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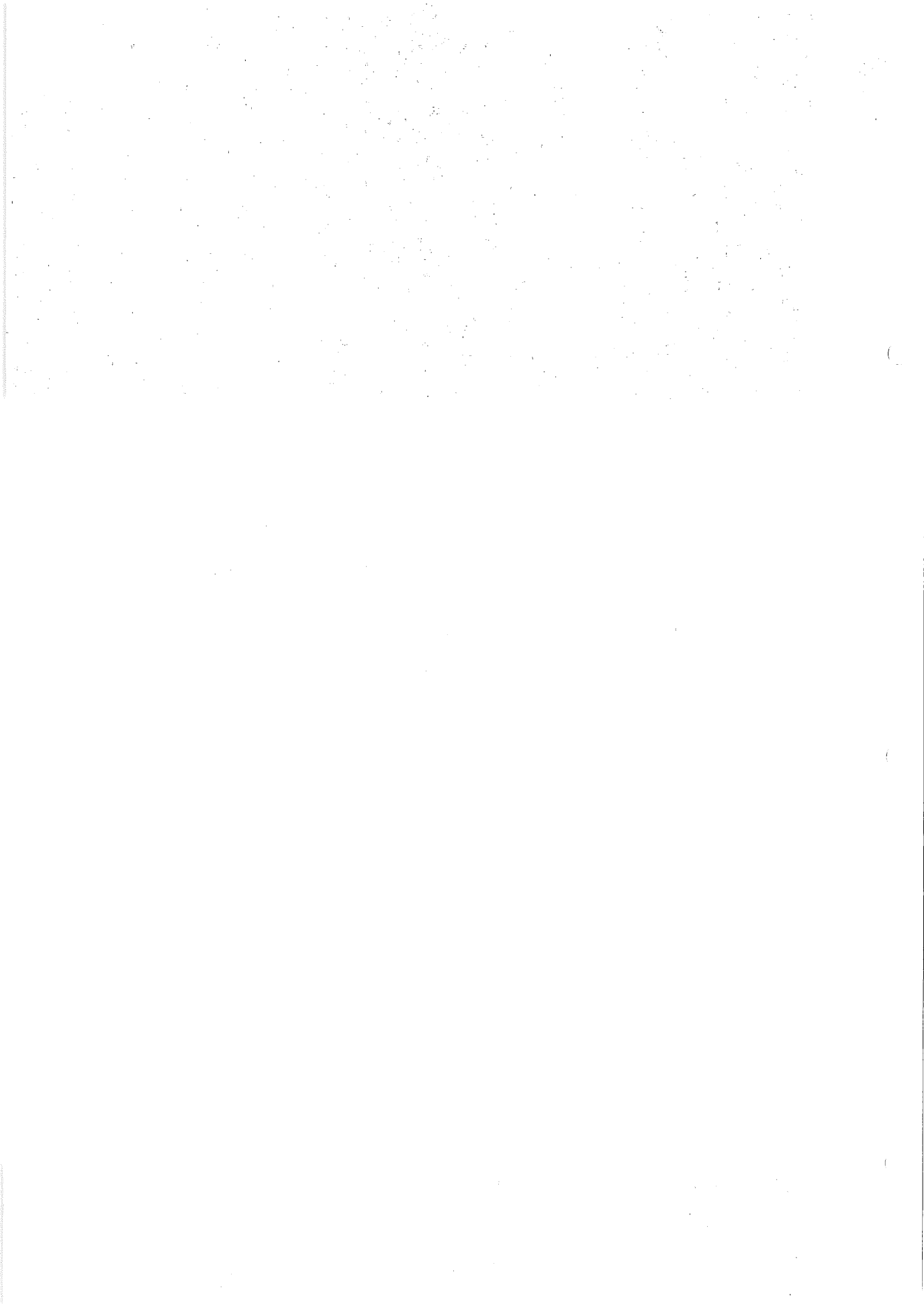
海洋生物環境研究所研究報告

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Present Status of Seagrass at Albion and Pointe aux Cannoniers,  
Mauritius, Indian Ocean - A Preliminary Study

インド洋モーリシャスのアルビオンとポイントカノニエにおける海草群落の現況  
(予報)

