Hydrology and Phytoplankton Community Structure at Itamaracá-Pernambuco (Northeast Brazil)

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ABSTRACT

Quali-quantitative studies and hydrologic parameters were carried out in the profiles 6 (Orange) and 7 (Catuama) during the Victor Hensen cruise, in accordance with the bilateral scientific cooperation agreement Brazil/Germany. Hydrologically a zone of thermic and saline stability characterizes the superficial layer. The nutrient concentrations were generally low on the surface and higher at levels surpassing 100m in depth. 102 taxa were identified including diatoms (49), dinoflagellates (49), bluegreen algae (3), and euglenophyceae (1). The diversity and evenness were high, surpassing the environmental equilibrium. The clustering of samples showed evidence of 2 main groups, one encompassing the stations 32 and 38, characterized predominantly by Oscillatoria erythraeum, and another encompassing the remaining stations, characterized by dinoflagellates and diatoms. The clustering of species involved 4 groups, the biggest being oceanic marine species (49 species) and coastal and eurihaline marine species (31 species). The phytoplankton density varied from 50,000 cell.l^{-1} to 590,000 cell.l^{-1}, characterizing an oligotrophic environment.

Key Words: Hydrology; nutrients; phytoplankton structure.

INTRODUCTION

The mangrove ecosystems are considered important functional components of the tropical coasts, as they constitute a primary source of organic material for the adjacent coastal systems. For this reason they are valued as being among the most productive vegetative communities in the world.

The phytoplankton organisms are composed of unicellular photosynthesizing microscopic algae, found in isolation or in colonies, that flow in the surface of the water. They are considered the most important primary producers of aquatic ecosystems (Boney, 1989). In tropical regions the primary phytoplankton production is low in the stratified oceanic waters and high in the coastal and upwelling waters, the availability of nutrient salts being one of the determinant factors for the development of phytoplankton, even when there is enough light (Gross & Gross, 1996).

Phytoplankton studies of the continental shelf of Pernambuco (Brazil) are limited to the neritic region, at approximately 15 miles from the coast. The first studies merely approached aspects of taxonomic character in phytoplankton, based on samples collected by net (Eskinazi-Leça, 1970, 1990; Eskinazi-Leça & Passavante, 1972; Passavante, 1979; Silva, 1982; Silva-Cunha & Eskinazi-Leça, 1990). Very few studies deal with the quantitative aspects of phytoplankton at the Continental Shelf of Pernambuco. Eskinazi-Leça et al. (1989a,b; 1991; 1993) studied the phytoplankton of the continental shelf of Pernambuco, in profiles in front of Piedade beach, the port of Recife and the island of Itamaracá; Passavante & Feitosa (1989) studied the primary biomass in terms of chlorophyll -a in the profile in front of Piedade beach; Gomes (1989; 1991) studied the composition, density and annual variance of phytoplankton in a profile at the north of the island of Itamaracá

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and Ressurreição (1990) studied the phytoplankton biomass in a profile in front of the port of Recife.

Costa (1991) studied the hydrology and primary biomass of the Northeast region of Brazil, as a complementary study with stations distributed between Recife (PE) and Macau (Rio Grande do Norte), extending from the continental shelf to the oceanic area.

The cruise JOPS II (Joint Oceanographic Projects) was carried out through an agreement of bilateral cooperation in science and technology between Brazil (Ministério das Ciências e Tecnologia) and Germany / Zentrum für Marine Tropenökologie (ZMT).

This expedition was divided in 9 legs and its basic objective was to evaluate the contribution of the mangrove systems to the production and diversity of the coastal waters along the Brazilian continental shelf, between the latitudes of 3º and 9ºS.

The samples of leg 5, were collected in the continental shelf and oceanic waters between the states of Pernambuco and Ceará, along 14 profiles perpendicular to the coast, 50 miles in length and with 69 stations.

This study sought to estimate the degree of fertility of the water, based on the variation and distribution of the nutrient elements dissolved in the environment, and in relation with the structure and levels of production of the phytoplankton community.

MATERIAL AND METHODS

The samples for the analysis of the hydrologic and phytoplanktonic parameters were collected by the Research Vessel Victor Hensen, in 2 profiles perpendicular to the island of Itamaracá during 1 and 2 of March, 1995. These corresponded to profiles 6 (Orange) and 7 (Catuama) between the latitudes 07º49,0'S and 07º41,5'S, and longitudes 34º45,6'W and 33º03,3'W. In each profile 5 stations were demarcated, distanced 10 miles from each other being 2 at the neritic region and 3 at the oceanic one (Figure 1).

