



# ARQUIVOS DO MUSEU BOCAGE

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Nova Série, Vol. III, n.º 9, pp. 265-286

17 de Agosto de 1999

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## FISHES OF THE SEAGRASS BEDS OF THE INHACA ISLAND (MOZAMBIQUE) - COMMUNITY STRUCTURE AND DYNAMICS

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### INTRODUCTION

Inhaca is the most important fisheries place of Maputo's Bay (Sanches, 1961) and there are fishermen in 52 % of the local families (G.T.A, 1990).

The importance of seagrass beds as important nursery areas has been demonstrate all around the world (Baelde, 1990; Blaber *et al.*, 1992; Almeida, 1994; Almeida *et al.*, *in press*).

Seagrass beds are also characterised by the seasonal change on the structural composition of their ichthyofaunas (Kikuchi, 1966; Adams 1976 a,b; Weinstein & Heck, 1979; Bett & Harmellin-Vivien 1982; Kimura *et al.*, 1983; Pollard, 1984; Robblee & Zieman, 1984; Whitfield *et al.*, 1989; Bouchon-Navaro *et al.*, 1992 and Almeida, 1994).

The ichthyofauna of the seagrass of Inhaca's Island (subtropical) was previously study by Almeida *et al.* (*in press*) during the cold season who found 66 species, before that Macnac & Kalk (1962) listed 43 species, Sanches (1963) did

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This study was carried out within an EC Project — Contract n.º TS3-CT92-0114: "Inter linkages Between Eastern-African Coastal Ecosystems".

not refer to seagrass as the habitat for his 134 species cited, and Snuith (1969) only indicated 10 species associated with seagrass beds in his list of 573 tropical fishes.

In southern Africa, Whitfield *et al.* (1989) and Ter Morshuizen & Whitfield (1994) studied the ichthyofauna in *Zostera capensis* beds.

The main objectives of this paper were: to study the community structure and dynamics of the fish fauna associated with seagrass beds of *Thalassodendron ciliatum* / *Cymodocea serrulata* and *Thalassia hemprichii* / *Halodule wrightii* in areas that are exploited by local population and to establish the basis for a future management of these communities.

### STUDY AREA

The island of Inhaca is located about 32 Km from Maputo on the east coast of Africa (Mozambique) at 26.° south and 33,57.° east (fig. 1).

Sampling was carried out in two locations, located in areas of high densities of seagrass. The sampling stations are all exploited by the local population.

The most recent geographic distribution of the seagrass around the Inhaca Island was established by Bandeira (1991) (fig. 1).

### MATERIAL AND METHODS

Material was collected during twelve sampling operations carried out from July 1993 to July 1994 at two stations: One located in area of *Thalassodendron ciliatum* / *Cymodocea serrulata* association and the other in *Thalassia hemprichii* / *Halodule wrightii*. These seagrass beds, at high tide, are about 5-6 meters depth.

Sampling was performed during the day by means of a beam trawl net (rectangular mouth of 50x150 cm and 1 cm mesh aperture) towed for 10 minutes at a speed of 1.5 knots. At Station I sampling was sometimes carried out during the night. The material was obtained at high tide at the first quarter of the moon in a total of thirty-six samples (12 day samples + 12 night samples at Station I and 12 day samples at Station II).

The sampled individuals were identified to the species level. Individuals of *Apogon nigripinnis*, *Apogon cooki*, *Plotosus lineatus*, *Siganus sutor*, *Paramonocanthus barnardi* and *Pelates quadrilineatus* were measured to the nearest millimetre (total length), and weighted (mg).

Cluster analysis of the thirty six samples, based in the number of individuals of the 44 more abundant species (excluding the species represented by only one

individual) was used with rough data to compute a Bravais-Pearson correlation coefficient symmetrical matrix. UPGMA was employed for the construction of the dendrogram and the software used for was NTSYS-PC v.s.1.6 by James F. Rohlf.