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## Present Status of Seagrass at Albion and Pointe aux Cannoniers, Mauritius, Indian Ocean - A Preliminary Study

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**ABSTRACT :** A study on the distribution, species composition, and zonation of seagrass was made at Albion and Pointe aux Canoniers, Mauritius, Indian Ocean. The objectives of the study were a) an understanding of the current status of seagrass in Mauritius and b) the constitution of baseline data on seagrass for the eventual establishment of a long term monitoring program. In this study, five species, *Halodule uninervis*, *Halophila ovalis*, *Halop. stipulaceae*, *Syringodium isoetifolium*, and *Thalassodendron ciliatum*, were observed. *T. ciliatum* was observed only at Pointe aux Canoniers. The species distribution showed a banded pattern at Albion and a mosaic pattern at Pointe aux Canoniers. The dominant species at Albion was *Halod. uninervis* whereas *S. isoetifilium* was dominant at Pointe aux Canoniers. This preliminary study will help in the constitution of baseline data in view of setting up a regular seagrass monitoring program around Mauritius.

**Key Words :** Seagrass bed, Distribution, Species composition, Monitoring program, Mauritius.

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要約：インド洋のモーリシャス沿岸において、海草群落の分布、種組成などの現状把握と長期的なモニタリング調査のベースラインデータの整備を目的として、海草群落調査を行った。調査場所を、主島西海岸のアルピオン (Albion) と北部のポイントカノニエ (Pointe aux Canonniers) の礁池に設定した。この調査を通じて、*Halodule uninervis*, *Halophila ovalis*, *Halop. Stipulaceae*, *Syringodium isoetifolium*, *Thalassodendron ciliatum* の 5 種の生育を確認した。このうち、*T. ciliatum* は、ポイントカノニエのみで観察された。アルピオンでは、海草群落が海岸線に沿うような帯状分布であったことから、海岸線の基線から沖へ向かって測線を設定するポイントライントランセクト法を適用した。この結果、調査範囲 72,000 m<sup>2</sup> のうち 29.0% を海草群落が占め、優占種が *Halod. uninervis* であることが明らかになった。ポイントカノニエでは、モザイク状分布であったことから、50m×50m の固定枠を設定し、この中を 5 m 幅のベルトに分割して調査を実施した。この結果、調査範囲 2,500m<sup>2</sup> のうち 50.1% を海草群落が占め、岸寄りでは *S. isoetifolium* が、礁原寄りでは *T. ciliatum* が優占していることが明らかになった。今回の調査により、モーリシャス沿岸における海草群落の長期的なモニタリング調査のベースラインとなる知見が得られた。今後は、上記の知見に立脚した上で、海草群落に影響を及ぼすと考えられる環境要因の検討を含む総合的なモニタリングが望まれる。

キーワード：海草群落，分布，種組成，モニタリング調査，モーリシャス

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## I . INTRODUCTION

Seagrass beds are found in shallow coastal areas of the world. The beds or meadows may be monospecific or may consist of an assemblage of various species. According to Phillips and Menez (1988), there are 48 species of seagrass present in the world whereas Kuo and McComb (1989) identified 58 species. This shows that some controversy still remains in seagrass taxonomy. All seagrasses are monocotyledons and are grouped into two families viz Potamogetonaceae (9 genera) and Hydrocharitaceae (3 genera) (Phillips and Menez 1988).

In Mauritius, 6 species of seagrass from both the above-mentioned families were recorded by Bosser *et al.* (1984), namely *Syringodium isoetifolium*, *Thalassodendron ciliatum*, *Halodule uninervis*, *Halod. wrightii*, *Halophila ovalis*, and *Halop. stipulacea*. However, *Halod. wrightii* was described as Atlantic Ocean species by Phillips and Menez (1988). This may imply that further investigation into existing seagrass species in Mauritius is required.

Seagrasses stabilize and hold bottom sediments and prevent erosion of the coastline. They also act as nursery to a myriad of marine organisms and support numerous herbivore and detritivore food chains. They help in recycling nutrients within this complex ecosystem. The high primary production of seagrass beds is closely linked to the high production rate of associated fisheries (English *et al.* 1997).