For the hydrologic analysis the samples were collected at three depth levels in the stations situated in the continental shelf (surface, intermediate and deep layers) and at 5 depth levels in the oceanic region (0m, 50m, 100m, 150m and 200m). Salinity and the pH were determined through a CTD (conductivity, temperature and depth meter); the dissolved oxygen levels and those of nutrient salts (NO_2, NO_3, PO_4 and SiO_2), were determined through the methods described by Strickland & Parsons (1972) and Grasshoff et al. (1983).

Samples for the qualitative study of phytoplankton were collected by a Baby Bongo net with a mesh opening of 64 µm, being fixed with neutral formol to 4% and analyzed in optic microscopy. The identification of the species was based on the studies of Cupp (1943), Hustedt (1930; 1959; 1961/66), Desikachary (1959), Sournia (1967), Wood (1968), Pesantes (1978), Dodge (1982), Sournia (1986), Balech (1988) and Silva-Cunha & Eskinazi-Leça (1990). The diatom synonyms were based on Moreira Fiho et al. (1994/95).

For the calculation of the specific diversity the index of Shannon (1948) was utilized and in Cluster Analysis, for the samples as well as for the species, the Bray-Curtis similarity index was utilized, using the computer program NTSYS (Numerical Taxonomy and Multivariate Analysis System) of Metagraphics Corporation, California-U.S.A.

For the quantitative study (cellular density), the samples were collected from the surface with Van Dorn bottles, fixed with lugol solution and analyzed in inverted microscopy through the Utermöhl method (Hasle, 1978).

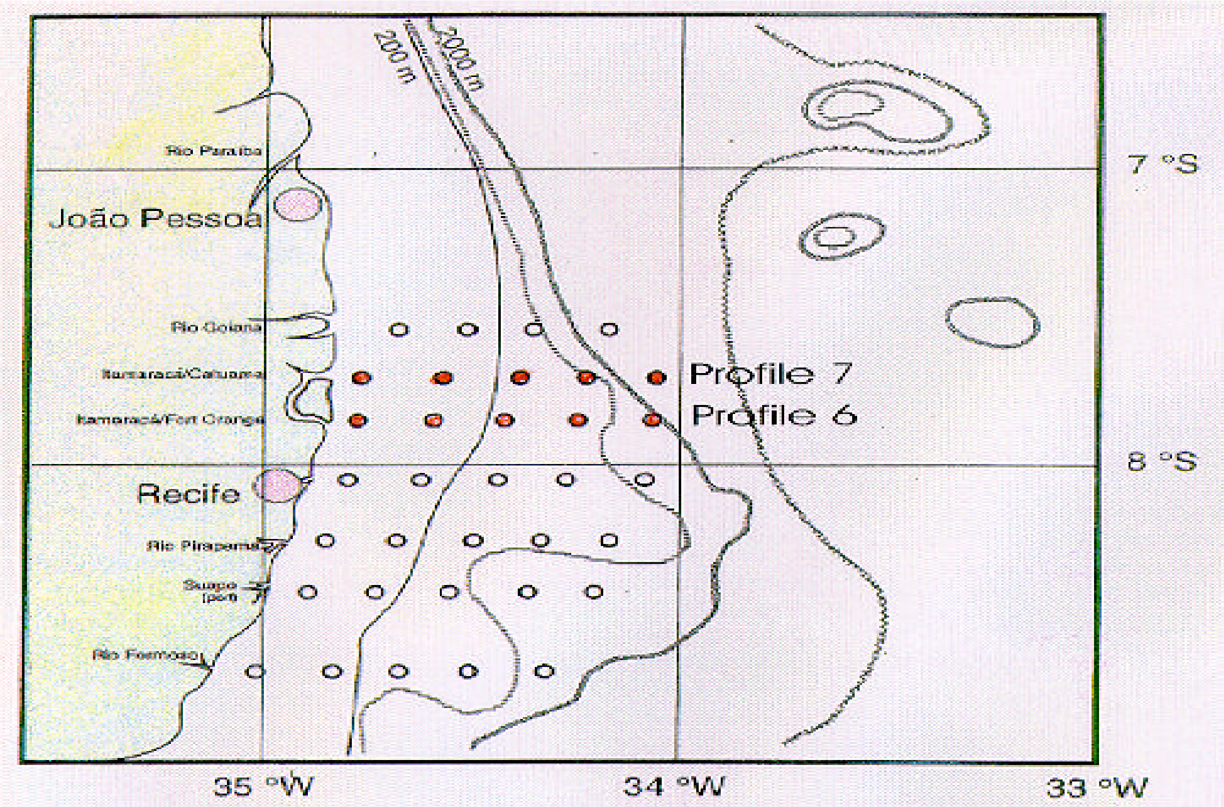


Figure 1: The geographical situation of the research area showing the position of the phytoplankton sampling stations. Hydrological samplings was carried out at the same stations.

