

NOTES

SOME OBSERVATIONS ON *LUCIFER FAXONI* BORRADAILE (CRUSTACEA: DECAPODA: SERGESTIDAE) COLLECTED FROM A TIDAL ESTUARY

ABSTRACT

A study of *Lucifer faxoni* conducted within the estuary of Potengi, Natal, Brazil, utilizing the pier of "Base Naval" showed that these planktonic organisms were present in the zooplankton samples throughout the day, though they were more abundant towards the evening when they enter the estuary with the in-coming tide. All size groups were represented in the sample but a great majority of specimens were in the size (length of "neck") range of 0.81 mm to 1.10 mm (male and female).

THE SERGESTID shrimps of the genus *Lucifer* Thompson are represented in the Atlantic Ocean by two species, *L. faxoni* Borradaile and *L. typus* H. Milne Edwards. These two species, though have the same range of distribution, the former from 43°N to 23°S and the latter from 42°N to 40°S (Holthuis, 1959), their pattern of distribution is distinct. *L. faxoni* is considered a neritic species — collected even in the estuaries, whereas *L. typus* is recognised as an oceanic species (Bowmann and McCain, 1967).

Though a great deal of information is available on the species of *Lucifer* from the studies carried out in the North Atlantic (Williams, 1965 and 1969; Woodmansee, 1958 and 1966; Bowmann and McCain, 1967; Harper, Jr. 1968), the study on the biology of *L. faxoni* by Lópes (1966) from the region of Cananea, São Paulo, Brazil is the only detailed account available from the South Atlantic.

An intensive sampling of zooplankton within the estuary of Potengi, Natal, covering a period of 24 hours provided some interesting information on the population of *L. faxoni*.

The authors are grateful to CNPq (National Council for the Development of Science and

Technology, Brazil) for the support received in the form of fellowships. We also would like to record our thanks to the authorities of the "Base Naval" in Natal for permission to utilize the pier for our sampling.

MATERIAL AND METHODS

The data presented here were obtained from a fixed station (pier of "Base Naval") within the estuary of Potengi, Natal (Fig. 1).

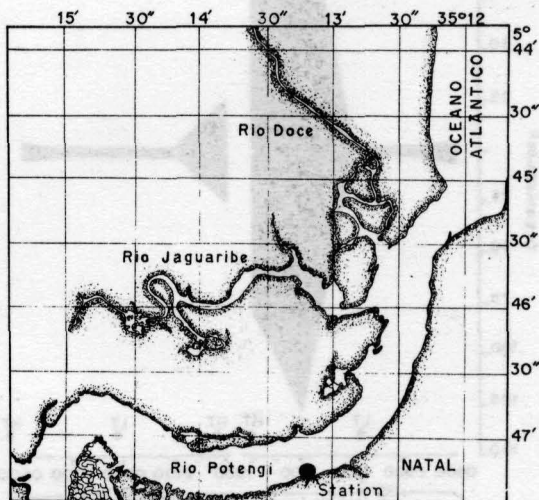


FIG. 1. Map of the estuary of Potengi, Natal, Brazil showing the sampling station.

TABLE 1. *Physico-Chemical Parameters*

DATE	TIME	PHYSICO-CHEMICAL PARAMETERS							
		TEMPERATURE		PH		SALINITY		OXYGEN	
		S	F	S	F	S	F	S	F
08/11/95	06.00	27.0	27.0	8.09	8.27	34.0	38.16	8.4	8.2
08/11/95	09.00	28.0	28.0	8.00	7.83	40.9	33.27	9.0	8.4
08/11/95	12.00	28.5	28.0	7.84	7.93	35.6	38.45	9.6	10.2
08/11/95	15.00	21.0	27.0	8.12	8.15	31.3	40.1	7.6	9.4
08/11/95	18.00	27.5	27.0	8.23	8.18	39.5	38.1	6.4	7.8
09/11/95	18.00	27.0	27.5	8.10	7.74	36.25	38.0	7.2	11.1
09/11/95	21.00	28.0	27.5	7.72	8.06	35.3	38.0	6.2	7.8
09/11/95	00.00	27.0	27.0	7.75	7.65	34.4	41.6	6.4	6.2
10/11/95	03.00	28.0	27.0	7.00	7.89	38.0	38.9	8.4	8.1
10/11/95	06.00	28.0	28.0	7.97	8.06	38.0	38.9	9.0	8.6

S = Surface,
F = Bottom

Temperature -°C
Salinity -P.P.M.
Oxygen - (ml/L)