Seagrass beds are vital components of the coastal ecosystem and their regular monitoring will help in understanding seasonal (regular) changes as well as unseasonal (irregular) changes due to human impacts or natural disturbances such as cyclones, floods or drought. Consequently, seagrass bed monitoring is important in the integrated coastal zone management in Mauritius. However, there was little information about distribution pattern, abundance, seasonal change, and other ecological characteristics of seagrasses.

Under this circumstance, seagrass area survey was undertaken at 2 sites on Mauritius. The objectives of the present study are a) an understanding of the current status of seagrass in Mauritius (distribution, species composition and zonation) and b) the constitution of baseline data on seagrasses for the eventual establishment of a long term monitoring program.

## II . STUDY SITES

Two sites, Albion and Pointe aux Canonnières, were selected for preliminary studies to understand the distribution and species composition (Fig.1). The lagoon at

Albion is located in the western coast of Mauritius and is enclosed by a fringing coral reef. The length of the coastline is about 1.8 km and the reef is situated some 800 m offshore enclosing a lagoon of 1.7 km<sup>2</sup>. The lagoon at Pointe aux Canonniers is in the north of the island with the fringing reef found at about 100 m from shore. The length of the coastline is about 300 m enclosing a lagoon of about 0.03 km<sup>2</sup>.