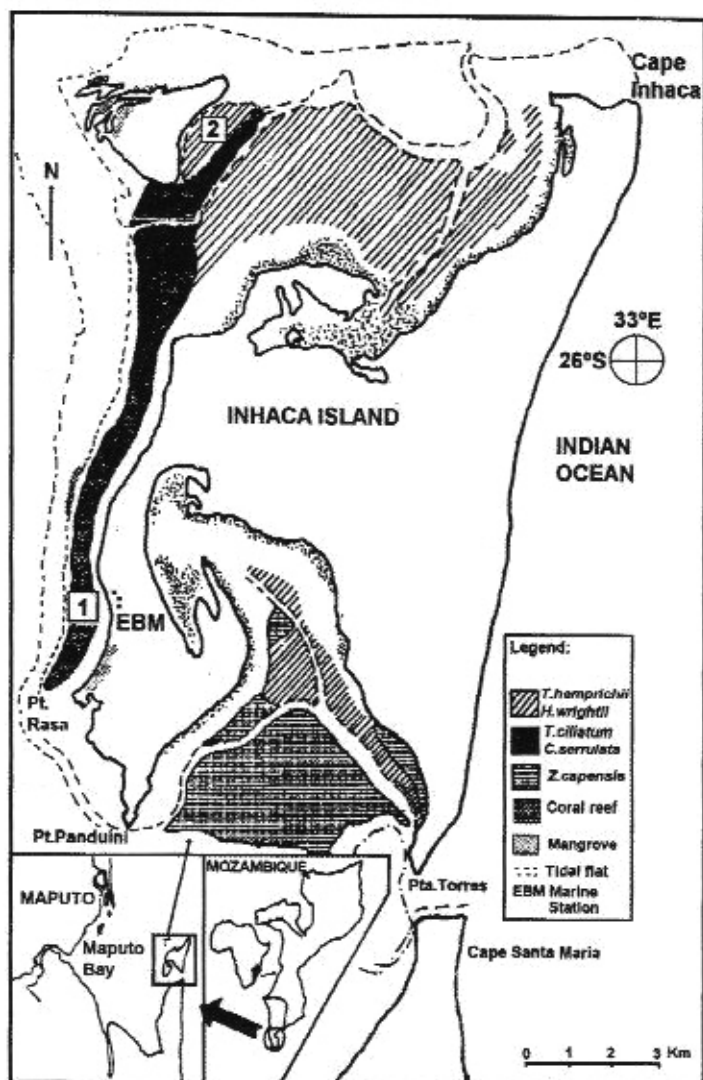


Fig. 1 — Sampling areas:

- 1 — Estação de Biologia Marinha — Station I
- 2 — Banco da Sangula — Station II

## RESULTS

The thirty-six samples comprised 5922 individuals representing 66 species in 30 families (Table I, II, and III).

In these samples the Families Labridae (with 7 species), Lethrinidae (with 6 species), Scorpaenidae, (with 5 species), Apogonidae, Mullidae and Syngnathidae (with 4 species) were the best represented in numbers of species.

#### Station I (Estação de Biologia Marinha)

##### Diurnal samples

The twelve day samples show 7 species of a total of 44 could be considered as resident (frequency of capture  $> 75\%$ ) (species in bold in the tables), nine species as transitive (frequency of capture  $> 25\% - 75\% <$ ) and the other 26 species as occasional (frequency of capture  $\leq 25\%$ ) (Table I).

The diurnal catch at Station I (table I) was characterised by the presence of four species (excluding *Plotosus lineatus* because this species only appeared in February and with a large number of individuals — 654, that explained the high total weight in this catch): *Paramonocanthus barnardi* (336 individuals — 27,7 % by number), *Apogon nigripinnis* (151 individuals — 12,5 % by number), *Siganus sutor* (188 individuals — 15,5 % by number) and *Pelates quadrilineatus* (179 individuals — 14,7 % by number).

Eight species were only caught in this diurnal samples and all with only one individual (*Cirrhilabrus exquesitus*, *Upeneus tragula*, *Pseudochromis natalensis*, *Scarus scaber*, *Dendrochirus brachypterus*, *Scorpaenodes guamensis*, *Sebastapistes strongia* and *Epinephelus septemfasciatus*).

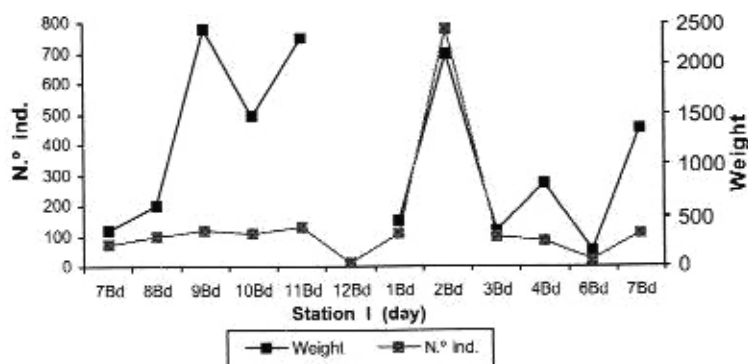


Fig. 2 — Evolution of the number of individual (N.º) and weight (g) along the 12 months at Station I (Bd - day samples)

At the Station I (day samples) the high values in February in the number of individuals and weight is due to the presence of 645 young *Plotosus lineatus* which represented 85 % of the total catch of that month and also responsible for the low values of the Shannon index, Equitability and Margalef's index (Fig. 3).

Table I — List and total catches of the fish species in Station I (diurnal samples)  
— in bold the resident species

