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Taxonomic Composition of the Microflora (Cyanophytes and Microalgae) of Somone Lagoon (Senegal)

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Abstract **Original Research Article**

This work aims to determine taxonomic composition of the microflora (cyanophytes and microalgae) of Somone Lagoon. Observation of the samples collected between March and June 2013 has allowed to list 50 species belonging to 3 phyla, 5 classes, 19 orders, 25 families and 34 genera. Bacillariophyta have the greatest species richness with 90% of the species, followed by Cyanophyta (8%) and Euglenophyta (2%). Bacillariaceae are the most represented family with 8 species. For the genera, these are *Diploneis* and *Nitzschia*, each with 4 species. These 50 species are new for the microflora of the Somone lagoon.

Keywords: Taxonomic composition, Microflora, cyanophytes, microalgae, Somone Lagoon, Senegal.

INTRODUCTION

The specific diversity appears essential when interested in the role of phytoplankton and periphyton in marine ecosystems. Indeed, the dynamic of the population of cyanophytes and microalgae are influenced by many environmental factors (hydroclimatic, physicochemical and biological) which act on the populations themselves, and consequently on the dynamics of species associations [1]. The determination of the taxonomic composition over a given period makes it possible to know and estimate the evolution of living conditions. Despite their relative importance at the base of trophic network, to our knowledge, there is not yet a systematic study on cyanophytes and microalgae in Somone lagoon. The objective of this work is to determine taxonomic composition of the microflora (cyanophytes and microalgae) of Somone Lagoon.

MATERIALS AND METHODS

Presentation of the study area

The lagoon (Figure 1) is located in the Somone watershed, 60 km south of Dakar, between the village of Ndiass and Mbour City. Somone is bounded on the west by the Atlantic Ocean and the edges of the Ndiass Massif, on the north by those of the Thiès Cliff, on the east and south by the sandy plain from Tasset to Ngaparou [2]. Covering an area of 7 km^2, the lagoonal-estuarine ecosystem of Somone was established as a Natural Reserve of Community Interest en 1999 [3]. The presence of the lagoon is the result of a year-round supply of marine water which maintains a very important ecological and economic mangrove. Today, water supplies from the watershed are non-existent due to the combination of several factors including the Bandia Dam. The only freshwater supplies come from precipitation and the water table [2]. Thus, the lagoonal-estuarine system of Somone is characterized by an inverse hydrological functioning where marine influences predominate. The temperature of the lagoon surface water is warmer in the wet season (30 ° C on average). In January, it is between 20 and 28 ° C [3]. The overall depths are less than 1m. [4]. A semi-diurnal tide is exerted all year round and thus controls the immersion / emersion cycle in the ecosystem [3].

Fig-1: Location of Somone Lagoon

Sampling and observation

Samples, taken by scraping supports and using a plankton net between March and June 2013 in the lagoon (14 ° 29'49.7 " N, 017 ° 04'54.8 " W), were observed under the microscope for the description and identification of taxa. For diatoms, a treatment for cleaning frustules was carried out.

Taxon identifications were carried out through work such as that of [5-10]. The systematic arrangement of the list was made by according to [11-14].

RESULTS AND DISCUSSIONS

Table-1: List of taxa inventoried in Somone Lagoon

Phylum	Class	Order	Family	Species
Cyanophyta	Cyanophyceae	Synechococcales	*Merismopediaceae*	*Merismopedia sp*
		Oscillatoriales	Oscillatoriaceae	*Oscillatoria sp 1*
			Pseudanabaenaceae	*Leptolyngbya* cf. *foveolarum* (Rabenhorst ex Gomont)
				Pseudanabaena sp
Bacillariophyta	Coscinodiscophyceae	Thalassiosirales	*Thalassiosiraceae*	*Thalassiosira eccentrica* (Ehrenberg) Cleve
			Stephanodiscaceae	*Cyclotella stylorum* Brightwell 1860
		Melosirales	Melosiriaceae	*Melosira crenulata* (Ehr.) Kuetz
		Paraliales	Paraliaceae	*Paralia sulcata* (Ehrenberg) Cleve
		Coscinodiscales	Coscinodiscaceae	*Coscinodiscus oculus-iridis* Ehrenberg
				Coscinodiscus oculus-iridis var. borealis (Bailey) (Cleve, 1883)
		Triceratiales	Triceratiaceae	*Odontella obtusa* Kùtzing
		Biddulphiales	Biddulphiaceae	*Biddulphia tuomeyi* (J.W. Bailey) Roper 1859
	Fragilariophyceae	Fragilariales	Fragilariaceae	*Opephora pinnata var. lanceolata* Boyer 1916
				Opephora schwartzii (Grunow) Petit
		Rhaphoneidales	Rhaphoneidaceae	*Raphoneis amphiceros var. rhombica* Grun
		Thalassionematales	Thalassionemataceae	*Thalassionema bacillare* (Heiden) Kolbe
		Striatellales	Striatellaceae	*Grammatophora hamulifera* Kützing
				Grammatophora marina (Lyngbye) Kützing
				Grammatophora oceanica Ehrenberg 1841