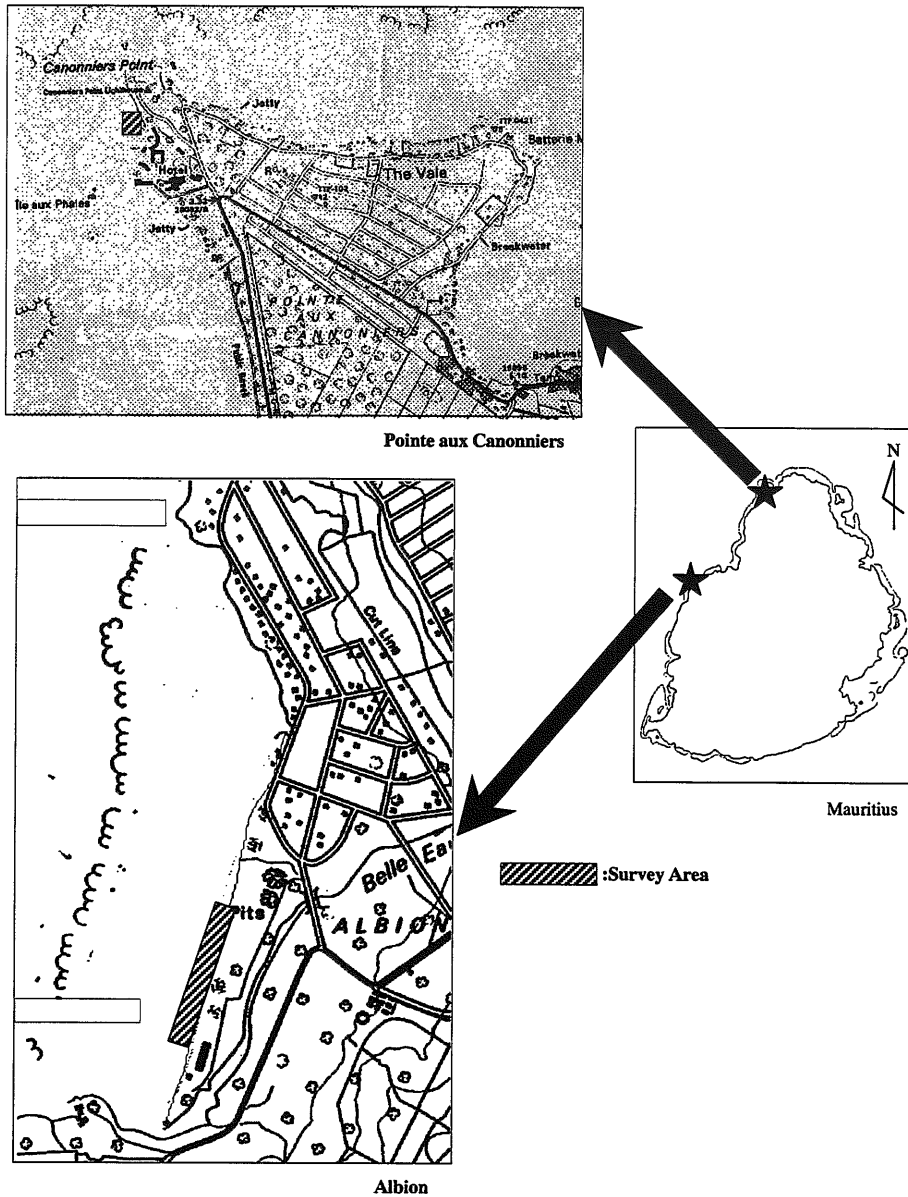


Fig.1. Two survey sites ; Albion and Pointe aux Cannoniers.

### III. METHODS

The methodology used depended on the pattern of seagrass distribution present at the two sites. Based on general observation, we adopted the point line transect method for banded distributed pattern and applied belt transect method for the mosaic distributed pattern. The detail procedures are described below.

At Albion, a general visual survey was effected in the lagoon using a boat with intermittent diving on 29 September, 1999, in order to identify the transition points of seagrass beds. A rough sketch of the seagrass area was thus obtained. Based on the distribution pattern from the sketch, point line transects were used to record the transition of seagrass cover. A fixed position was taken 15 m from the gate of the Albion Fisheries Research Centre (AFRC) (Fig.2) and two nylon ropes of 200 m in length were placed stretching in a north / south direction.

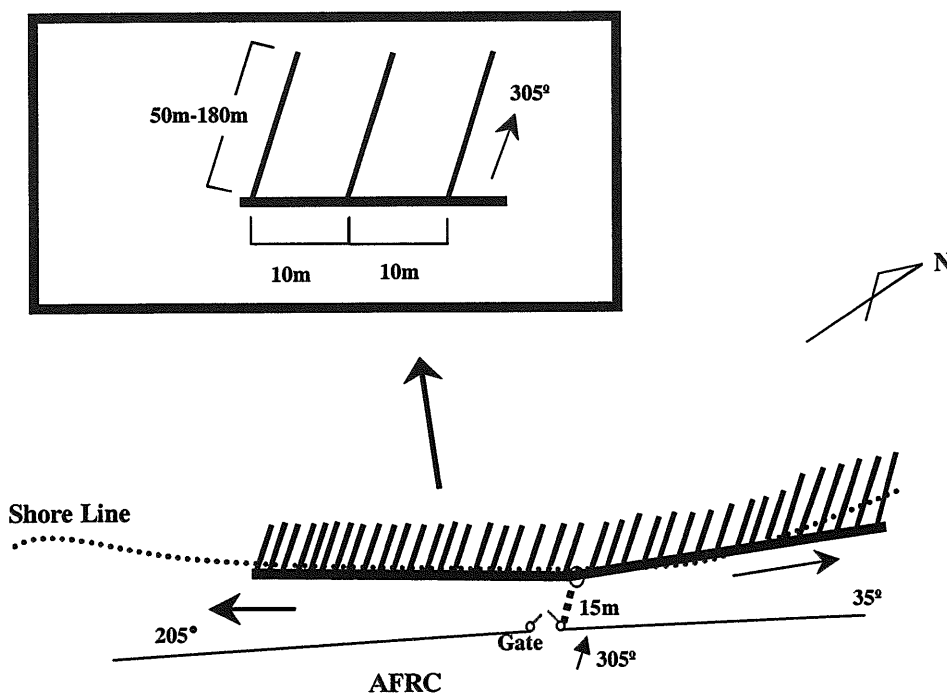


Fig.2. Point line transect for the seagrass area survey at Albion.

Line transects were laid at 10 m intervals, virtually perpendicular to the shore. The length of transects varied from 50 m to 180 m depending on the seagrass cover along the line. The seagrass cover under the transect line was recorded from 1 to 7, October,

1999, and the species of seagrass were identified *in situ*. The percentage cover of each monospecific seagrass bed was calculated using the Microsoft Excel software.