RESULTS

Hydrology

The water masses displayed temperatures varying from 15,62ºC (St.35) at 200m, to 28,97ºC (St. 37) in the surface layer (Table I). The salinity ranged from 35,4 ppt (St.35 and 39) at 200m, and 37,1 ppt (St.34 and 40) at 100m. The concentrations of dissolved oxygen oscillated between 3,83 ml l^{-1} (St.35) and 5,01 ml l^{-1} (St.34), being the highest values recorded in the surface layer. The pH values oscillated between 7,95 (St.31) and 8,40 (St.34), both in the surface layer.

The concentrations of dissolved nutrient elements were relatively low, the minimum values being registered mostly in the surface layer, and the maximum at 200m.

The nitrite-N concentration ranged from 0,001 µmol.l^{-1} in stations on the surface layer to 0,100 µmol.l^{-1} (St.40) at a depth of 150m. The nitrate-N concentrations varied between 0,017 µmol.l^{-1} (St.34) at 50m and 3,610 µmol.l^{-1} (St.39) at 200m. The phosphate concentration showed a minimum value of 0,148 µmol.l^{-1} in the surface layer (St.34), and a maximum of 1,157 µmol.l^{-1} (St.35) at 200 m. In relation to the silicate-Si, the highest value (10,705 µmol.l^{-1}) was detected in station 32 (closest to shore), in the surface layer, being the minimum value, 1,418 µmol.l^{-1} (St.41) at 150m depth.

Table 1. Hydrological Parameters from the Orange and Catuama Profiles.

Station (No)	Depth (m)	Temp. (^oC)	Salinity (ppt)	O_2 (ml/l)	pH	$N\text{-}N0_2$ ($\mu mol.l^{-1}$)	$N\text{-}N0_3$ ($\mu mol.l^{-1}$)	$P\text{-}PO_4$ ($\mu mol.l^{-1}$)	$Si\text{-}Si0_2$ ($\mu mol.l^{-1}$)
Orange Profile									
St. 31	0	28,93	36,8	4,66	7,95	0,030	0,334	0,271	6,856
St.32	0	28,84	37,0	4,66	8,16	0,020	0,078	0,172	10,705
	0	28,89	37,0	4,58	8,04	0,001	0,044	0,172	7,016
	50	26,58	37,0	4,57	8,3	0,001	0,154	0,295	3,661
St.33	100	24,50	36,9	4,57	8,11	0,001	0,145	0,443	3,491
	150	20,22	36,2	4,52	8,09	0,060	1,897	0,566	1,762
	200	15,95	35,5	4,48	7,99	0,010	1,900	0,837	2,053
	0	28,49	36,6	4,68	8,40	0,020	0,029	0,148	4,395
	50	27,44	36,9	5,01	8,19	0,030	0,017	0,246	3,280
St.34	100	24,84	37,1	4,89	7,98	0,010	0,136	0,345	3,167
	150	20,07	36,2	4,46	8,23	0,010	1,041	0,615	3,047
	200	16,47	35,5	4,46	8,09	0,001	2,807	0,616	8,165
	0	28,32	36,6	4,68	8,08	0,010	0,034	0,246	4,173
	50	27,00	36,8	4,89	8,24	0,001	0,193	0,222	2,097
St.35	100	24,73	37,0	4,89	8,07	0,001	0,188	0,394	8,528
	150	20,10	36,8	4,57	8,29	0,080	0,878	0,468	7,406
	200	15,62	35,4	3,83	8,08	0,010	1,249	1,157	2,899
Catuama Profile									
	0	28,97	36,9	4,69	8,12	0,001	0,097	0,246	3,326
St.37	8	28,90	36,9	4,68	7,96	0,001	0,158	0,246	6,794
	12	28.90	36,9	4,68	8,08	0,001	0,093	0,222	8,851
	0	28,51	36,9	4,57	8,16	0,001	0,221	0,345	9,536
St. 38	19	28,23	37,0	4,68	8,29	0,020	0,460	0,197	4,839
	37	28,17	37,0	4,78	8,22	0,001	0,318	0,246	4,740
	0	28,55	36,7	4,68	8,23	0,030	0,019	0,222	5,946
	50	26,92	36,9	4,78	8,12	0,001	0,048	0,222	6,754
St. 39	100	24,81	36,8	4,57	8,16	0,09	0,033	0,295	5,608
	150	20,98	36,2	4,46	8,16	0,001	3,498	0,763	4,435
	200	16,30	35,4	4,41	8,06	0,050	3,610	0,739	4,359
	0	28,53	36,6	4,62	8,31	0,030	0,018	0,246	5,766
St. 40	50	27,01	36,9	4,67	8,16	0,020	1,049	0,222	6,915
	100	24,84	37,1	4,67	8,24	0,100	0,534	0,295	5,322
	0	28,36	36,6	4,70	8,25	0,001	0,135	0,172	2,328
	50	27,26	36,8	4,57	8,09	0,001	0,102	0,271	2,762
St. 41	100	24,75	37,0	4,46	8,32	0,001	0,129	0,222	3,957
	150	20,62	36,2	4,46	8,25	0,040	1,657	0,468	1,418
	200	16,23	35,5	4,29	8,30	0,001	2,710	0,689	7,893