Station I (First quarter of moon)	BM	BM	BM	BM	BM	BM	BM	BM	BM	BM	BM	BM	% F
Diurnal samples	D	D	D	D	D	D	D	D	D	D	D	D	
Month	7	8	9	10	11	12	1	2	3	4	6	7	
N. <sup>o</sup> of Individuals	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	
<i>Apogon nitidus</i>				1									8.33
<i>Apogon cooki</i>			3	1	1		41		4	2		1	58.33
<b><i>Apogon nigriflammis</i></b>	1	13	19	24	13	2	21	6	30	20	1	1	100.00
<i>Archamia mozambicensis</i>		1											8.33
<i>Petroscirtes breviceps</i>	1	1		2		3		3		1	1	1	66.67
<i>Aeoliscus punctulatus</i>	7		5	4	9		11		10	2	3		66.67
<i>Chaetodon aunga</i>				1						1			16.67
<i>Lophodiodon calori</i>			3	4	6		1					2	41.67
<i>Cheilodactylus inermis</i>		1	2	3					1	1			41.67
<i>Novaculichthys macrolepidopus</i>	2				4	2	2			1	2		50.00
<i>Novaculichthys taeniourus</i>					1								8.33
<i>Pteragogus flagellifer</i>		1											8.33
<b><i>Stethojulis interrupta</i></b>	1	1	2		12	4	6		4	4	1		75.00
<i>Paracheilinus</i> sp				4	11								16.67
<i>Cirrhitilabrus exquesitus</i>				1									8.33
<i>Lethrinus lentjan</i>				2		2	3						25.00
<i>Lethrinus nebulosus</i>	1												8.33
<i>Lutjanus chremerbergi</i>											1		8.33
<i>Lutjanus fulviflamma</i>			2				1		4				25.00
<b><i>Paramonocanthus barnardi</i></b>	9	40	86	46	62	5	38		11	16	8	17	91.67
<i>Parupneus rubescens</i>					5			1	1		2	1	41.67
<i>Parupneus indicus</i>												2	8.33
<i>Upeneus tragula</i>						1							8.33
<i>Lactoria cornuta</i>					1								8.33

<i>Sorsogona prionata</i>	1	1							1				25.00
<i>Plotosus lineatus</i>								654					8.33
<i>Chysiptera annulata</i>	2	1	5	3	6	1	6		8	18	2		83.33
<i>Pseudochromis natalensis</i>		1											8.33
<i>Calotomus spinidens</i>	3			1		1							25.00
<i>Leptoscarus vaigiensis</i>	1	1	2	2	3		3		2	2	1	2	91.67
<i>Scarus scaber</i>				1									8.33
<i>Dendrochirus brachypterus</i>						1							8.33
<i>Parascorpaena mossambica</i>	1		1							5	1	1	41.67
<i>Scorpaenodes guamensis</i>				1									8.33
<i>Sobastapistes strongia</i>						1							8.33
<i>Epinephelus rivulatus</i>				1									8.33
<i>Epinephelus septemfasciatus</i>				1									8.33
<i>Siganus sutor</i>	5	15	16	3	13	1	3	27	23	9	10	63	100.00
<i>Hippocampus camelopardalis</i>					1		1						16.67
<i>Syngnathoides biaculeatus</i>	3	1	1	1				2	2	2		1	66.67
<i>Saurida gracilis</i>	1												8.33
<i>Pelates quadrilineatus</i>	23	5	2	6	9		2	72	8	7	2	43	91.67
<i>Canthigaster solandri</i>										1		1	16.67
N.º TOTAL OF INDIVIDUALS	62	83	149	113	159	27	139	765	109	90	35	136	1867
N.º SPECIES	16	14	14	22	16	13	15	7	14	15	13	13	

At this station (Estação de Biologia Marinha) and in diurnal samples, Almeida *et al.* (*in press*) caught three other species: *Cantherrhines fronticinctus* (1 individual at 20/7/93 — new moon), *Ptarmus jubatus* (1 individual at 2/8/93 — full moon), *Stegastes fasciolatus* (2 individual at 2/8/93 — full moon).

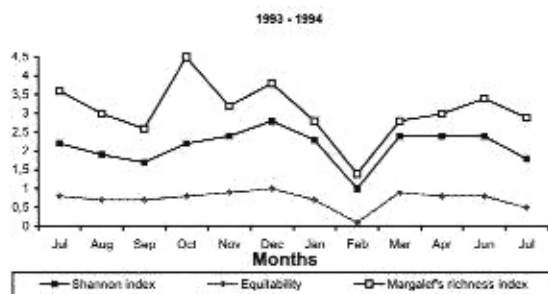


Fig. 3 — Month variation of the different index at Station I (day samples)