The density of seagrass shoots was effected by placing a quadrat of 50 cm x 50 cm subdivided into 25 squares of 100 cm<sup>2</sup> each on a monospecific seagrass bed on 7 October, 1999. The number of shoots in 9 representative squares was counted (Fig.3). Six quadrates were placed in the scarce and dense zones and the average number of shoots in the quadrates were calculated.

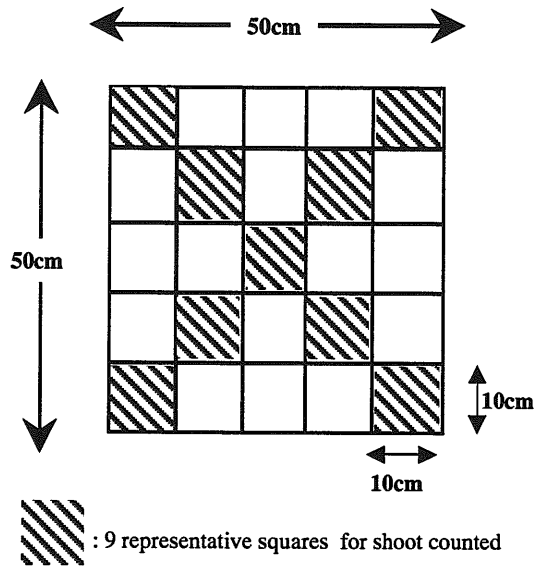


Fig.3. A quadrat for density estimation of seagrass shoots.

A rough sketch of seagrass area at Pointe aux Canonniers was obtained from a general survey as explained above on 30 September, 1999. A large quadrat of 50m x 50m was then placed in the lagoon (Fig.4), about 25m from the boundary wall of Le Canonnier Hotel. Line transects were placed at 5 m interval in the quadrat. The seagrass cover within the area of the transect (belt-transect of 50m x 5m) was recorded on 5 October, 1999. The total area thus covered was 2,500 m<sup>2</sup>. The area covered by each species of seagrass in the mosaic distribution pattern was calculated using the Scion Image (Scion Corporation) software.



