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DISTRIBUTION OF MYSIDACEA (CRUSTACEA) IN THE CANANEIA REGION

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DISTRIBUIÇÃO DE MYSIDACEA (CRUSTACEA) NA REGIÃO DE CANANÉIA

RESUMO

Este trabalho apresenta o estudo de alguns aspectos ecológicos das espécies hipopelágicas de Mysidacea, coletadas na região lagunar de Cananéia, entre Lat. 25°04'S-24°58'S e Long. 47°54'W-47°56'W.

Na realização deste trabalho foram utilizadas amostras de plâncton, coletadas mensalmente em 12 Estações, localizadas desde a proximidade da Barra de Cananéia até o interior dos "marigots". Coletas de plâncton foram feitas em profundidade, com rede D e, em superfície, com rede cônica de zooplâncton.

É analizada a distribuição espacial das espécies de *Mysidacea* no estuário em relação à salinidade, oxigênio dissolvido e profundidade de coleta e a variação sazonal, em relação à temperatura.

São discutidos alguns aspectos do ciclo de vida das espécies, com base na ocorrência de diferentes estágios de desenvolvimento.

ABSTRACT

Six species of hypopelagic mysids were collected in the lagunar region of Cananeia (Lat. 25°04'S-24°58'S and Long. 47°54'W-47°56'W). *Mysidopsis tortonesi, Brasilomysis castroi* and *Metamysidopsis elongata atlantica* with a wide distribution, *Bowmaniella (C.) brasiliensis* and *Promysis atlantica* with a distribution limited to the entrance of the main channel and *Mysidopsis coelhoi* which was rarely found at St. I and III. The quantitative horizontal distribution decreases in low values of salinity and dissolved oxygen. The largest occurrences of Mysidacea was recorded at deeper stations, where light penetration is minimal. *Mysidopsis tortonesi* was the dominant species in autumn, spring and winter and *Brasilomysis castroi* in summer. *Mysidopsis tortonesi* and *Metamysidopsis elongata atlantica* were more abundant in spring, *Brasilomysis castroi* in summer and *Promysis atlantica* occurred only during winter. There are good indications that young specimes migrate to surface layers at night while adults remain close the bottom. The co-existence, throughout the year, of a population composed by great number of young specimens and small number of adults, including gravid females, indicates continuous reproduction of these species.

Número especial em homenagem ao Prof. Dr. Paulo Sawaya, no ano jubilar de seu magistério.

INTRODUCTION

Mysidacea have been considered an important element of the estuarine plankton. There are very few ecological records on shallow water mysids from tropical regions (Bainbridge, 1960; Ganapati & Shyamasindari, 1959/62; Goodbody, 1965). The first assessment of mysids in South America was carried out by Almeida Prado (1972, in press).

This report is based on an annual collections of samples from the Cananeia region. The horizontal and vertical distribution of mysids, their seasonal variation and breeding are studied along the estuary.

Cananeia region is a mangrove environment situated on the São Paulo south coast (Brazil). It is composed by ramified channel which surrounds Cananeia Island. The channel is 1 to 3 km wide and 6 to 7 m depth, although sometimes it is as deep as 20 m. It receives oceanic waters through the barra de Cananeia and fresh water comes from rivers, "marigots" and land drainage (Kutner, 1962).

The area studied is limited by lat. 25°04'S-24°58'S and long. 47°56'W-47°54'W (Figs. 1 and 2).

MATERIAL AND METHODS

During a one year period, plankton samples were taken monthly at 12 stations covering an area extending from the entrance of the main channel to the interior of the "marigots" (Fig. 2). The samples were taken with a D-net (mesh 295 μ), in the depth, and with a conical zooplankton net (mesh 295 μ), at the surface (Almeida Prado, 1972). Both nets were towed horizontally against tidal movements for a period of 5 minutes.

Plankton samples were preserved in alcohol 70% soon after collection. The material collected with D-net was washed with sea water through a sieve (mesh 295 μ) before preservation. Then the mysids were picked from the samples and counted up.

Due to the large number of specimens the following classification criterium of the developmental stages was adopted: young (secondary sexual characteristics absent or in development), adult male, adult female and gravidic female.