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<i>Lophodiodon calori</i>					16		1	2			10		33.33
<i>Pleorhynchus flaromaculatus</i>	1		5		2						2		33.33
<i>Novaculichys macrolepidopus</i>					8								8.33
<i>Pteragogus flagellifer</i>	1												8.33
<i>Stethojulis interrupta</i>					1								8.33
<i>Lothrinus variegatus</i>		3											8.33
<i>Lethrinus lentjen</i>	6	1			7								25.00
<i>Lethrinus rubrioperculatus</i>		1		1									16.67
<i>Lethrinus ramak</i>		1											8.33
<i>Lutjanus ehrenbergi</i>											4		8.33
<i>Lutjanus fulviflamma</i>	1		1			1		2	8				41.67
<b><i>Paramonocanthus barnardi</i></b>	22	3	105	6	47	18	20	3	80	5	62	3	100.00
<i>Stephanolepis auratus</i>											3		8.33
<i>Parupneus rubescens</i>						3	2	1			8		33.33
<i>Parupneus cinnabarinus</i>	1												8.33
<i>Parupneus indicus</i>					1		1				3		25.00
<i>Lactoria cornuta</i>						1	1						16.67
<i>Sorsogona prionata</i>	2			7		5							25.00
<i>Plotosus lineatus</i>	1		7		1			36	286		1		50.00
<i>Plotosus nkunga</i>	1												8.33
<i>Chrysiptera annulata</i>	4		2		4	1	1	5	18		7		66.67
<i>Calotomus spinidens</i>				1	1	6	1	1	1				50.00
<i>Leptoscarus vaigiensis</i>	5		14		3	1			5		9		50.00
<i>Parascorpaena mossambica</i>	2				3	1					1		33.33
<i>Epinephelus rivulatus</i>					1								8.33
<b><i>Siganus sutor</i></b>	8	85	19	275	12	158		58	166	9	150	5	91.67
<i>Crenidens crenidens</i>									1				8.33
<i>Hippocampus camelopardalis</i>			2										8.33
<b><i>Syngnathoides blaculeatus</i></b>	3	1	11		2	2	2	1	3		4		75.00
<i>Trachyrhamphus bicoartatus</i>							1						8.33
<i>Saurida gracilis</i>								6			2		16.67
<b><i>Pelates quadrilineatus</i></b>	38	27	42	48	27	32	15	65	235	65	88	10	100.00
<i>Arothron immaculatus</i>						1							8.33
<i>Canthigaster solandri</i>									1				8.33
N.º TOTAL OF INDIVIDUALS	135	153	250	359	175	268	113	238	897	100	503	29	3220
N.º SPECIES	20	12	14	10	22	18	15	14	16	5	20	5	



In December *Siganus sutor* consisting of large individuals is responsible for 65 % of the total weight. The peak observed during March was caused by the presence of young *Plotosus lineatus*, *Pelates quadrilineatus* and *Siganus sutor* (Fig. 4).

At this station (Estação de Biologia Marinha) and during the night, Almeida *et al.* (*in press*) caught four other species: *Scarus tricolor* (1 individual at 10/7/93 — first quarter of moon), *Scorpaenodes littoralis* (1 individual at 10/7/93 — first quarter of moon), *Upeneus tragula* (1 individual at 18/7/93 — new moon) and *Epinephelus andersoni* (1 individual at 18/7/93 — new moon).

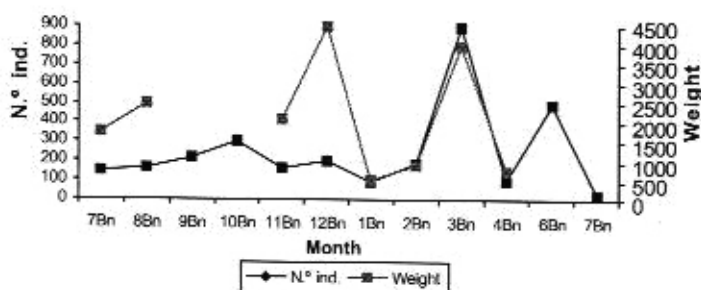


Fig. 4 — Evolution of the number of individual (N°) and weight (g) along the 12 months at Station I (Bn - night samples)

The richness index of Margalef and the Shannon index have small values in April and July 1994 because only 5 species were caught (Fig. 5).

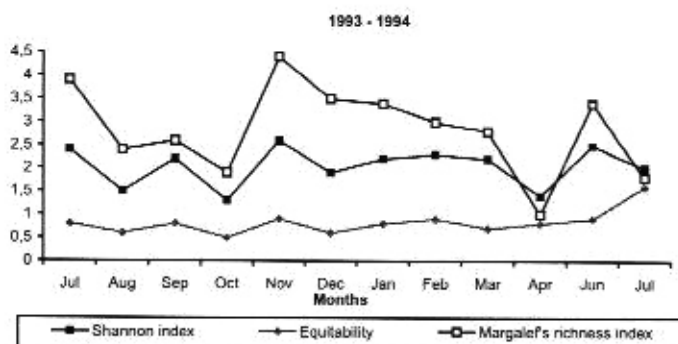


Fig. 5 — Month variation of the different index at Station I (night samples)

### Station II (Banco da Sangala)

In Station II four of forty-three species were, dominant by number: *Pelates quadrilineatus* (124 individuals — 14,8 %), *Paramonocanthus barnardi* (124 individuals — 14,8 %), *Siganus sutor* (98 individuals — 11,7 %) and *Chrysiptera annulata* (77 individuals — 9,2 %) (Table III).

Two of the five resident species are common with those of Station I (*Paramonocanthus barnardi*, and *Siganus sutor*).

Ten species were, only caught at this station. Six with one individual (*Antennarius pictus*, *Bothus paratherinus*, *Chaetodon vagabundus*, *Hippocampus histrix*, *Arothron hispidus* and *Ablabys binotatus*), two with two (*Platycephalus indicus* and *Pterois milas*), one with three (*Dascyllus trimaculatus*) and another one with seven (*Lethrinus hypselopterus*).

The peak in weight in January is due to the presence of 10 *Lutjanus fulvivlamma* that represented 75 % of the total weight (Fig. 6).

At this station (Banco da Sangala) and during the day, Almeida *et al.* (*in press*) have caught four other species: *Plectorhynchus flavomaculatus* (1 individual at 18/7/93 — new moon), *Papilloculiceps longiceps* (1 individual at 18/7/93 — new moon), *Hippocampus kuda* (1 individual at 18/7/93 — new moon) and *Arothron immaculatus* (1 individual at 12/7/93 — second quarter of moon). During March the values of the diversity indices was lower (Fig. 7). Table IV indicates the status of the 66 species at the different stations and under the sampling conditions.