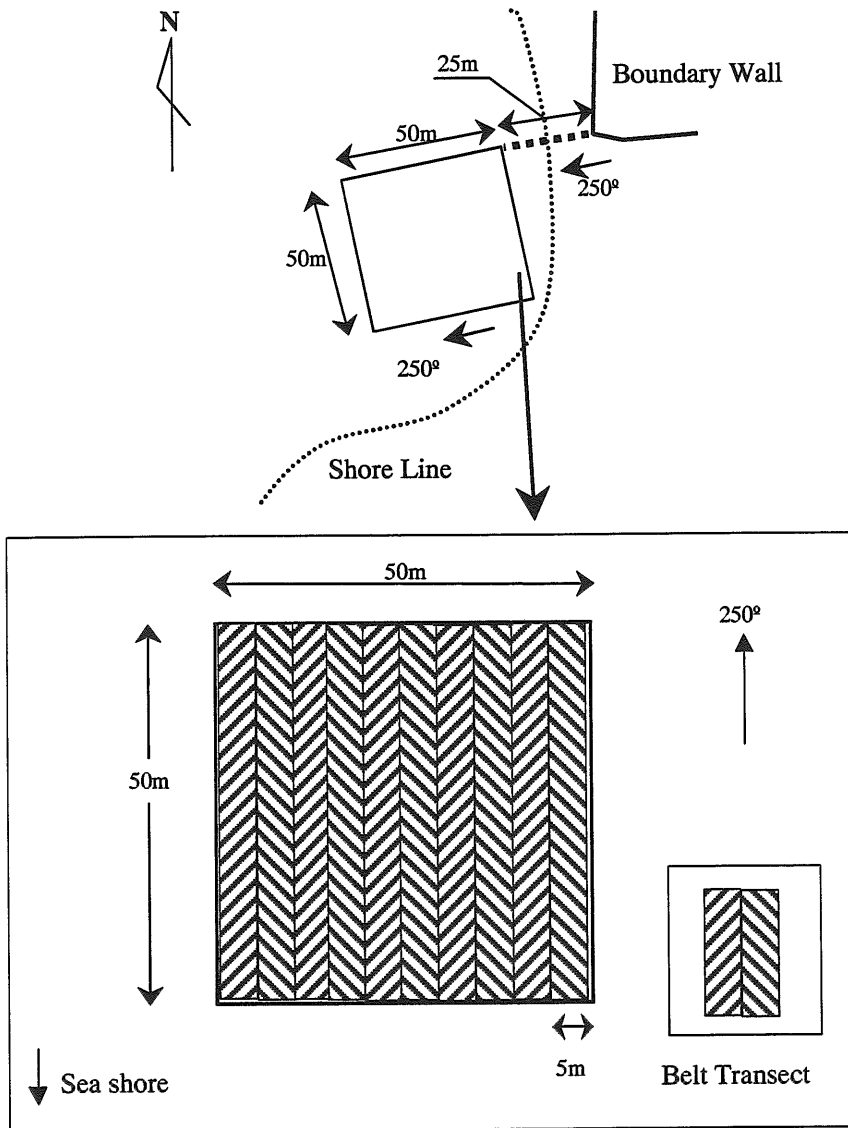


Fig.4. Belt transects for the seagrass area survey at Pointe aux Cannonies.

#### IV. RESULTS and DISCUSSION

Four species of seagrass were present in the Albion lagoon, viz. *Halop. ovalis*, *Halop. stipulacea*, *Halod. uninervis* and *S. isoetifolium* (Fig.5). The distribution pattern of each seagrass species with density was shown in Fig.6.

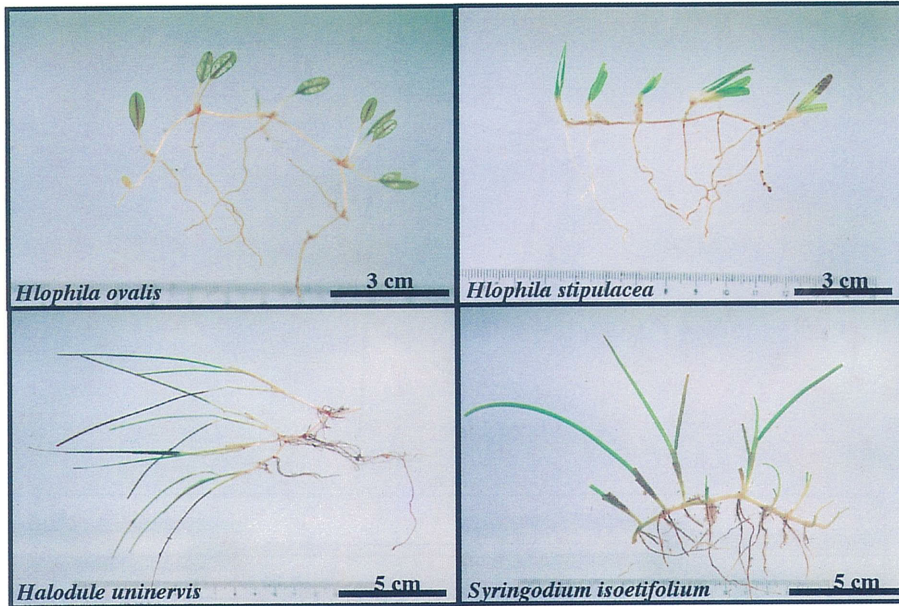


Fig.5. Seagrass species on the survey area at Albion.

