

AFS 2005036/6402

## Seasonality in some tropical harpacticoid copepods (Crustacea) from West African coastal river

C.G. Oronsaye

Department of Zoology, Faculty of Science, University of Benin, Benin City, Nigeria

(Received November 25, 2005).

**ABSTRACT:** Studies on the occurrence and seasonality of some harpacticoid copepods (crustacean) from a West African coastal river were carried out. An all year round sampling was made to cover the twelve months of the year, using plankton nets of 55µm and 100µm mesh sizes. Three species of harpacticoid copepods were identified, namely: *Nannopus palustris*, *Diarthrodes cf major* and *Bryocampus minutes*. While *Nannopus palustris* showed peaks in the dry season months of January and February, *Diarthrodes cf major* and *Bryocampus minutes* showed peaks in the rainy season months of July and August. Thus these crustaceans exhibit seasonality due to dry and rainy season months in the tropical coastal waterbody. The seasonal abundance of these zooplankton is very important to the pelagic clupeids such as the “bonga” fish, *Ethmalosa fimbriata* and *Sardinella* species which feed largely on them.

Key Words:

### Introduction

Studies on copepods (crustacean) is a subject of continuous research because they constitute a good percentage of the permanent zooplankton population. Kiefer (1933) studies some free-living copepods (crustacean) from French – speaking West African rivers, and contributed to their taxonomy. Lindberg (1950) reported the occurrence of some copped species from the inland rivers in Ivory Coast. Plesa (1961) described some new copepods from the interstitial fauna which he collected from the beaches of Ghana. Green (1962) reported the occurrence of seven copepod species while investigating the planktonic crustacean of Sokoto River in Nigeria. Dussart and Grass (1966) sampled the planktonic crustacean of Lake Chad and made contributions towards the taxonomy of some copepod species. Van de Velde (1978) studied the taxonomy of some crustacean from the valley of river Senegal. Dumont *et al* (1981) collected the crustacean zooplankton of Mali, studied their faunal composition and community structure. Oronsaye (1997) studied the salinity and distribution of cyclopoids (crustacean: copepoda) in the Warri River. Karanovic and Pesce (2002) collected copepods from ground water of Western Australia and described a new species from the collection. Mollmann and Koster (2002) studied the calanoid copepods with regards to their predation by clupeid fish in the Baltic sea. Mollmann *et al* (2003) again studied the marine copepod, *Pseudocalanus elongates* in connection to climate variability and fisheries in the Central Baltic sea.

Reports on the seasonality of these crustaceans in the tropical West Africa coastal river is lacking. This paper therefore, intends to contribute to the knowledge on the seasonality of some harpacticoid copepods in a tropical coastal river.

## **Materials and Methods**

### *Study Area*

The West African coastal river studied is the Warri River. It is found within Latitude 5°30'N and Longitude 60°0'E (Fig. 1). It takes its source at Utagba-Uno which is hinterland. The coastal portion studied starts from Otokutu, and ends at Forcados town which covers a distance of 77km. Eight sampling stations were chosen for monthly sampling from July 1998 to July 1999, namely: Otokutu (I), Udu-bridge (II), Aladja (III), Warri (IV), Ejere (V), Bennet Island (VI), Buoy 4 (VII) and Forcados Town (VIII). Rainy season months in the area lasts for 7-8 months (i.e. April to November) while dry season lasts for 4-5 months (i.e. December to March).

### *Procedure*

The harpacticous copepods were collected by towing two plankton nets of 55µm and 100µm mesh sizes at 5knots for 5 minutes behind an engine boat. They were sorted out from the zooplankton collect and preserved in 4% buffered formalin. This method has also been used by Green (1962) and Egborge (1974). Identification was made using keys and works of Kiefer (1933), Lang (1965), Dussart and Grass (1966), Wells (1970), Van de velde (1978) and Karanovic and Pesce (2002).

## **Results**

Three species of harpacticoids were identified, namely: *Nannopus palustris* (Brady, 1880), *Diarthrodes cf major* (Thompson, 1882) and *Bryocamptus minutes* (Claus, 1862). Their occurrence and distribution with regards to the dry and rainy seasons of the year is shown in Figure 2. The eight sampling stations are plotted against the months of the year, while the bars indicate the occurrence of the harpacticoid species in their relative percentages.