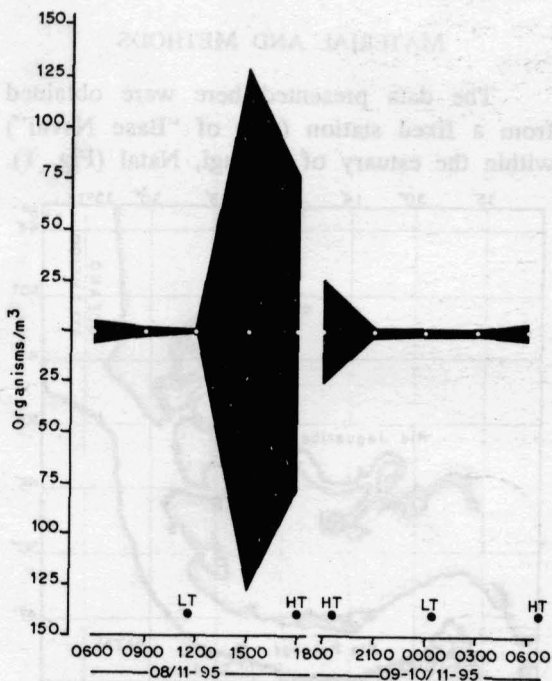


FIG. 2. Diurnal variations in the abundance of *Lucifer faxoni*. LT = low tide and HT = high tide.

Samples were obtained at three hours interval beginning from November 8, at 06:00 hrs. and ending at 06:00 hrs. on November 10, with a twenty four hour break between 18:00 hrs. on November 8 and 18:00 hrs. on November 9, 1995.

Water samples were collected from surface and bottom with a Van Dorn sampling bottle at each sampling to determine the physico-chemical parameters. Zooplankton samples were obtained with a 48 cm diameter net (125 μ m mesh size) by vertical hauls from close to the bottom to the surface. A total of three samples were collected at each sampling hour to obtain a more representative data on zooplankton population.

Specimens of *Lucifer* were separated, sexed, counted and measured individually. "Neck" (distance between orbit and anterior border of buccal cavity) length has been used in this study to present the size composition of the population of *L. faxoni*.

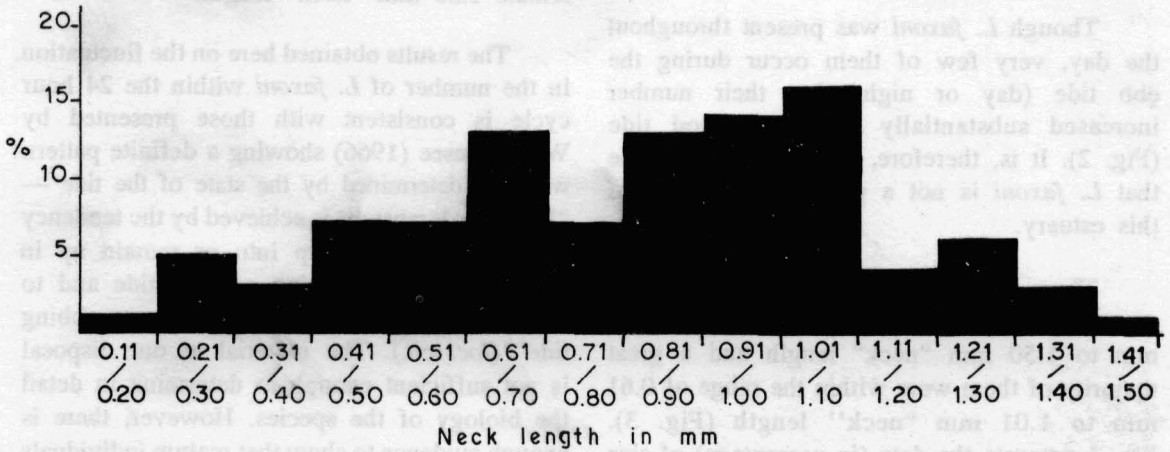


FIG. 3. Size frequency composition in percentage of the population of *L. faxoni* in the sample

RESULTS

Physico-chemical parameters (Table 1)

No discernible daily variation in temperature was observed, at surface or bottom; fluctuation of 1.0°C between day and night and between surface and bottom was recorded. Fluctuation in pH value during the day and night was even less significant. The parameter which presented large fluctuation during the day was salinity, normally having higher values at the bottom, with the exception at 09:00 hrs. and 18:00 hrs. when surface value was higher. Salinity values of over 40 ppm. were also observed during the sampling. Dissolved oxygen value did not show any large variation during the day, though higher values occurred during the day (Table 1).

