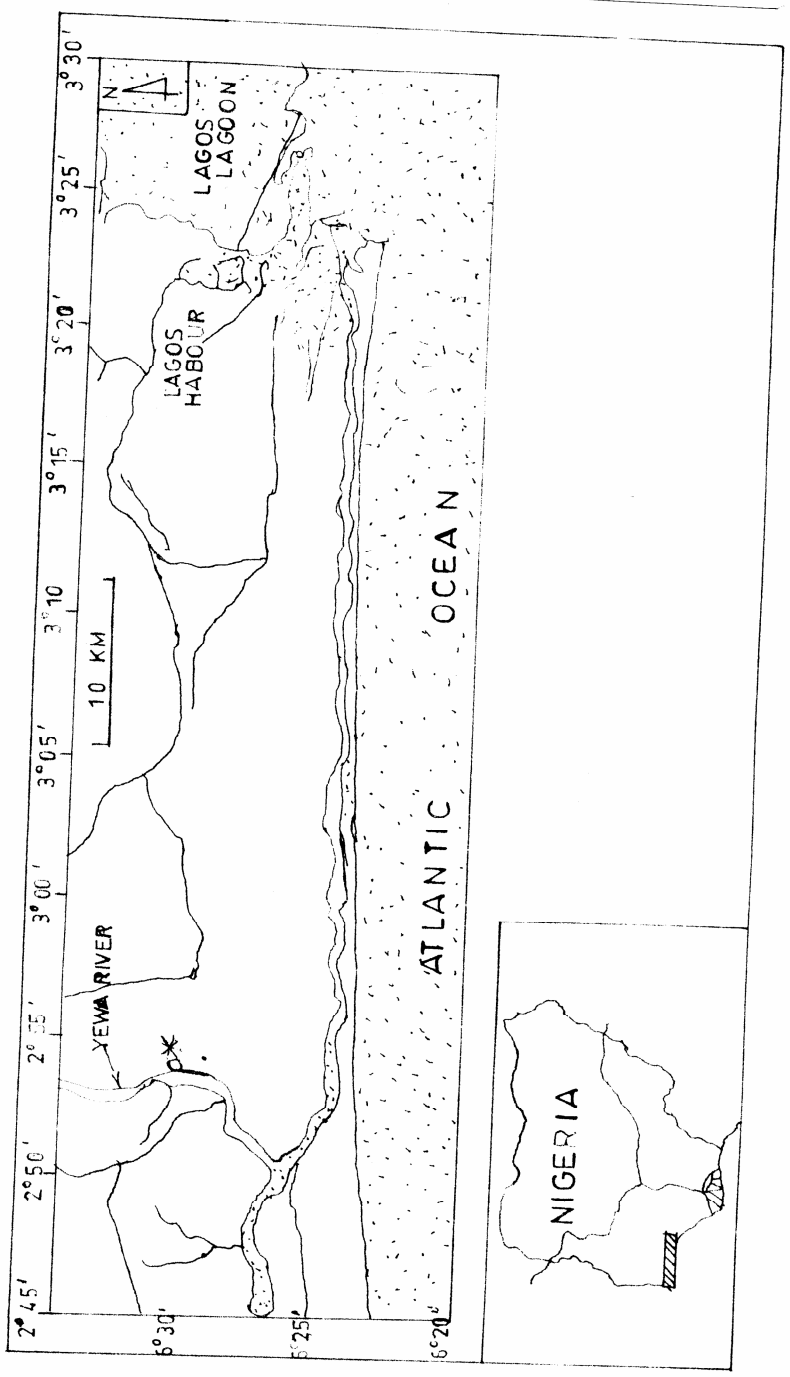

Fig. 1: Map of Lagos harbour system showing the locations of sampling stations.

Table 1

SALINITY VALUES AT THE STATIONS IN ‰

S/N.	Stations	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUGUST	SEPT.
1	Lagos Harbour	15.2	18.4	18.6	29.2	30.15	32.5	30.2	33.4	29.25	20.3	19.5	16.2
2	Tin can Island	14.3	16.2	17.5	23.3	28.2	30.2	28.5	31.1	28.6	19.2	17.4	15.3
3	Festac Creek	12.2	13.6	14.3	19.6	24.2	25.8	23.6	26.4	22.8	18.6	16.6	14.8
4	Ibese	3.4	4.8	6.7	12.2	18.4	19.5	20.6	21.5	18.6	10.2	7.3	5.25
5	Agaja	2.1	2.8	3.2	6.8	13.2	15.6	14.7	16.2	13.8	9.5	6.6	3.8
6	Epe	0.8	1.2	1.8	2.5	8.6	14.5	8.2	10.2	7.3	5.2	2.4	1.3
7	Badagry	0.4	0.5	0.62	0.7	1.82	2.5	3.8	5.6	4.2	2.1	1.2	0.6