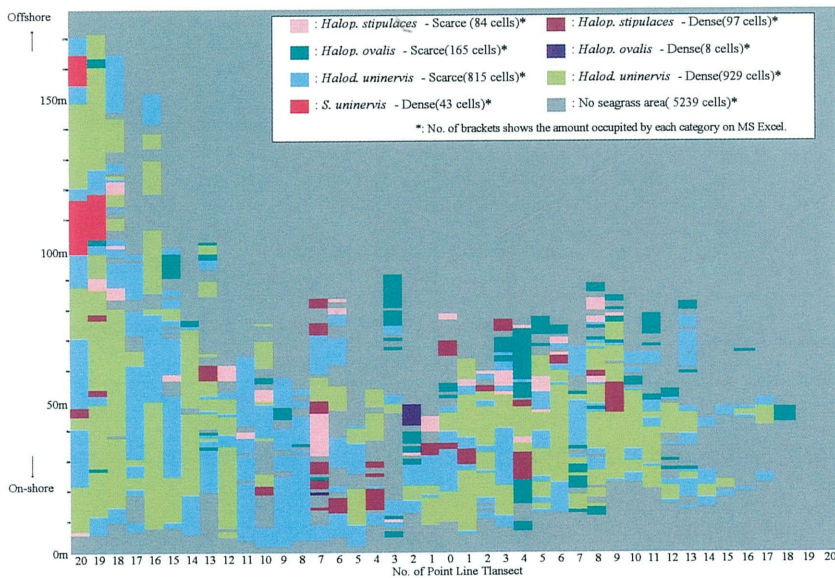


Fig.6. Seagrass distribution pattern at Albion.

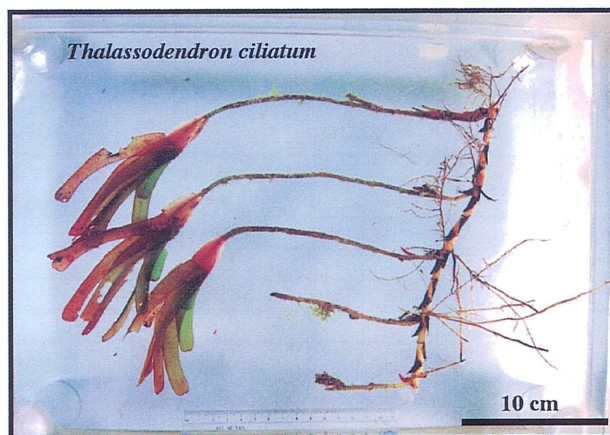
A banded pattern of distribution of seagrass was apparent in the Albion lagoon with prominent zones of variable densities. The total seagrass area was about 20,890 m<sup>2</sup> (29 %) out of the surveyed area (72,000 m<sup>2</sup>). The dominant species, *Halod. uninervis*, occupied over 80% of the seagrass cover, followed by *Halop. stipulacea*, *Halop. ovalis* and *S. isoetifolium* (Table 1).

**Table 1.** Total occupied area of each species in survey area (72,000 m<sup>2</sup>) at Albion

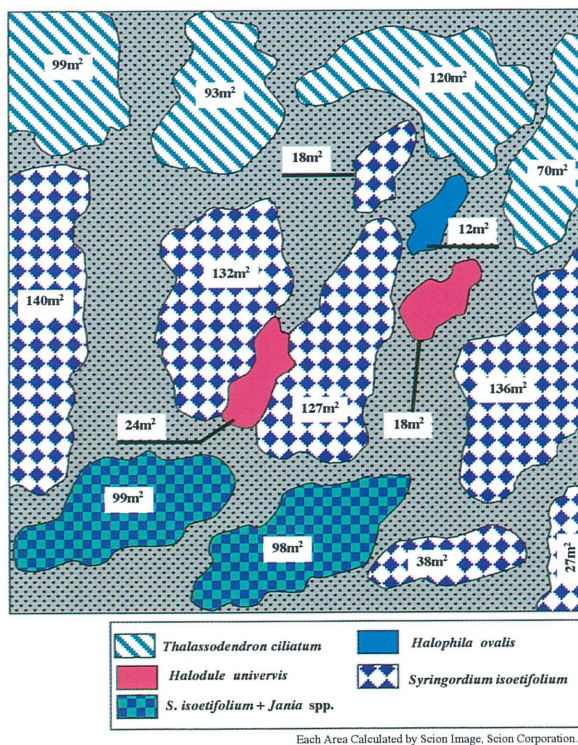
Species name	Density	% of occupied area
<i>Halophila ovalis</i>	Scarce	2.2%
<i>Halop. ovalis</i>	Dense	0.1%
<i>Halop. stipulacea</i>	Scarce	1.1%
<i>Halop. stipulacea</i>	Dense	1.3%
<i>Halodule uninervis</i>	Scarce	11.0%
<i>Halod. uninervis</i>	Dense	12.6%
<i>Syringodium isoetifolium</i>	Dense	0.6%
Total Seagrass Area		29.0%

The dominant species, *Halod. uninervis*, was densely distributed at the left and right of the survey area, while it was scarce or almost absent in the middle zone. At the south-west side of the surveyed area, the seagrass beds extended up to about 180 m towards the reef, while in the middle, they covered up to about 90 m reefwards, then, at the north-east side of the survey area, the extent of seagrass was only about 50 m.