The result as seen in Figure 2 shows the effect of seasonality on the occurrence and distribution of the three harpacticoid species studied. *Nannopus palustris* was found to occur at Aladja, Warri, Ejere, Bennet Island, Buoy 4 and Forcados town, showing peaks in the dry season months of January and February. *Diarthrodes cf major* also occurred in the same sampling stations (i.e. Aladja to Forcados town), but it showed higher peaks in rainy season months of July and August. *Bryocamptus minutes* occurred at Otokutu, Udu-bridge, Aladja and Warri, also showing higher peaks in the rainy season months of July and August.

## **Discussion**

In the tropics, temperature is fairly uniform in the waterbodies all the year round, thus seasonality in waterbodies is found to be caused by dry and rainy periods of the year. For instance, Green (1962) made an all year round study of river Sokoto, Nigeria and reported on the seasonal variation of the zooplankton, especially the crustacean. Imevbore (1967) collected samples although the dry and rainy seasons of the year from the Eleiyele reservoir in Ibadan, Nigeria. He provided a checklist of the planktonic organisms including the crustacean and contributed to the knowledge on the hydrology. Robinson and Robinson (1977) studied the Northern basin of Lake Chad (West Africa), and contributed to the information on the seasonal distribution of the zooplankton. Egborge (1974) investigated the planktonic organisms of river Oshun in Nigeria and made contributions towards the seasonal variation and distribution of the zooplankton. In their several studies of seasonal variation of zooplankton and crustacean organisms in