Phytoplankton Composition

The 102 identified taxa (Table II) are distributed as follows: dinoflagellates, 45 species and 4 varieties, predominated by *Ceratium macroceros*, *C.massiliense*, *C. pentagonum*, *C. tripos* var. *pulchellum* and *C.vultur* var *vultur* in stations 35 and 40; diatoms, 48 species and 1 variety, represented primarily by *Rhizosolenia imbricata*, *Rhizosolenia styliformis* and

Rhizosolenia styliformis var *latissima* in station 41, and *Asterionella notata* and *Streptotheca thamesis* in stations 31 and 37; bluegreen algae, 3 species, composed prominently of *Oscillatoria erythraeum* in all stations, yet with percentages of 70% and 48% of the population in stations 32 and 38 respectively; and euglenophycae, represented by a single species, *Euglena acus*.

Specific diversity and Evenness

The specific diversity varied from 2.12 bits.cel^{-1} to 4.56 bits.cel-l^{-1}. The values remained high (above 3 bits.cel^{-1}) in most stations of both profiles, with the exception of stations 32 and 38. The low phytoplankton diversity recorded at these stations was associated with the predominance of *Oscillatoria erythraeum*.

The evenness varied from 0.48 to 0.88, presenting overall high values, the lowest being stations 32 and 38 (Figure 2).

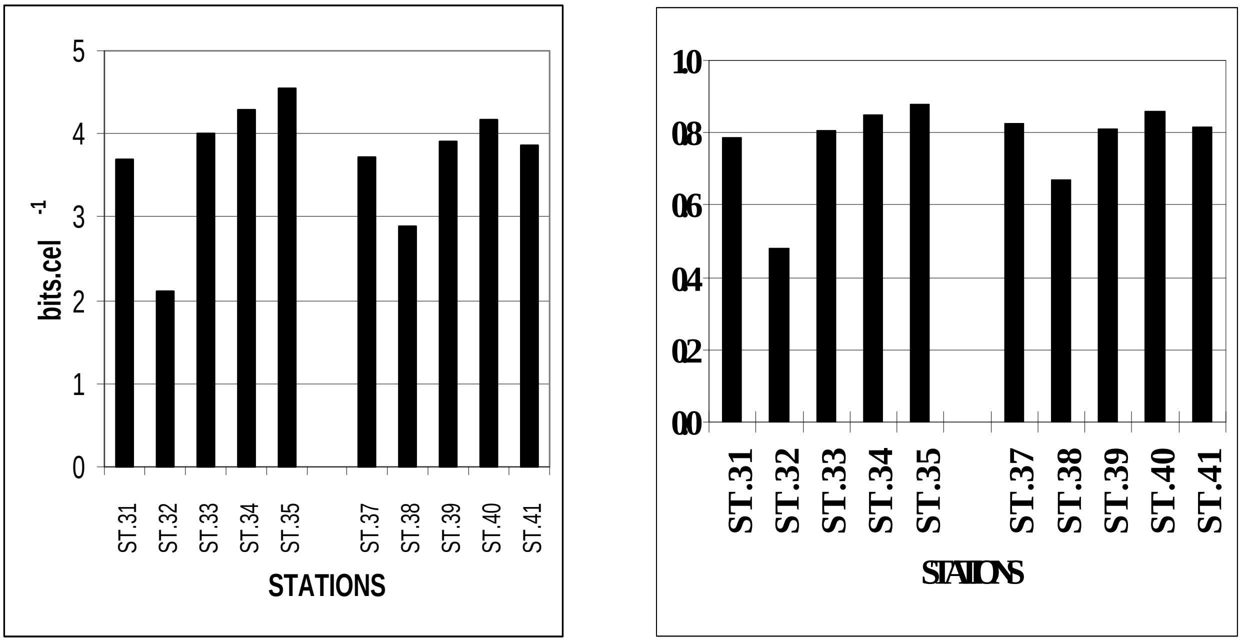


Figure 2: Specific diversity and evenness at Orange (Profile 6) and Catuama (profile 7)