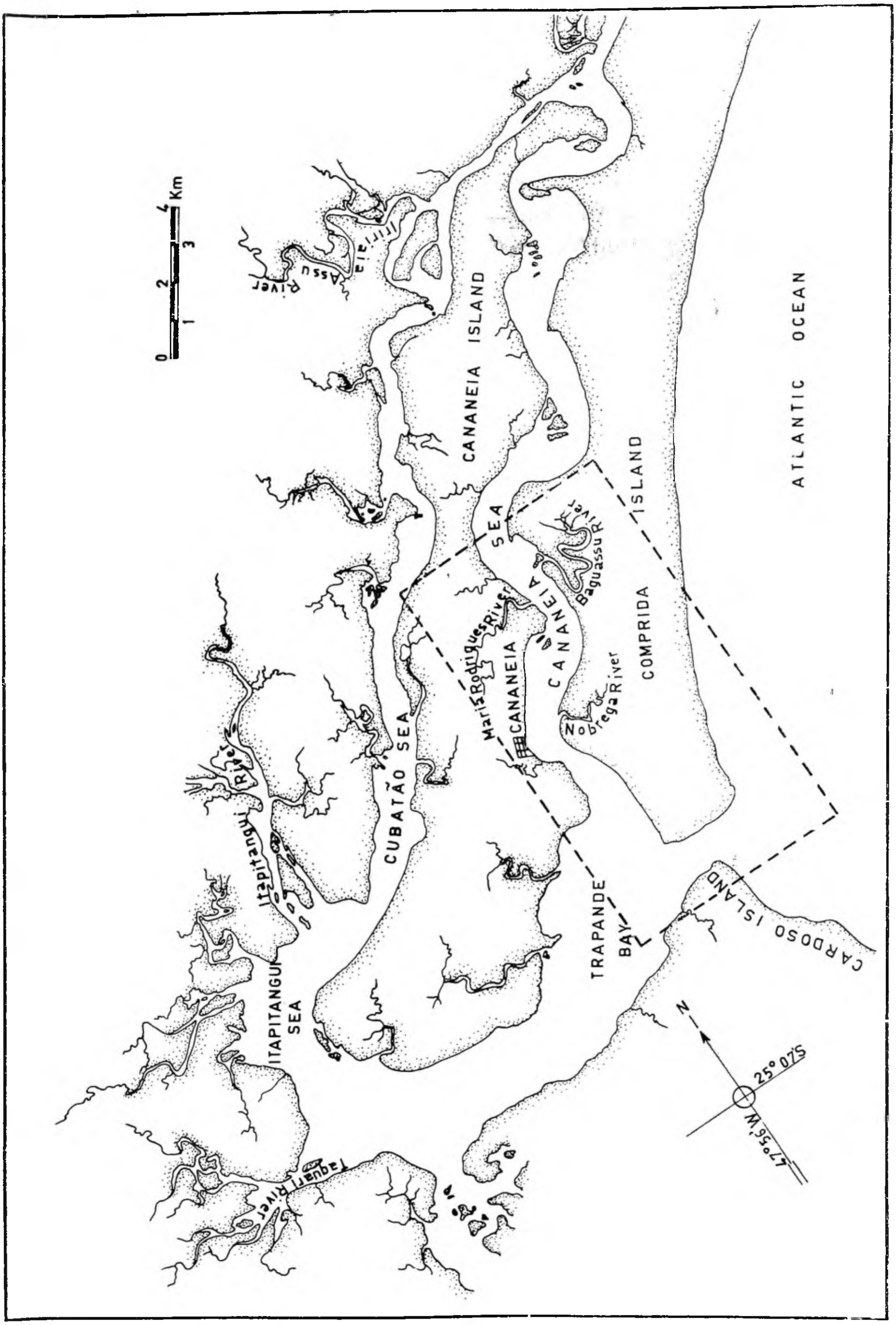

Fig. 1 - Cananéia Region

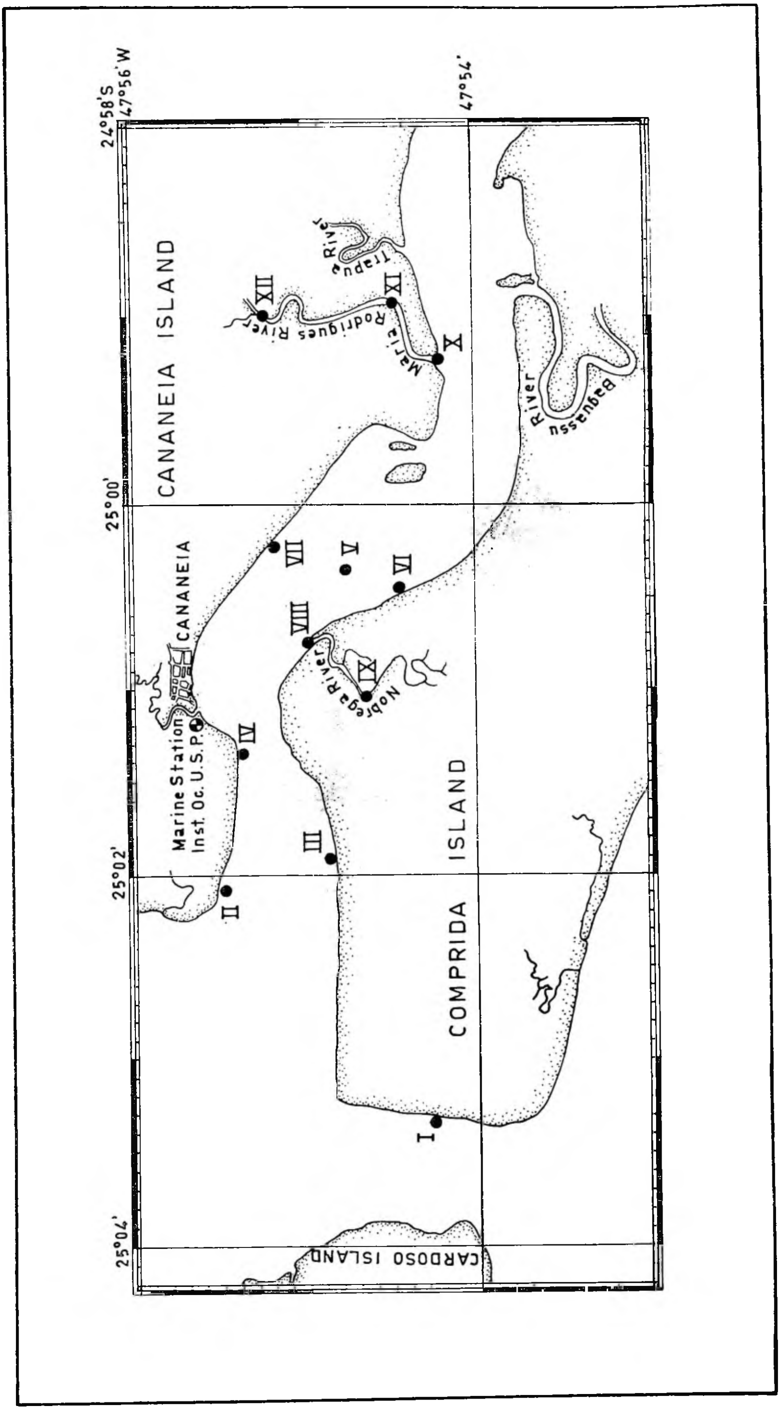

Fig. 2 — Locations of collecting stations in the Cananéia Sea.

The vertical migration was studied based on samples collected at St. III (21/22-7-70). The samples were taken horizontally at 0 m, 4 m (zooplankton net) and at 8 m over the substratum (D-net), every 4 hours during a period of 24 hours. Both nets were towed for a period of 5 minutes.

In addition to this collection, surface plankton was taken by daylight during the period of one year (April/70 to May/71) in the Stations I, IV, V, X, XI, XII and in all stations (August and September, 69).

Salinity determinations were made by the Harvey method and dissolved oxygen by Winkler method. Temperature were recorded with a reversing thermometer adapted to a Nansen water bottle.

Light penetration (Kutner, 1972) was measured with a hydrophotometer and taken at the same time as the plankton samples.

The mean of specimens obtained at each station during the period of 13 months was studied in relation to the same mean values of salinity, dissolved oxygen and local depth of collection. The mean number of specimens collected at all stations every month was related to the same mean of temperature.