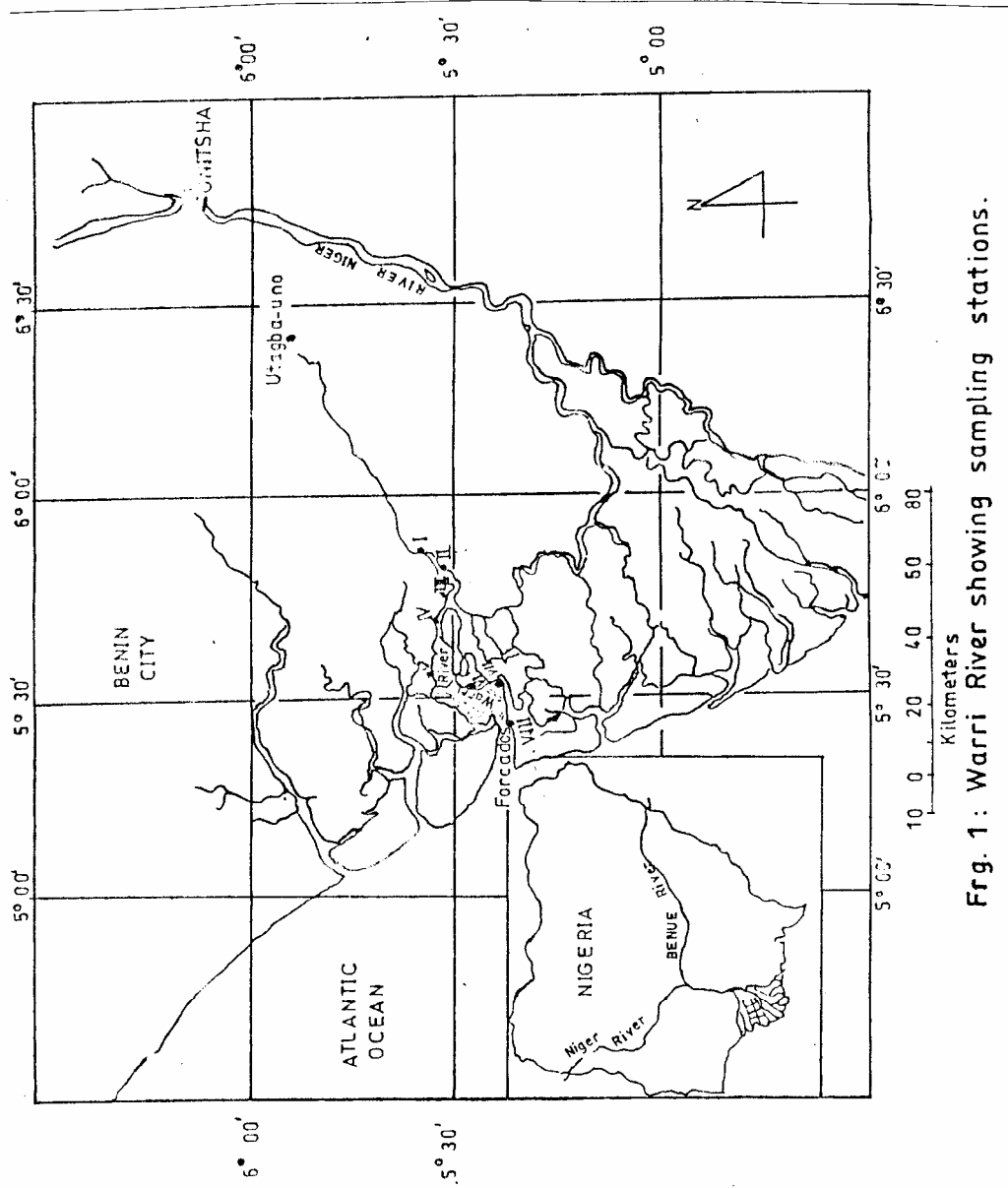


Fig. 1: Warri River showing sampling stations.

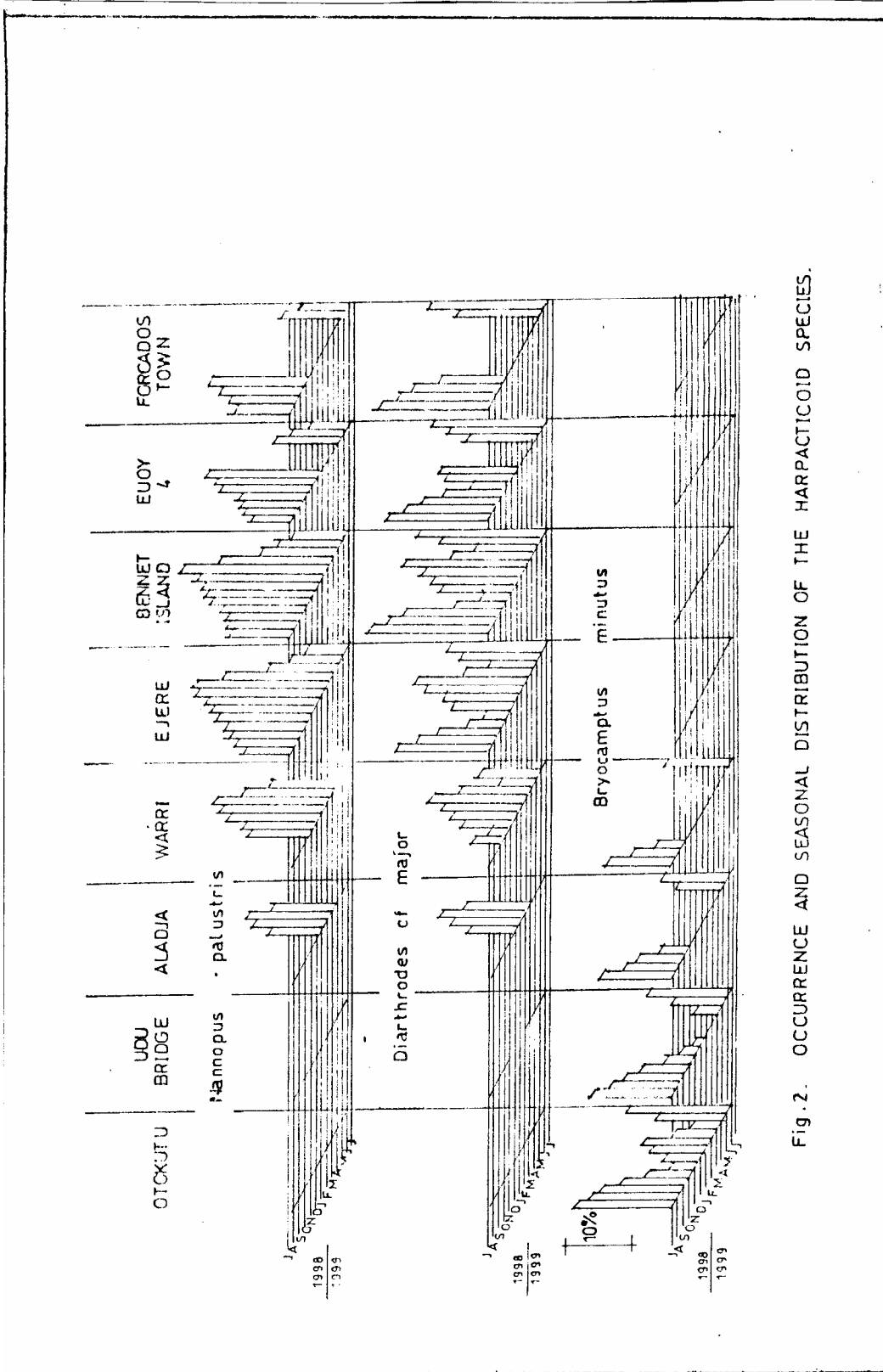


Fig. 2. OCCURRENCE AND SEASONAL DISTRIBUTION OF THE HARPACTICOID SPECIES.