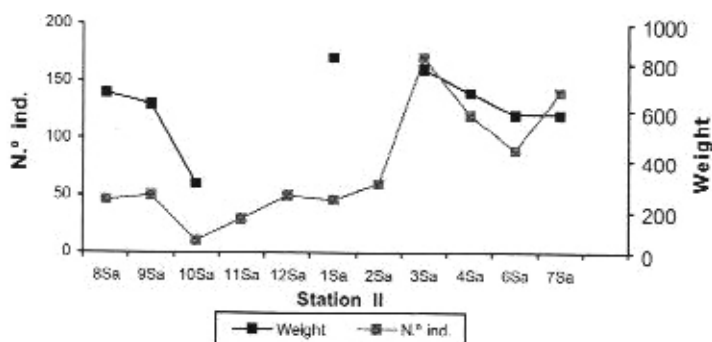


Fig. 6 — Evolution of the number of individual (N.º) and weight (g) along the 12 months at Station II

Table III — List and total catches of the fish species in Station II (diurnal samples)  
— in bold the resident species

Station II (First quarter of moon)	San	San	San	San	San	San	San	San	San	San	San	San	% F
Diurnal samples	D	D	D	D	D	D	D	D	D	D	D	D	
Month	7	8	9	10	11	12	1	2	3	4	6	7	
N. <sup>o</sup> of Individuals	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	N. <sup>o</sup>	
<i>Antennarius pictus</i>	1												8.33
<i>Apogon cooki</i>										3			8.33
<i>Apogon nigripinnis</i>									7	9	1		25.00
<i>Petroscirtes broviceps</i>								1	6	2	3	3	41.67
<i>Bothus paratherinus</i>						1							8.33
<i>Aeoliscus punctulatus</i>	2		7		3	11					2		41.67
<i>Chaetodon auriga</i>	2	3	4								1		33.33
<i>Chaetodon vagabundus</i>			1										8.33
<i>Cynoglossus durbanensis</i>		1											8.33
<i>Cynoglossus lachneri</i>	1												8.33
<i>Lophodiodon calori</i>	1					3	2		3				33.33
<i>Chellio inermis</i>		1	1					1			1	30	41.67
<i>Novaculichthys macrolepidopus</i>		4	1		3	1		1		2	4	1	66.67
<i>Pteragogus flagellifer</i>		3											8.33
<i>Stethojulis interrupta</i>	13	4					2	2		3	5	21	58.33
<i>Lethrinus hypsilepterus</i>	7												8.33
<i>Lethrinus nebulosus</i>				1									8.33
<i>Lethrinus rubrioperculatus</i>	4												8.33
<i>Lutjanus ehrembergi</i>										4	2		16.67
<i>Lutjanus fulviflamma</i>	5						10		3				25.00
<b><i>Paramonocanthus barnardi</i></b>	13	7	10	3	9	18	9	11	8	3	20	13	100.00
<i>Stephanolepis aratus</i>			1										8.33
<i>Parupneus rubescens</i>												1	8.33
<i>Lactoria cornuta</i>						1		1				1	25.00
<i>Platycephalus indicus</i>	1							1					16.67
<i>Sorsogona prionata</i>						1							8.33
<i>Plotosus lineatus</i>	2	1									3		25.00
<b><i>Chysiptera annulata</i></b>	1	1		1	1			7	42	17	3	4	75.00
<i>Dascyllus trimaculatus</i>		2		1									16.67
<i>Calotomus spinidens</i>	1	1	3				1	2					41.67
<b><i>Leptoscarus vaigiensis</i></b>	5	3	1	1		1	1		2	2	2	4	83.33
<i>Parascorpaena mossambica</i>			2			3							16.67
<i>Pterois miles</i>			1					1					16.67

<i>Siganus sutor</i>	8	10	12	3	5	1	1	10	6	4	9	29	100.00
<i>Hippocampus camelopardalis</i>		1					1						16.67
<i>Hippocampus histrix</i>	1												8.33
<i>Syngnathoides biaculeatus</i>	7	1	1	4	4	4	3	1			5	4	83.33
<i>Saurida gracilis</i>	1		1									3	25.00
<i>Polates quadrilineatus</i>		1	1					25	106	55	1	22	58.33
<i>Arothron hispidus</i>				1									8.33
<i>Canthigaster solandri</i>										1	1	1	25.00
<i>Ablabys binotatus</i>												1	8.33
N.º TOTAL OF INDIVIDUALS	76	44	47	15	25	45	30	64	183	105	63	138	835
N.º SPECIES	19	16	15	8	6	11	9	13	9	12	16	15	