TABLE 2: DISTRIBUTION OF COPEPOD SPECIES AT THE SAMPLING STATIONS

N/S	COPEPOD SPECIES	STATION 1	STATION 2	STATION 3	STATION 4	STATION 5	STATION 6	STATION 7
1	*Centropages Typicus*	+++	++	+				
2	*Corycaeus sp*	+++	++	+	-	-	-	-
3	*Oncaea sp*	+++	++	+	-	-	-	-
4	*Acartia tonsa*	+	+	+	+++	++	-	-
5	*Temora longiconis*	+	+	+	+++	++	-	-
6	*Rhinocalanus cornutus*	+	+	+	+++	++	-	-
7	*Oithona nana*	+	+	+	+++	++	-	-
8	*Macrosetella gracilis*	+	+	+	+++	++	-	-
9	*Diarthrodes cf. major*	+	+	+	+++	++	-	-
10	*Miracia efferata*	+	+	+	+++	++	-	-
11	*Euterpina acurtifroms*	+	+	+	+++	++	-	-
12	*Nannopus palustris*	+	+	+	+++	++	-	-
13	*Halicyclops korodiensis*	-	-	-	-	+	+++	++
14	*Thermocyclops crassus*	-	-	-	-	+	++	+++
15	*Altheyella africana*	-	-	-	-	+	++	+++
16	*Microcyclops varicans*	-	-	-	-	+	++	+++
17	*Thermodiaptomus yabensis*	-	-	-	-	+	++	+++
18	*Macrocyclops distinctus*	-	-	-	-	+	++	+++

KEY:

- = NIL

\+ = Present

++ = Very abundant

+++ = Highly abundant

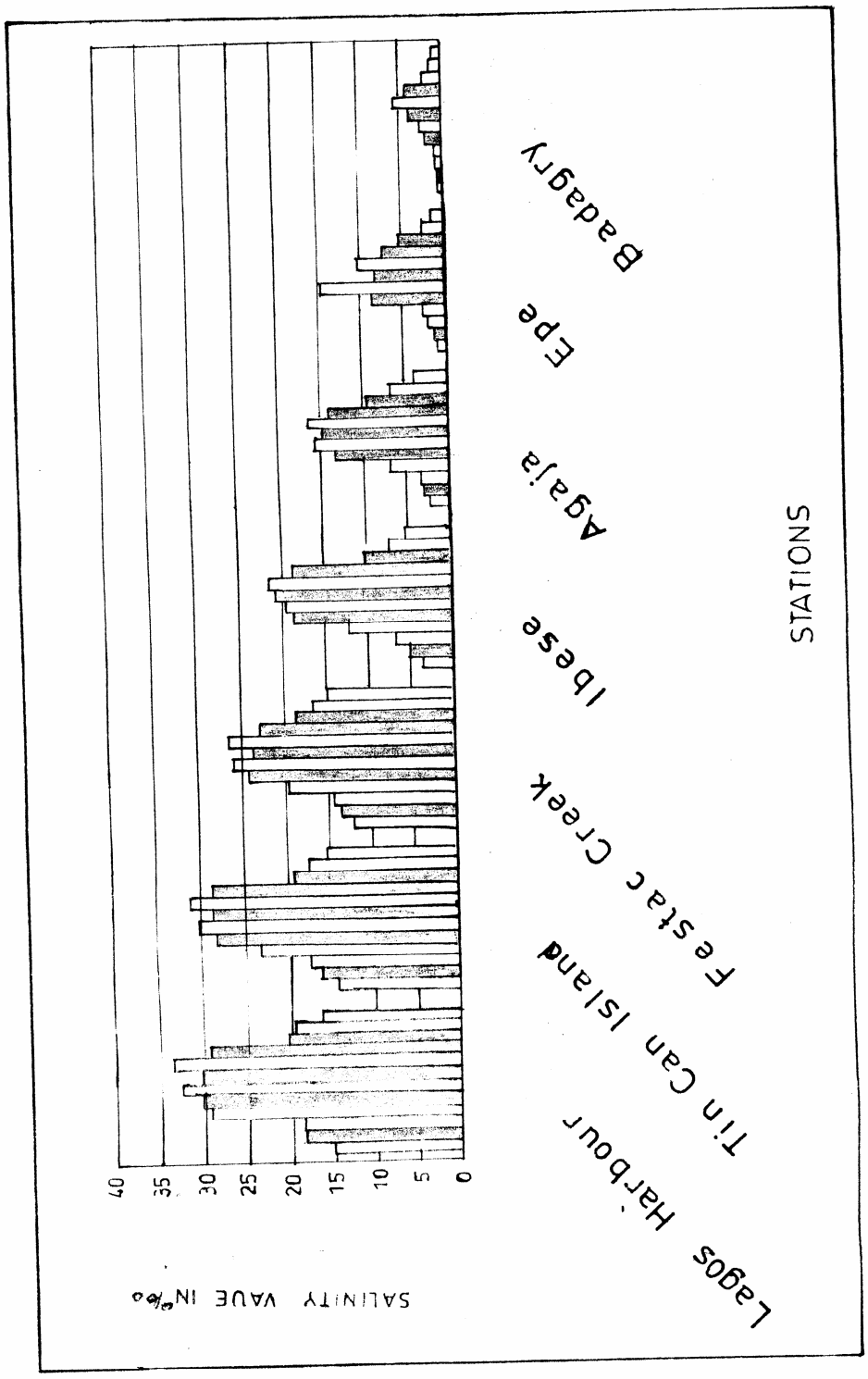

Fig. 2 SALINITY VARIATIONS OF THE STATIONS OF STUDY IN LAGOS HARBOUR SYSTEM

The brackish water assemblage comprised of *Acartia tonsa, Temora longiconis, Rhinocalanus cornutus, Oithona nana, Macrosetella gracilis, Diarthrodes cf major, Miracia efferata, Euterpina acutifrons* and *Nannopus palustris* which were found in Lagos harbours, Tin can Island, FESTAC creek, and Agaja when salinity range was 16-26%. The brackish/freshwater assemblage were confined to Agaja, Epe and Badagry which include: *Halicyclops korodiensis, Thermocyclops crassus, Attheyella Africana, Microcyclops varicans, Macrocyclops distinctus, Thermodiaptomus yabensis.*

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