Nigeria and other West African waterbodies, they reported trends of seasonality due to dry and rainy periods of the year. Therefore, the seasonality in occurrence of the three harpacticoid species which is due to the dry and rainy periods of the year is in agreement with the works of the several authors cited above. By this study, the tropical coastal waterbody is as well seen to exhibit seasonality due to dry and rainy periods of the year. The seasonal abundance of these zooplankton is important to some clupeids such as the “bonga” fish, *Ethmalosa fimbriata* and *Sardinella* species which feed largely on them.

ACKNOWLEDGEMENT: I can never forget Late Professor A.B.M. Egborge of the Zoology Department, University of Benin, who suggested and supervised this research work.

## References

- Dumont, H.J.; I Pensaert,; I Van de Velde (1981). The crustacean zooplankton of Mali (West Africa). Faunal Composition, community structure and biogeography, with a note on the water chemistry of the lakes of the internal Delta of the River Niger. *Hydrobiologia*; 80: 161-187.
- Dussart, B. and R. Grass (1966). Faune Planctonique due lac Tchad, I. Crustaces, Copepodes. *Cah. Orstom. Ser. Oceanogr.* 4: 78-91.
- Egborge, A.B.M. (1974). Plankton of River Oshun, Nigeria. The seasonal variation and distribution of zooplankton. *Jof West Afr. Sci. Ass.* 19: 39-53.
- Green, J. (1962). Zooplankton of the River Sokoto, the crustacean. *Proc. Zool. Soc., London*, 138: 415-453.
- Imevbore, A.M.A. (1967). Hydrology and plankton of Eleiyele Reservoir, Ibadan, Nigeria. *Hydrobiologia* 30: 154-176.
- Karanovic, T. and G.I. Pesce (2002). Copepods from ground waters of Western Australia, vii. Nitokro Humphrey sp. Nov., (crustacean: Copepoda: Harpacticoida). *Hydrobiologia*, 470: 5-12.
- Kiefer, F. (1933). Freilebende Binnegewasser Copepoden Diaptomiden and Cyclopiden Franzosiseh West Africa. *Arch. Hydrobiol.* 26: 121-142.
- Lang, K. (1965). Copepods, Harpacticoida from the Califonian Pacific Coast. *Kungl. Sevensk. Vetensk. Kad. Handl.*, 10: 2-12.
- Lindberg, K. (1950). Cyclopiodes (Crustacea:Copepoda) de la Nigeria (Afrique occidental). *Bulletin of Society of Zoology, France*; 75: 145-148.
- Mollmann, C. and F.W. Koster (2002). Population dynamic of calanoid copepods and the implications of their predation by clupeid fish in the central Baltic sea; *J. Plankt. Res.* 24: 959-977.
- Mollmann, C; G. Korninovs; M. fetter; F.W. Koster and H.H. Hinrichsen (2003). The marine copepod. *Pseudocalanus elongatus* as a mediator between climate variability and fisheries in the central Baltic sea. *Fish Oceanogr.* 12: 360-368.
- Oronsaye, C.C. (1997). Salinity and distribution of cyclopoids (crustacean:copepoda) in a tropical coastal river. *Tropical Ecology*, 38(1): 121-123.
- Plesa, C. (1961). New Cyclopiodes (crustacean:copepoda) of the interstitial fauna from the Beaches of Ghana. *Journal of West Sci. Ass.*; 7: 1-13.
- Robinson, A.H. and P.K. Robinson (1977). Seasonal distribution of zooplankton in the Northern Basin of Lake Chad. *Journal Zoology, London*, 163: 25-61.
- Van de Velde (1978). Cladoceera and copepods from the valley of the river Senegal. *Biol. Jearb* 46: 192-201.
- Wells, J.B.J. (1970). Keys to aid in the identification of Marine harpacticoid copepods; University of Aberdeen Press, U.K., 215pp.