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Environmental Science

MONITORING OF THE FAUNISTIC COMPONENTS OF THE WATER COLLECTION SYSTEM OF A THERMELECTRIC PLANT IN NORTHEAST OF BRAZIL

Larissa Felix de LUCENA	Graduated in Biological Sciences from the University of Pernambuco. Av. Agamenon Magalhães, S/N - Santo Amaro, Recife, Pernambuco, Brasil. ZIP: 50100-010
Múcio Luiz Banja FERNANDES*	Professor of the Master's Program in Education at the University of Pernambuco. Rua Amaro Maltez, 201. Centro, Nazaré da Mata, Pernambuco, Brazil. ZIP 55.800-000. *Corresponding Author
Renata Laranjeiras GOUVEIA	PhD student in the PRODEMA Development and Environment Program at the Federal University of Pernambuco. Av. Prof. Moraes Rego, 1235 - Cidade Universitária, Recife, Pernambuco. ZIP: 50670-901
Midiã da Silva RODRIGUES	PhD student at the Graduate Program in Tropical Animal Science (PGCAT) at the Federal Rural University of Pernambuco. Rua Dom Manuel de Medeiros, s/n, Dois Irmãos, Recife, Pernambuco, Brasil. ZIP: 52171-900
Andrea Karla Pereira da SILVA	Professor of the Master's Program in Management of Sustainable Local Development of the University of Pernambuco. Av. Sport Club do Recife, 252 - Madalena – Recife, Pernambuco, Brazil. ZIP. 50750-500.

ABSTRACT Environmental monitoring is an important management tool used by enterprises that seek to comply with current environmental standards. This paper deals with the case of the Thermoelectric Power Plant of Pernambuco, and studies the biological components retained in the rotating screens to monitor the biota conditions in its area of influence. The material is collected at the Plant and taken to the laboratory where it is screened and its wet and dry weights are obtained. These data are correlated with the total biomass of the sample and the percentage of each group is found. During 2016, thirteen species were found in the collected material, with varied distribution throughout the months. The percentages found for them were small, with the largest portion corresponding to decomposing organic matter, leaves and mangrove propagules. These results demonstrate the importance of monitoring in the verification and evaluation of possible impacts to the marine biota in the region.

KEYWORDS : Environmental management; Environmental monitoring; Fauna; Thermoelectric.

INTRODUCTION

In the last decades, with the emergence of new concepts such as sustainable development and specific legislation focused on the environment, there has been a greater concern in the business environment with environmental aspects. Within this perspective, environmental management and its instruments have been increasingly used to help enterprises adapt to this new reality (SOUZA, 2002; GOUVEIA, 2011). A tool widely used by companies that seek to meet environmental requirements is environmental monitoring.

Environmental monitoring can be understood as the knowledge and systematic monitoring of the situation of the physical and biotic means of a site. It acts on the assessments of the state of preservation or degree of degradation of a given environment. Provides information for the elaboration of management strategies on ecosystems and recovery plans for degraded areas (GUERESCHI, 2004; MMA, 2009).

According to Bitar and Ortega (1998), this instrument consists basically in the accomplishment of measurements and specific observations, of certain parameters and indicators. They serve to assess whether there are occurrences of environmental impacts in the region, to measure their magnitude and to verify if the measures adopted are or are not effective. When applied in projects that are in operation, it allows evaluating and correcting situations and minimizing future effects (SÁNCHEZ, 1994).

For Guereschi (2004), the use of biota in environmental management programs has been increasingly important in the conservation of ecosystems and environmental quality. Biological monitoring, or biomonitoring, is based on the organisms' responses to the environment in which they are found (CALLISTO; GONÇALVES JR .; MORENO, 2005; BUSS; OLIVEIRA; BAPTISTA, 2008).

Biomonitoring is a tool adopted by the Thermoelectric Plant of Pernambuco (TERMOPE), located in the Suape Port Industrial Complex in the state of Pernambuco (Northeast of Brazil), through the systematic and periodic monitoring of the biological material retained in the rotary screens of the capture pumps of water. The proposal is to evaluate the conditions of the marine biota of the area that is influenced by the plant.

MATERIALS AND METHODS

Study area

The work was carried out at the Thermoelectric Power Plant of Pernambuco (TERMOPE), which is part of the Suape Industrial Port Complex (CIPS). The Complex is located on the southern coast of the state of Pernambuco, about 40 km from the capital Recife (from 08º22'S to 08º25'S and 34º55'W) (Figure 1) and occupies an area of approximately 13,500 ha (SILVA, 2003; TEÓDULO et al. al., 2003).