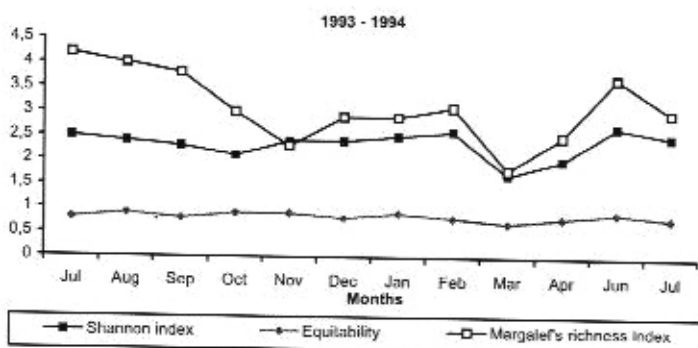


Fig. 7 — Month variation of the different index at Station II

Table IV — Status of the 66 species at the different stations and sampling conditions

BM/D — Station I (Estação de Biologia Marinha) day samples

BM/N — Station I (Estação de Biologia Marinha) night samples

SAN — Station II (Banco da Sangala)

R — resident species; O — occasional species; T — transitive species

Station (First quarter of moon)	EBM/D	EBM/N	SAN
<i>Antennarius pictus</i>			O
<i>Platymus jubatus</i>		T	
<i>Apogon nitidus</i>	O	O	
<i>Apogon cooki</i>	T	R	O
<i>Apogon nigripinnis</i>	R	R	O
<i>Archamia mozambiquensis</i>	O		
<i>Petroscirtes brevicaps</i>	T	T	T

<i>Bothus paratherinus</i>			O
<i>Aeoliscus punctulatus</i>	T	R	T
<i>Chaetodon auriga</i>	O	T	T
<i>Chaetodon vagabundus</i>			O
<i>Cynoglossus durbanensis</i>		O	O
<i>Cynoglossus lachneri</i>		O	O
<i>Lophodiodon calori</i>	T	T	T
<i>Pleorhynchus flavomaculatus</i>		T	
<i>Cheilio inermes</i>	T		T
<i>Novaculichthys macrolepidopus</i>	T	O	T
<i>Novaculichthys taeniourus</i>	O		
<i>Pteragogus flagellifer</i>	O	O	O
<i>Stethojulis interrupta</i>	R	O	T
<i>Paracheilinus</i> sp	O		
<i>Cirrhitilabrus exquesitus</i>	O		
<i>Lethrinus hypselopterus</i>			O
<i>Lethrinus letjen</i>	O	O	
<i>Lethrinus nebulosus</i>	O		O
<i>Lethrinus rubrioperculatus</i>		O	O
<i>Lethrinus variegatus</i>		O	
<i>Lethrinus ramak</i>		O	
<i>Lutjanus ohrenbergi</i>	O	O	O
<i>Lutjanus fulviflamma</i>	O	T	O
<b><i>Paramonocanthus barnardi</i></b>	R	R	R
<i>Stephanolepis auratus</i>		O	O
<i>Parupneus rubenscens</i>	T	T	O
<i>Parupneus cinnabarinus</i>		O	
<i>Parupneus indicus</i>	O	O	
<i>Upeneus tragula</i>	O		
<i>Lactoria cornuta</i>	O	O	O
<i>Platycephalus indicus</i>			O
<i>Sorsogona prionata</i>	O	O	O
<i>Plotosus lineatus</i>	O	T	O
<i>Plotosus nkunga</i>		O	

<i>Chrysiptera annulata</i>	R	T	R
<i>Dascyllus trimaculatus</i>			O
<i>Pseudochromis natalensis</i>	O		
<i>Calotomus spinidens</i>	O	T	T
<i>Leptoscarus vaigiensis</i>	R	T	R
<i>Sacrus scabor</i>	O		
<i>Dendrochirus brachyphorus</i>	O		
<i>Parascorpaena mossambica</i>	T	T	O
<i>Scorpaenodes guarnensis</i>	O		
<i>Pterois miles</i>			O
<i>Sebastapistes strongia</i>	O		
<i>Epinephelus rivulatus</i>	O	O	
<i>Epinephelus septemfasciatus</i>	O		
<b><i>Siganus sutor</i></b>	R	R	R
<i>Crenidens crenidens</i>		O	
<i>Hippocampus camelopardalis</i>	O	O	O
<i>Hippocampus histrix</i>			O
<i>Syngnathoides biaculeatus</i>	T	R	R
<i>Trachyrhamphus bicoartatus</i>		O	
<i>Saurida gracilis</i>	O	O	O
<i>Pelates quadrilineatus</i>	R	R	T
<i>Arothron immaculatus</i>		O	
<i>Arothron hispidus</i>			O
<i>Canthigaster solandri</i>	O	O	O
<i>Ablabys binotatus</i>			O
N. <sup>o</sup> SPECIES	44	44	43

## DISCUSSION

The distribution of the most abundant species is different in Stations I and II and also between diurnal and night samples (fig 8). In the seagrass association *Thalassodendron ciliatum* / *Cymodocea serrulata* (Station I), *Apogon nigripinnis*, *Paramonocanthus barnardi*, *Siganus sutor* and *Pelates quadrilineatus* are resident species and in the association *Thalassia hemprichii* / *Halodule wrightii* (Station II), the residents species are *Paramonocanthus barnardi*, *Chrysiptera annulata*, *Leptoscarus vaigiensis*, *Siganus sutor* and *Syngnathoides biaculeatus*. As Bell and Pollard (1989: 565) pointed out "assemblages of fish from different

seagrass habitats often vary in species composition, even when these habitats are adjacent."