ENVIRONMENTAL FACTORS

The mean salinity decreases from the entrance of the main channel to the interior of the "marigot" The mean salinity at St. I was 28.05‰ and at St. XII was 10.03‰. It ranged from 18.05‰ to 33.34‰ at St. I and from 02.23‰ to 20.68‰ at St. XII (Table I).

The mean dissolved oxygen per Station decreases from the entrance of the main channel to the interior of the "marigots" The higher means of dissolved oxygen, 4.51 and 4.63 ml/l, were respectively obtained at St. I and VIII and the lower mean, 2.88 ml/l, at St. XII (Table II).

The water flooding through the Barra of Cananeia contained 4.8 ml/l of oxygen, and the "marigot" water only had 2.3 ml/l of dissolved oxygen. The remarkably low quantity of oxygen in the "marigot" water is caused by a characteristic state of reduction in the upper reaches of the "river" and indicates a correlation with the quantity of reduced matter in the water (Kato, 1966).

TABLE I

Monthly salinity ($^{0}/oo$) at 12 stations

DATA	STATIONS											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1969												
Sep.	28,47	30,65	26,60	20,60	x	26,99	27,68	24,53	22,40	24,43	22,34	20,68
Oct.	22,39	27,20	24,45	21,89	23,57	18,62	21,00	23,78	16,13	13,44	x	07,55
Nov.	18,05	25,76	13,27	15,32	x	15,43	15,48	14,49	03,46	02,52	01,05	x
Dec.	27,30	25,17	23,65	19,46	x	09,67	13,29	10,07	16,86	10,95	11,45	09,98
1970												
Jan.	33,15	30,77	28,63	29,33	25,36	22,68	10,62	20,01	16,68	15,12	11,81	10,39
Feb.	26,34	26,69	30,99	26,21	20,26	26,08	09,34	06,90	10,71	05,44	05,03	02,23
Mar.	30,73	32,47	29,85	24,13	80,05	30,54	26,36	11,21	07,11	11,39	04,49	02,60
Apr.	33,34	30,84	28,92	23,59	31,71	28,68	24,37	21,08	16,65	14,84	11,03	07,18
May	21,22	27,43	24,87	24,87	20,14	21,91	19,99	-	-	14,45	20,97	13,20
Jun.	32,59	28,69	29,35	18,04	28,58	26,89	24,85	14,41	12,86	12,80	08,56	05.50
Jul.	28,34	26,90	-	26,94	25,31	31,09	28,58	24,06	19,03	22,56	11,07	11,13
Aug.	32,37	25,89	26,25	27,07	30,15	27,98	28,78	20,93	20,54	24,48	21,08	16,97
Sep.	30,38	21,07	27,49	28,44	30,24	23,03	27,00	18,44	17,66	17,43	10,21	12,91

x - not sampled.

The temperature is homogeneous in the area. The mean temperature of the 12 stations was higher (27.42°C) in January and lower (19.95°C) in July (Table III).

The environmental records obtained at St. III (21-22/7/70) were very homogeneous throughout the water column. The vertical gradient of salinity was due to tidal moviments (Table IV).

The mean depth of the sampling in the main channel was higher than 6 m at St. I, III, V, about 4 m at St. II, IV, VI and VII; and in the "marigot" it was higher than 5 m at St. X, XII and lower than 4 m at St. VIII, IX and XI (Table V).

TABLE II

Monthly dissolved oxygen (ml/l) at 12 stations

DATA	STATIONS											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1969												
Sep.	5,49	4,94	5,54	5,47	x	5,37	5,49	5,04	4,79	5,25	4,79	4,68
Oct.	4,83	4,78	4,58	4,60	4,42	5,09	2,80	4,89	4,48	2,54	x	3,04
Nov.	–	–	–	–	x	–	–	–	–	–	–	x
Dec.	4,89	5,08	4,56	4,63	x	5,25	5,28	5,28	3,30	3,74	2,03	2,98
1970												
Jan.	4,25	3,86	4,40	3,72	3,64	3,69	4,17	4,12	4,18	2,57	2,96	2,06
Deb.	3,36	1,96	3,76	3,74	3,27	3,69	3,75	4,37	2,54	2,35	1,81	1,33
Mar.	3,52	3,52	3,24	3,52	3,53	3,12	3,10	4,31	1,48	3,54	1,87	1,89
Apr.	4,40	4,40	4,19	4,53	4,00	3,99	4,05	4,94	4,61	4,47	3,00	2,48
May.	3,97	4,23	4,26	3,62	4,12	4,60	4,25	4,75	3,10	4,50	3,72	3,36
Jun.	–	–	–	4,04	3,99	3,93	3,94	3,55	2,80	3,57	3,41	2,88
Jul.	4,80	4,94	5,37	5,40	4,69	4,84	4,81	5,14	3,34	3,66	4,07	3,83
Aug.	4,46	4,80	4,82	3,35	4,60	4,89	4,84	4,90	2,50	4,56	4,04	3,38
Sep.	5,60	4,60	4,60	4,00	3,39	3,40	4,00	4,30	2,30	3,40	3,90	2,70