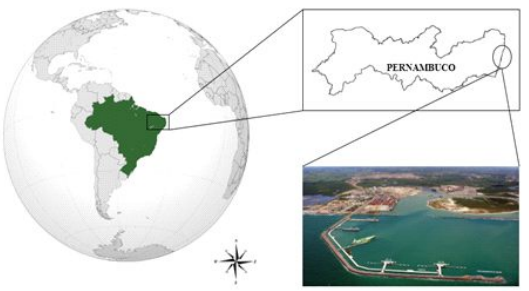

Figure 1. Location of the Suape Industrial Port Complex

The water used in the cooling of the turbines is removed from the sea and during the production process, biological components are brought into the collection system and are retained in the rotary screens of the suction pumps. These components are then stored in a cast metal box, called the disposal box, where they remain until the site is cleaned.

Collection and analysis of samples

The study took place from January to December 2016, with monthly collections. During collection, the samples were manually collected in the disposal box, placed in plastic bags and taken to the Environmental Studies Laboratory (LEA) located at the Advanced Institute of Technology and Innovation (IATI).

In the laboratory, the first step was the manual sorting of the material. After the species were separated and identified, each group was weighed individually on a semi-analytical scale to obtain their moist weight. The samples were then brought to heater at 50 ° C for a period of 24 hours. After this interval, the already dehydrated biological material was weighed again to check its dry weight.

The biomass calculation was made from the correlation of the dry weights with the total biomass found. The total dry weight of the sample corresponded to the total biomass of each month of collection, equivalent to 100%. The values of the dry weight found for each group present in the material were then analyzed to obtain the quantitative percentage of each species in the total biomass.

The results were distributed in the months of 2016. The monthly distribution and frequency of occurrence of the species during the year investigated

RESULTS AND DISCUSSION

During the monitoring period, thirteen species, belonging to five phyla, were found in the organic material retained in the rotating screens. The collected species presented variable occurrences throughout the months (Figure 2), being the *Litopenaeus schmitti* shrimp the most frequent species, being present in ten collections, followed by the cousin *Carijoa riisei*, found in nine samples. In February, no representative was registered because the plant was in maintenance period.

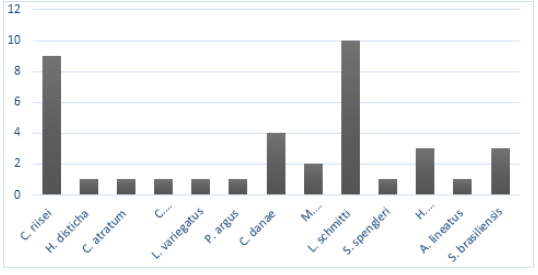

Figure 2. Frequency of faunistic representatives during collection months

The months with the greatest diversity of species were March, May and December, with six species recorded in each. These results for March and May may be related to the high levels of rainfall observed in these periods (Figure 3), since the higher rainfall causes more material to be carried into the plant. The result found for December is justified by the fact that this month corresponds to the reproduction period of many marine species. The species in reproductive activity move more intensely in the water catchment region.

Climatic information recorded for the year 2016 corroborates the hypothesis that some of the representatives found would come from beaches and estuaries located on the southern coast of the state of Pernambuco. The same species are found in other regions of the same coast. All the registered copies have already been cited for the region in the studies of Coelho, (1965); Coelho and Santos (1994); Santos, Pereira and Ivo (2006); Silva et al. (2006) and Barroso (2012) for crustaceans; Calder and Mayal (1998); Neves, Lima and Perez (2007); Lira (2008); Grohmann, Nogueira e Silva (2011) with cnidarian studies. The reef fish were studied by Rocha, Rosa and Rosa (1998); Tischer and Santos (2003); Fernandes et al. (2010); Paiva and Araújo (2010); Pereira, Ferreira and Rezende (2010); Lippi (2013) and Macedo (2014). Echinodermata was studied by Lima and Fernandes (2009). The specimens of the fauna reach the TERMOPE system through the action of ocean currents, influenced by the winds, and the rains.

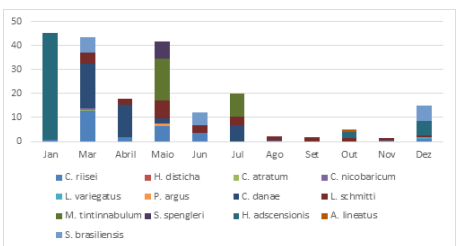

Figure 3. Percentage of each faunistic component in the total biomass of the samples

CONCLUSION

Environmental monitoring is an important environmental management tool, essential for the verification and evaluation of possible impacts to the marine biota in the area that is influenced by the Pernambuco Thermoelectric Power Plant.

In the year of 2016 the presence of thirteen species in the collected material was verified. The months of March, May and December were the ones that presented greater diversity of species.

The collected animals represented small percentages of the total monthly biomasses. There was a predominance of leaves and propagules of mangroves, which are reached and carried to the water suction pumps, as well as organic material in decomposition stage

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