Zooplankton

Diurnal variation in the abundance of zooplankton confirms the normally expected pattern, with higher number collected during the night with a peak value of 4283/m³ at 21:00 hrs (Sankarankutty and Medeiros, 1988). As has been shown in the previous studies

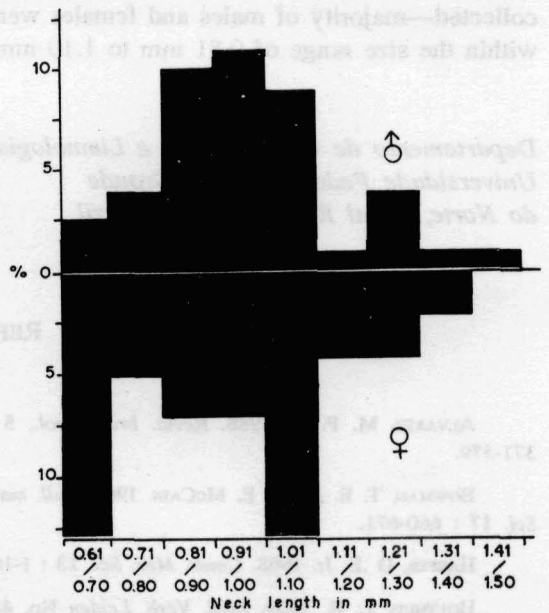


FIG. 4. Size frequency composition (in percentage) of males and females in the samples.

(Nair and Sankarankutty, 1988; Sankarankutty, 1991; Sankarankutty and Medeiros, 1988; Sankarankutty *et al.*, 1995 and 1997), Copepoda, nauplii of Cirripedia, Appendicularia, larvae of Brachyura and Chaetognatha were always well represented in the plankton.

Lucifer faxoni (Figs. 2-4)

Though *L. faxoni* was present throughout the day, very few of them occur during the ebb tide (day or night) but their number increased substantially with the flood tide (Fig. 2). It is, therefore, reasonable to assume that *L. faxoni* is not a permanent resident of this estuary.

The population of *L. faxoni* was represented by a wide size range from 0.11 mm to 1.50 mm "neck" length and a great majority of them were within the range of 0.61 mm to 1.01 mm "neck" length (Fig. 3). Fig. 4 presents the data (in percentage) of size range of male and female populations collected—majority of males and females were within the size range of 0.81 mm to 1.10 mm;

largest male measured 1.50 mm and the largest female 1.55 mm "neck" length.

The results obtained here on the fluctuation in the number of *L. faxoni* within the 24 hour cycle is consistent with those presented by Woodmansee (1966) showing a definite pattern which is determined by the state of the tide — "Landward transport is achieved by the tendency of *Lucifer* to swim up into or remain up in the water column during a flood tide and to drop out of the water column during an ebbing tide" (*loc. cit.*). The material at our disposal is not sufficient enough to determine in detail the biology of the species. However, there is enough evidence to show that mature individuals were well represented in the samples together with smaller and immature individuals in smaller proportion.

Departamento de Oceanografia e Limnologia,
Universidade Federal do Rio Grande
do Norte, Natal RN-59014-100, Brazil

C. SANKARANKUTTY
F.E.N.V. BARCA

REFERENCES

- ALVAREZ, M. P. U. 1988. *Revta. bras. Zool.*, **5** : 371-379.
- BOWMAN, T. E. AND J. E. McCAIN. 1967. *Bull. mar. Sci.* **17** : 660-671.
- HARPER, D. E. Jr. 1968. *Contr. Mar. Sci.* **13** : 1-16.
- HOLTHUIS, L. B. 1959. *Zool. Verh, Leiden* No. **44**: 296 pp..
- LOPES, M. T. 1966. *Biol. Inst. Oceanogr. Univ. São Paulo* **15** : 47-54.
- NAIR, V. R. AND C. SANKARANKUTTY. 1988. *Atlântica, Rio Grande* **10** : 5-20.
- OMORI, M. 1977. *Proc. Warm Water Zoopl. Spl. Pub. UNESCO/NIO*, **10**: 1-12.
- SANKARANKUTTY, C. 1991. *Bol. Dep. Ocean. Limnol, Natal*, **8** : 125-144.
- _____, J. E. LINS OLIVEIRA, K.M.F CUNHA, A.C.C. SILVA AND E.V.G BARCA. 1995. *Revta bras. Zool.* **12** : 273-301.
- _____, AND G. F. MEDEIROS 1988. *Indian Ocean. Biology of Benthic Marine Organisms. Techniques and method as applied to the Indian Ocean. Oxford & IBH Publishing Co., New Delhi*: pp. 331-341.
- WILLIAMS, A. B. 1965. *Fish. Bull.*, **65** : 1-298.
- _____, 1969. *Chesapeake Sci.*, **10** : 36-47.
- WOODMANSEE, R. A. 1958. *Ecology* **39** : 247-262.
- _____, 1966. *Ibid.*, **47** : 847-850.