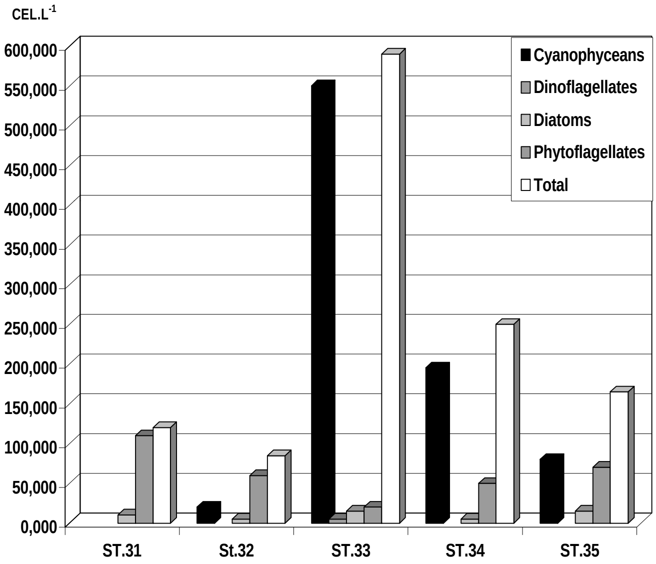
Table 2: Phytoplankton Composition from the Orange and Catuama Profiles

Cyanophyceans
1-*Oscillatoria erythraeum* Ehrenberg
2-*Oscillatoria* sp
3- *Oscillatoria princeps* Vaucher ex Gomont
Euglenophyceans
4-*Euglena acus* Ehrenberg
Dinoflagellates
5-*Amphisolenia bidentata* Schöder
6-*Ceratium* candelabrum var *candelabrum* (Ehrenberg) Stein
7-*Ceratium cephalotum* Lemmermann
8-*Ceratium dens* Ostenfeld & Schmidt
9-*Ceratium contortum* var *contortum* Gourret
10-*Ceratium furca* (Ehreberg) Claparède & Lachmann
11-*Ceratium fusus* (Ehrenberg) Dujardin
12-*Ceratium geniculatum* (Lemmmermann) Cleve
13-*Ceratium gibberum* Gourret
14-*Ceratium gravidum* Gourret
15-*Ceratium hexacanthum* Gourret
16-*Ceratium horridum* (Cleve) Gran
17-*Ceratium limulus* Gourret
18-*Ceratium lineatum* (Ehrenberg) Cleve
19-*Ceratium macroceros* (Ehrenberg) Vänhoffen
20-*Ceratium massiliense* (Gourret) Jörgensen
21-*Ceratium pentagonum* Gourret
22-*Ceratium reflexum* Cleve
23-*Ceratium tripos* var *pulchellum* (Schröder) Lopez
24-*Ceratium vultur* var *vultur* Cleve
25-*Ceratocorys armata* (Schütt) Kofoid
26-*Ceratocorys gouretti* Paulsen
27-*Ceratocorys horrida* Stein
28-*Ceratocorys* sp
29-*Cladopyxix brachiolata* Stein
30-*Cladopyxis hemibranchiata* Balech
31-*Corythodinium constrictum* (Stein) Taylor
32-*Dinophysis circumsutum* (Karsten) Balech
33-*Dinophysis cuneus* (Schütt) Abé
34-*Dinophysis hastata* Stein
35- *Dinophysis rapa* Stein
36-*Gonyaulax* sp
37-*Ornithocercus magnificus* Stein
38-*Ornithocercus quadratus* Schütt
39 *Ornithocercus splendidus* Schütt
40-*Ornithocercus steinii* Schütt
41-*Oxytoxum elegans* Pavillard
42-*Phalacroma* sp
43-*Podolampas elegans* Schütt
44-*Prorocentrum micans* Ehrenberg
45-*Protoperidinium breve* Paulsen
46-*Protoperidinium grande* (Kofoid) Balech
47-*Protoperidinium pedunculatum* (Schütt) Balech
48-*Protoperidinium* sp
49-*Pyrocystis fusiformis* Wyville-Thomson
50-*Pyrocystis lunula* (Schütt) Schütt
51-*Pyrocystis noctiluca* Murray ex Schütt
52-*Pyrocystis robusta* Kofoid
53-*Pyrophacus horologicum* Stein
Diatoms
54-*Achnanthes brevipes* Agardh
55-*Amphora arenaria* (Donkin) Kützing
56-*Amphiprora alata* (Ehrenberg) Kützing
57-*Asterionellopsis glacialis* (Castracane) Round
58-*Asterionella notata* Grunow
59-*Bacillaria paxilifer* (O. M.) Hendey
60-*Campylodiscus clypeus* Ehreberg
61-*Chaetoceros coarctatus* Lauder
62-*Chaetoceros lorenzianus* Grunow
63-*Chaetoceros tetrastichon* Cleve
64-*Climacodium frauenfeldianum* Grunow
65-*Climacosphenia moniligera* Ehrenberg
66-*Cocconeis scutellum* Ehrenberg
67-*Corethron hystrix* Hensen
68-*Coscinodiscus oculusiridis* Ehrenberg
69-*Coscinodiscus* sp
70-*Cylindrotheca closterium* (Ehrenberg) Reiman & Lev
71-*Diploneis bombus* Ehrenberg
72-*Ditylum brightwellii* (West.) Grunow
73-*Ethmodiscus gazellle* (Janisch) Hustedt
74-*Guinardia stolterfothii* (Péragallo) Hasle
75- *Gyrosigma balticum* (Ehrenberg) Rabenhorst
76-*Hemiaulus sinensis* Greville
77-*Hemidiscus hardmanianus* (Greville) Man
78-*Isthmia enervis Ehrenberg*
79-*Leptocylindrus danicus* Cleve
80-*Licmophora abbreviata* Agardh
81-*Lithodesmium undulatum* Ehrenberg
82-*Lyrella lyra* (Ehrenberg) Karajeva
83-*Mastogloia splendida* (Greville) Grunow
84-*Melchersiella hexagonalis* C. Teixeira
85-*Navicula* sp
86-*Nitzschia longissima* (Brébisson) Grunow
87-*Nitzschia sigma* (Kützing) Wm. Smith
88-*Nitschia* sp
89-*Odontellla mobiliensis* (Bailey) Grunow
90-*Paralia sulcata* (Ehrenberg) Cleve
91-*Planktoniella sol* (Wallich) Schütt
92-*Rhizosolenia acuminata* (Péragallo) Gran
93-*Rhizosolenia bergoni* Péragallo
94-*Pseudosolenia calcaravis* (Sch.) Sündstrom
95-*Rhizosolenia castracanei* Péragallo
96-*Rhizosolenia imbricata* Brightwell
97-*Rhizosolenia styliformis* Brightwell
98-*Rhiz. styliformis var latissima* Brightwell
99-*Streptotheca thamesis* Schrubsole
100-*Striatella unipunctata* (Ehrenberg) Heiberg
101-*Thalassiosira leptopus* (Grunow) Hasle & Fryx
102- *Tropidoneis seriata* Cleve