*Apogon nigripinnis* is always present at Station I (Estação de Biologia Marinha) but only in March, April and June at Station II (Banco da Sangala) with few individuals (fig 8a). *Apogon cooki* is one of the most important species at night at Station I (fig. 8b). This two species are eaten by the local population, but the former is consumed more because the fishery activity is done during the day.

*Plotosus lineatus* shows a very interesting distribution with a high number of juveniles in February / March at Station I. (fig 8c). This fact suggests that this species uses the seagrass beds as a nursery area during these months.

*Paramonocanthus barnardi* is not very abundant at Station II but in some samples it is more abundant then the diurnal samples of the Station I (fig 8d).

*Siganus sutor* presented a very irregular distribution varying from low to high density in successive months (fig 8e).

*Pelates quadrilineatus* seems to be more abundant in February/March/April at the two stations (fig 8f).

Cluster analysis of the thirty six samples, based in the number of individuals of the 44 more abundant species (excluding the species represented by only one individual), showed that the structure of the fish community was different at the two stations and also during the day and the night. For this analysis rough data was used to compute a Bravais-Pearson correlation coefficient symmetrical matrix. The resulting UPGMA dendrogram is shown in fig. 9.

The presence of a coral reef near Station I and the different composition of the seagrass association at the two Stations is the explain the differences between Station I and II. Higher catch rats were obtained in night samples because must fish species show a diurnal activity and remain inactive near the bottom during the night. These seagrass associations are both subjected to temporal variations due to the presence of several seasonal species and/or to the seasonal presence of different age-classes of the same species.

This dynamic is known in all seagrass beds around the world (Young, 1981).

Doing to this structure of the fish community local fisherman did not practice a directional fishery but a generally one. The must usually fishing gear is gillnetting, traps and manual beam trawl.

A comparison of our list of species (table IV) with that presented by (Sousa & Dias, 1981) and Fischer *et al.* (1990), indicates that 44% of the fishes species captured in Inhaca seagrass beds are commercially important. Some of the remaining species are also consumed by local populations. Seagrass beds are very important because 52 % of the local families are involved in the fisheries activities (G.T.A., 1990). These activities furnish about 133.000 Kg/year for consumption and the catch of molluscs and crustacean, made mainly by the women, furnish a supply of about 111.747.200 Kcal/year (Lopes, 1985).

At present, a total of 73 species of fish have been captured in the seagrass beds around Inhaca Island (data from this paper and Almeida *et al.* in press).

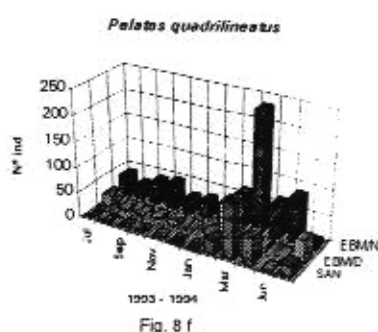
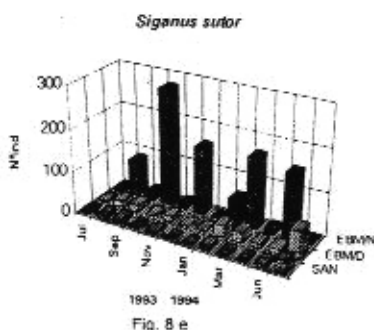
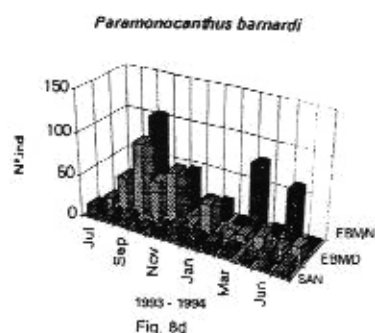
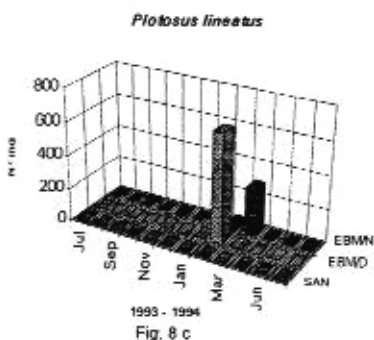
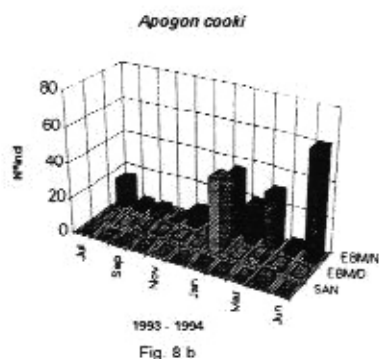
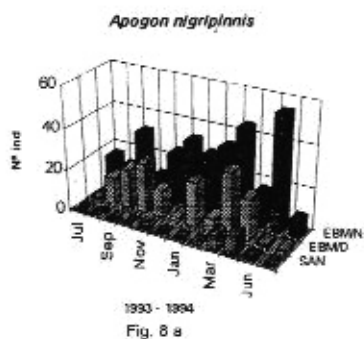