	Bacillariophyceae	Achnanthales	Achnanthaceae	*Achnanthes brevipes var. intermedia* Agardh
				Achnanthes longipes f. lata Agardh
				Achnanthes subconstricta (Meister) Toyoda
			Cocconeidaceae	*Cocconeis scutellum* Ehr.
		Naviculales	Sellaphoraceae	*Fallacia forcipata* (Greville) Stickle and Mann
			Diploneidaceae	*Diploneis bombus* (Ehrenberg) Ehrenberg ex Cleve
				Diploneis elliptica (Kuetz.) Cl.
				Diploneis gruendleri (A. Schmidt) Cleve
				Diploneis weissflogii (A. Schmidt) Cleve
			Naviculaceae	*Navicula cancellata* Donkin 1873
				Navicula tripunctata (O.F. Müller) Bory (1822)
				Navicula pennata A. S.
				Trachyneis aspera Ehr.
			Pleurosigmataceae	*Gyrosigma attenuatum* (Kuetz.) Cl.
				Gyrosigma balticum (Ehrenberg) Rabenhorst.
				Pleurosigma diverse-striatum Meister 1935
		Thalassiophysales	Catenulaceae	*Amphora costata* Sm.
				Amphora proteus Gregory
				Amphora turgida Gregory
		Bacillariales	Bacillariaceae	*Bacillaria paxillifera* (O. F. Müller) Hendey
				Cylindrotheca closterium (Ehrenberg) Reimann & Lewin 1964
				Cylindrotheca gracilis (Breb.) Grunow
				Hantzschia amphioxis (Ehrenberg) Grunow
				Nitzschia coarctata Grunow
				Nitzschia obtusa (W. Smith, 1853)
				Nitzschia sigma (Kützing) W. Smith(1853)
				Nitzschia spathulata Bréb.
		Rhopalodiales	Rhopalodiaceae	*Rhopalodia gibba var. ventricosa* (Kütz.) H. & M. Perag
		Surirellales	Surirellaceae	*Campylodiscus thurettii* Brébisson
				Surirella fastuosa (Ehrenberg) (Kützing, 1844)
Euglenophyta	Euglenophyceae	Euglenales	Euglenaceae	*Euglena spirogyra* Ehr

The analysis of Table 1 show that 50 species divided into 34 genera, 25 families, 19 orders, 5 classes and 3 phyla have been inventoried. 45 of these species belong to Bacillariophyta, which represents 90% of the species richness; these species belong to 27 genera and divided into 21 families. Cyanophyta, with 8% of species richness are represented by four species belonging to three genera and three families. Euglenophyta are represented by only one species (2%).

Bacillariaceae (Bacillariophyta) is the most representative family with 8 species; it is followed by those of Diploneidaceae and Naviculaceae with each four species. As for the genera, *Diploneis* and *Nitzschia* dominate with four species each and belong to the Bacillariophyceae Class characterized by the presence of raphe facilitating their adhesion to supports. The genera *Achnanthes*, *Amphora*, *Grammatophora*, *Navicula* each have three species.

This dominance of diatoms could be explained by their eurhyaline nature and by the fact that shallow coastal areas are generally very favourable for their growth. This is due to the speed of the mineralization and return processes in the circuit of the elementary components and to hydroclimatic factors such as salinity and especially the light and temperature [16].

CONCLUSION

This study allowed to know the taxonomic composition of the microflora (cyanophytes and microalgae) of Somone Lagoon. The 50 inventoried species belong to 3 phyla, 5 classes, 19 orders, 25 families and 34 genera. The Bacillariophyta dominate with 90% of the species richness. Bacillariaceae is the most representative family with 8 species. For the genera, *Diploneis* and *Nitzschia* each dominate with four species. These 50 species are new for the microflora of Somone Lagoon.

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