Cellular density

The cellular density varied from 50,000 cells.l^{-1} to 590,000 cells.l^{-1}, due to the reduced quantity of nutrient salts, that led to a low productivity in the water. Profile Orange presented densities from 85,000 cells.l^{-1} in station 32, to 590,000 cells.l^{-1} in station 33, and profile Catuama, with a minimum of 50,000 cells.l^{-1} in station 38, and maximum of 365,000 cells.l^{-1} in station 41. Diatoms and phytoflagellates dominated the coastal regions and bluegreen algae the oceanic regions (Figure 3).

ORANGE PROFILE



CATUAMA PROFILE

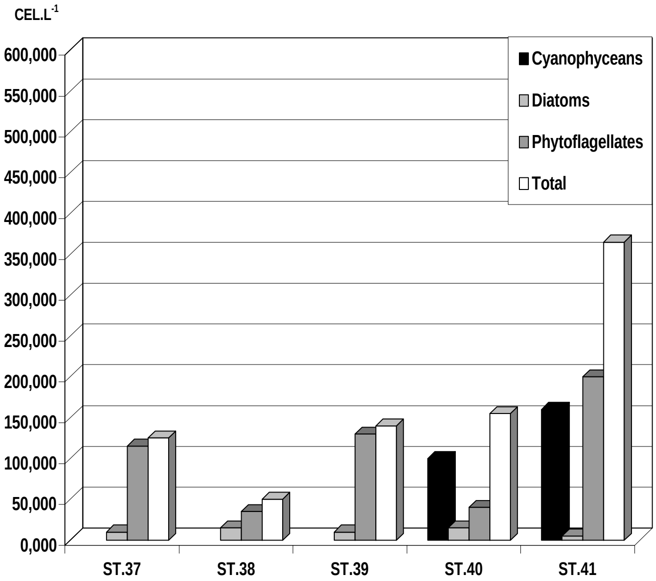


Figure 3: Phytoplankton density (Cells.l^{-1}) at the profiles Orange and Catuama (Profiles 6 and 7).

Samples Clustering

The results from the clustering of the samples (Figure 4) made evident 2 groups: one associating most of the stations, and characterized primarily by dinoflagellates and diatoms (group 1) and another, involving stations 32 and 38, where the species *Oscillatoria erythraeum* was dominant (group 2).

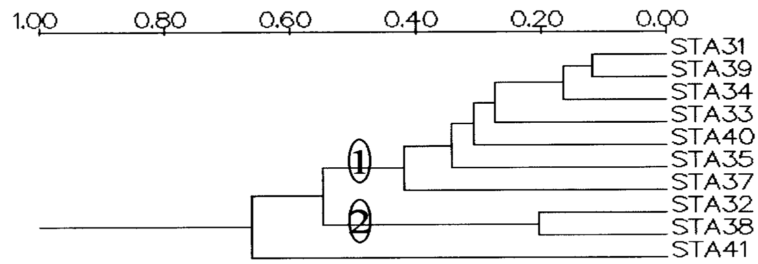


Figure 4: Dendrogram of the clustering of samples in profiles 6 and 7.