Fig. 8 — Distribution of the most abundant species at Station I (Estação de Biologia Marinha) and Station II (Banco da Sangala)

SAN — Banco da Sangala

EBM/D — Estação de Biologia Marinha — diurnal samples

EBM/N — Estação de Biologia Marinha — night samples



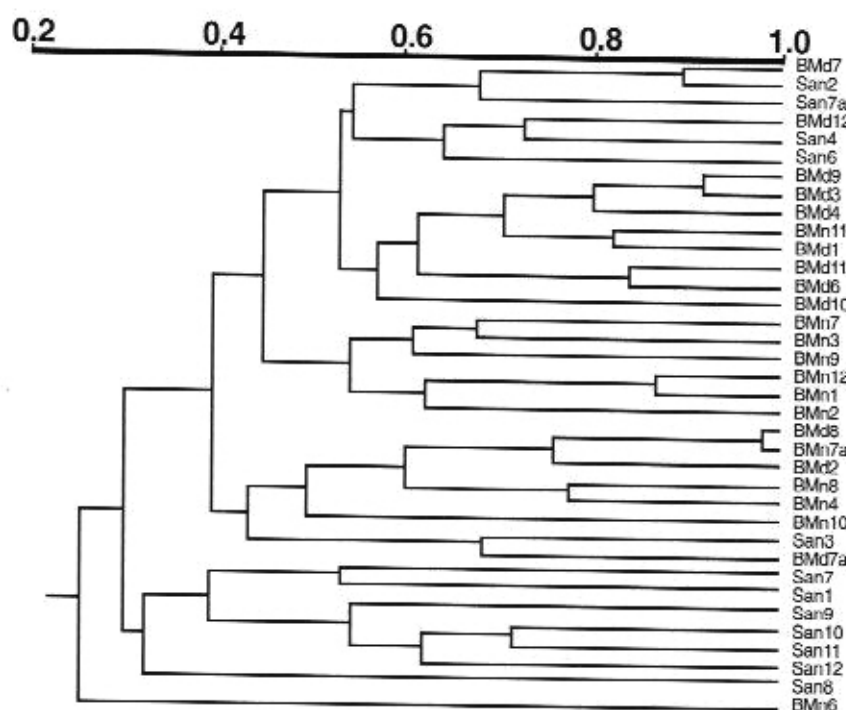


Fig. 9 — Cluster analysis of the different fish samples collected at Inhaca island since July 1993 until July 1994 (Bravais-Pearson correlation coefficient).

BMd — Station I (Estação de Biologia Marinha) day samples

BMn — Station I (Estação de Biologia Marinha) night samples

San — Station II — (Banco da Sangala)

The numbers indicate the month of the sample (7a - represents July 1994)

## SUMMARY

The ichthyofauna of seagrass beds in Inhaca Island (Mozambique) were studied at two different stations from July 1993 to July 1994. Sixty-six species of fishes belonging to thirty families were collected. Two sampling areas were chosen in order to study the structure, and dynamic of the fish fauna associated with seagrass beds of *Thalassodendron ciliatum* / *Cymodocea serrulata* and *Thalassia hemprichii* / *Halodule wrightii* at Inhaca island. The stations were all located in areas of high densities of seagrass exploited by the local population. Forty-four percent of the species captured in the seagrass of Inhaca's island have a commercial importance, and almost of them are consumed by the local population. The thirty-six samples show that three species (*Paramonocanthus barnardi*, *Siganus sutor* and

*Pelates quadrilineatus*) are resident species at the two samplings areas. Some species have a seasonal distribution such as *Plotosus lineatus*. The fish fauna associated with seagrass is essentially composed of young fishes.

## RESUMO

A ictiofauna dos povoamentos das Angiospermicas Marinhas da Ilha da Inhaca (Moçambique) foi estudado em dois locais entre Julho de 1993 e Julho de 1994. Sessenta e seis espécies de peixes pertencentes a trinta famílias diferentes foram capturados. Dois locais de estudo foram escolhidas para determinar a estrutura e a dinâmica da ictiofauna associada aos povoamentos mistos de angiospermicas marinhas constituídos por *Thalassodendron ciliatum* / *Cymodocea serrulata* e *Thalassia hemprichii* / *Halodule wrightii* na ilha da Inhaca (Moçambique). A selecção dos locais de estudo teve em consideração o facto de ser em zonas em que esses povoamentos eram muito densos e sobre os quais as populações locais exercem a sua actividade piscatória. As trinta e seis colheitas efectuadas demonstraram que três espécies (*Paramonocanthus barnardi*, *Siganus sutor* and *Pelates quadrilineatus*) eram espécies residentes nesses locais. Algumas espécies como é o caso de *Plotosus lineatus* apresentam uma presença sazonal. A ictiofauna presente nestes povoamentos de angiospermicas marinhas é essencialmente constituída por juvenis.

## ACKNOWLEDGEMENTS

Thanks are due to Domingos Gove (Director of the "Estação de Biologia Marinha da Inhaca") for the facilities offered, to Adriano Macio Jr. for his support.

An anonymous referee helped to improve the manuscript quality.

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