Five species of seagrass were observed at Pointe aux Canoniers viz. *Halop. ovalis*, *Halop. stipulacea*, *Halod. uninervis*, *S. isoetifolium*, and *T. ciliatum* (Fig.7). The distribution pattern of each seagrass species with density is shown in Fig.8.



**Fig.7.** Seagrass species on the survey area at Pointe aux Canoniers.



**Fig.8.** Seagrass distribution pattern at Pointe aux Cannoniers.

The seagrass cover was 1,252 m<sup>2</sup> (50.1%) out of the area (2,500m<sup>2</sup>) surveyed. The percentage cover showed that *S. isoetifolium* was dominant (49.5%), followed by *T. ciliatum* (30.4%) (Table 2). A mosaic distribution pattern of seagrasses at Pointe aux Cannoniers showing the area covered by each species was obtained. *T. ciliatum* was predominant reefward, whereas *S. isoetifolium* was found mostly inshore with patches of *Halop. ovalis* and *Halod. uninervis* scattered in the lagoon.

**Table 2.** Total occupied area of each species in survey area (2,500m<sup>2</sup>) at Pointe aux Cannoniers

Species name	Occupied area (m <sup>2</sup> )	% in total seagrass area
<i>Halophila ovalis</i>	12	1
<i>Halop. stipulacea</i> *	+	+
<i>Halodule uninervis</i>	42	3
<i>Syringodium isoetifolium</i>	620	50
<i>Thalassodendron ciliatum</i>	381	30
<i>S. isoetifolium + Jania spp.</i>	197	16
<b>Total Seagrass Area</b>	<b>1,252</b>	<b>100</b>

\* *H. stipulacea* was observed at Pointe Aux Cannoniers but was not recorded more than 1% in the quadrate.

Although there was little *Holop. stipulacea* within the survey area, small patches of this species were observed around the Pointe aux Canonniers site. Patches of *S. isoetifolium* in association with *Jania* spp. (macroalgae) were present in the shoreside of the survey area. It is to be noted that the determination of shoot density was not effected for Pointe aux Canonniers site due to time constraint.

A comparison between the two sites is shown in Table 3. The particular distribution patterns of seagrass at the two sites may be linked to the types of bottom sediment as well as the hydrodynamics of the area. The relationship between seagrass cover and sediment type will also be investigated.

**Table 3.** A comparison of characteristics between seagrass beds at the two sites

Site	Albion	Pointe aux Canonniers*
Composition	4 species	5 species
	<i>Halophila ovalis</i> <i>Halophila stipulacea</i> <i>Halodule uninervis</i> <i>Syringodium isoetifolium</i>	<i>Halophila ovalis</i> <i>Halophila stipulacea</i> ** <i>Halodule uninervis</i> <i>Syringodium isoetifolium</i> <i>Thalassodendron ciliatum</i>
Species distribution	Banded pattern	Mozaic pattern
Dominant species	<i>Halodule uninervis</i>	<i>Syringodium isoetifolium</i>

\* Density estimation was not performed at Pointe aux Canonniers.

\*\* *H. stipulacea* was observed at Pointe Aux Cannoniers but was not recorded more than 1% in the quadrat under study.

The baseline data obtained will help in the sustainable management of the coastal zones of Mauritius. Consequently, the same exercise is expected to be carried out at other selected sites around the island where seagrasses are found. The research for seagrass bed conservation will also be anticipated to include measurement of such factors affecting seagrasses or seagrass beds which are seawater temperature, salinity, seawater movement, light intensity, turbidity, and others. Regular monitoring on a quarterly basis will be effected in order to assess any unseasonal change due to natural phenomena (i.e. cyclones, droughts, heavy rainfall and others) and other anthropogenic impacts.

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