Species Clustering

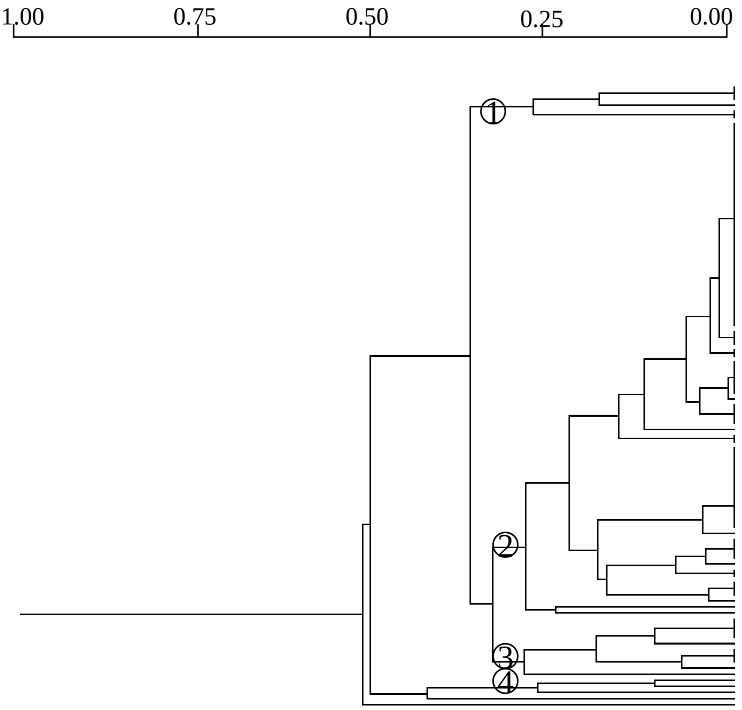


Figure 5: Dendrogram of the clustering of species in profiles 6 and 7

The clustering of species (Figure 5) made evident 4 groups: **Group 1**, with 6 species, (*Oscillatoria erythraeum, Protoperidinium grande, Chaetoceros tetrastichon, Ceratium pentagonum, Climacodium frauenfeldianum, Striatella unipunctata)* clustering primarily the oceanic diatoms. **Group 2**, was the biggest with 82 species, *(Oscillatoria princeps, Oscillatoria* sp, *Ceratium cephalotum, C. geniculatum, C. hexacanthum, Ceratocorys* sp, *Cladopyxix hemibranchiata, Dinophysis hastata, D. rapa, Protoperidinium pedunculatum, Chaetoceros lorenzianus, Corethron hystrix, Coscinodiscus* sp, *Hemidiscus hardmanianus, Euglena acus, Thallasiosira leptopus, Rhizosolenia styliformis, R. acuminata, Paralia sulcata, Nitzschia longissima, Mastogloia splendida, Lithodesmium undulatum, Odontella mobiliensis, Gyrosigma balticum, Diploneis* *bombus, Ceratium gravidum, Ceratium limulus, C. reflexum, Licmophora abbreviata,*

Campylodiscus clypeus, Ceratocorys gouretti, Amphiprora alata, Cladopyxix brachiolata, Dinophysis circumsutum, Corythodinium constrictum, Pyrophacus horologicum, Nitzschia sp, *Ornithocercus magnificus, Rhizosolenia bergoni*, *Ceratium candelabrum* var *candelabrum*, *Ditylum brightwellii, Cylindrotheca closterium, Ethmodiscus gazelle, Ceratocorys armata, Gonyaulax sp, Melchersiella hexagonalis Cocconeis scutellum, Coscinodiscus oculusiridis, Hemiaulus sinensis, Isthmia enervis, Pyrocystis fusiformis, Ceratium lineatum, Ornithocercus splendidus, Amphisolenia bidentata, Pseudosolenia calcaravis, Navicula sp, Leptocylindrus danicus Ceratocorys horrida, Guinardia stolterfothii, Prorocentrum micans, Climacosphenia moniligera, Tropidoneis seriata, Lyrella lyra, Amphora arenaria, Asterionellopsis glacialis, Achnanthes brevipes, Dinophysis cuneus, Pyrocystis lunula, Ceratium contortum var. contortum, Oxytoxum elegans, Ornithocercus quadratus, Nitzschia sigma, Podolampas elegans, Ceratium giberrum, Asterionella notata, Ceratium furca, Protoperidinium sp. Planktoniella sol, Ceratium horridum, Ceratium fusus, C. macroceros, C. dens* including 49 oceanic marine species and the rest distributed among marine eurihaline and coastal species, therefore indicating that in the sampling area, due to the short length of the continental shelf, exists an intrusion of oceanic water that brings the species to the coastal region. **Group 3**, 10 species (*Rhizosolenia imbricata*, *Streptotheca thamensis*, *Protoperidinium breve*, *Ornithocercus steinii*, *Phalacroma* sp, *Bacillaria paxillifer, Chaetoceros coarctatus, Rhizosolenia castracanei, Pyrocystis robusta, Ceratium massiliense*) were clustered including neritic, coastal and oceanic and **Group 4**, represented by 3 species of oceanic dinoflagellates (*Ceratium tripos* var *pulchellum, Pyrocystis noctiluca, Ceratium vultur* var. *vultur*).

DISCUSSION

On the continental shelf of Pernambuco the temperature did not vary much in the layers closest to the surface, forming an ecological barrier in the thermocline region, and consequently reducing the regeneration of nutrients between the superficial and deep layers. The salinity was minimum in the deeper layers, reaching a maximum on the superficial layer, near the top of the thermocline. Therefore, salinity and temperature present small variations in the superficial layer of the area of study, and do not have great influence on the distribution and diversity of the phytoplankton community. Dissolved oxygen was high on the superficial layer, with similar values to those of saturation, and the pH was alkaline in the whole area. Nutrient salts showed lower concentrations on the surface, primarily in the oceanic stations, except for silicate-Si that was higher in the stations closest to the coast. The poor nutrient content on the surface layer can be attributed to thermocline. Therefore the nutrient elements can be considered the primary factors that affect the development of phytoplankton and one of the causes of low productivity in the lower latitudes. According to Costa (1991) the greatest source of nutritional supplements for phytoplankton is the degradation and mineralization of organic material in the superficial layer. In the oceanic region the stability and stratification of the water column decreased considerably the nutrient concentrations, yet, according to Costa (1991), it can not be affirmed that any of the nutrients are entirely exhausted, specially in the levels of nitrate and silicate.

The composition of microphytoplankton was considerably diversified, having a higher number of diatom species in the coastal stations and of dinoflagellates in the oceanic stations. The presence of *Oscillatoria erythraeum* in the continental shelf of Pernambuco has already been referred by Eskinazi-Leça et al. (1989b) and Gomes (1991), as being a very frequent species with abundance of up to 70 %. The specific diversity and evenness were high, the environmental and special stability being the cause of the high diversity. With consideration to the ecology of the species, the predominance of oceanic planktonic species was observed, followed by those of marine coastal species. The bluegreen algae group showed values of high cellular density in the oceanic stations and the groups of diatoms and phytoflagellates in the coastal stations.

In general, cellular density showed low values in the region as a whole, (minimum of 50,000 cells.l^{-1} and maximum of 590,000 cells.l^{-1}) characterizing an oligotrophic tropical environment. The results however, are comparable to the ones found by Gomes (1991) that mentioned to the Continental Shelf North of Pernambuco (Itamaracá) phytoplankton densities varying from 83,000 cells.l^{-1} to 1,383,300 cells.l^{-1}, decreasing from the coast to offshore. Eskinazi-Leça et al. (1989b) found values oscillating from 50,000 cells.l^{-1} to 870,000 cells.l^{-1} in front of Piedade Beach (PE). The results are also comparable with works done at other states (Valentin et al., 1978; Teixeira et al., 1981).

RESUMO

Estudos hidrológicos e fitoplanctônicos foram realizados em dois perfis perpendiculares à costa, em frente à Ilha de Itamaracá-PE (perfis Orange e Catuama), durante a Expedição do Navio de Pesquisas Victor Hensen, dentro do acordo de cooperação bilateral celebrado entre o Departamento de Oceanografia da UFPE e o Centro de Ecologia Marinha Tropical (ZMT-Bremen-Alemanha). A camada superficial está caracterizada por uma zona de estabilidade térmica e salina. As concentrações de nutrientes foram geralmente mais baixas na superfície e mais elevadas em profundidades acima de 100m. Foram identificados 102 táxons, incluindo 49 diatomáceas, 49 dinoflagelados, 3 cianofíceas e 1 euglenofícea. A diversidade específica e equitabilidade foram elevadas, indicando um equilíbrio ambiental. A associação das amostras evidenciou 2 grupos, um caracterizado por dinoflagelados e diatomáceas, englobando a maioria das estações e outro, compreeendendo as estações 32 e 38, caracterizadas pelo predomínio de *Oscillatoria erythraeum*. A associação de espécies evidenciou 4 grupos, sendo o maior caracterizado por 49 espécies marinhas oceânicas e 31 espécies costeiras e eurialinas. A densidade fitoplanctônica variou de 50.000 cels.l^{-1} a 590.000 cels.l^{-1} denotando um ambiente oligotrófico.

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