x – not sampled

TABLE III

Monthly temperature (ºC) at 12 stations

DATA	STATIONS											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1969												
Sep.	22,0	20,4	20,9	21,1	x	20,8	20.7	20,9	20,5	20,7	21,0	21,3
Oct.	21,7	21,2	21,0	21,2	22,1	23,2	22,2	22,5	23,1	22,5	x	23,8
Nov.	23,2	24,4	24,5	24,4	x	26,2	26,0	26,0	24,5	27,4	26,4	x
Dec.	-	25,0	25,5	24,4	x	25,7	25,6	26,5	27,0	26,7	26,9	27,6
1970												
Jan.	26,4	27,0	27,2	27,1	27,2	27,5	27,6	27,7	28,1	27,5	27,9	27,9
Feb.	27,1	27,3	27,0	27,3	27,3	27,2	26,7	28,1	26,2	26,2	26,2	26,1
Mar.	26,4	26,5	26,4	26,6	26,2	26,4	26,5	26,9	26,3	26,1	24,1	24,3
Apr.	26,0	26,1	26,1	26,1	25,9	26,1	26,0	26,4	26,5	26,0	24,8	24,2
May	23,0	22,5	22,0	22,5	22,9	23,4	23,1	22,9	22,8	23,3	23,0	22,8
Jun.	21,5	21,9	22,1	21,6	22,3	22,3	22,2	22,4	21,5	21,8	21.7	21,3
Jul.	19,9	20,1	19,7	20,0	19,9	20,0	20,0	20,1	20,1	19,8	20,1	19,8
Aug.	19,0	19,0	18,9	20,6	19,5	19,9	19,9	20,5	20,6	20,5	20,7	20,6
Sep.	21.4	21,9	21,3	20,8	22,4	21,2	20,8	22,1	20,8	21,2	21,1	21,3

x - not sampled

TABLE IV

Hydrographical data: Salinity ($^{o}/oo$), Temperature (ºC) and dissolved oxygen (ml/l).

St. III - Data: 21-22/07/1970

DEPTH (m)	TIME						
	20:00	24:00	04:00	08:00	12:00	16:00	20:00
Salinity ($^{o}/oo$)							
0	27,19	20,86	22,46	25,37	25,37	18,68	25,69
4	27,71	23,16	29,43	26,30	21,04	22,29	28,43
8	28,29	23,22	29,28	26,33	22,75	25,44	29,45
Temperature (ºC)							
0	19,90	19,90	19,70	19,80	19,90	19,90	19,90
4	19,90	19,90	19,80	19,90	19,80	19,90	19,90
8	19,90	19,90	20,00	19,90	19,70	19,80	20,00
Dissolved oxygen (ml/l)							
0	5,35	4,96	4,93	4,88	5,09	5,21	4,89
4	4,77	4,93	4,74	4,80	4,90	5,02	4,87
8	4,78	4,90	4,67	4,85	5,37	4,80	4,86

TABLE V

Local depth of collection at 12 stations

DATA	STATIONS											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1969												
Sep.	7,0	5,0	7,0	4,5	x	5,0	5,0	3,0	1,0	7,0	5,0	5,0
Oct.	4,0	4,0	5,5	4,0	8,0	2,0	5,5	1,5	4,5	1,5	x	7,0
Nov.	5,0	5,0	5,0	4,0	x	3,5	3,0	4,0	2,5	6,0	5,0	x
Dec.	6,0	3,5	5,0	3,5	x	3,0	6,0	3,0	2,0	2,0	4,0	4,0
1970												
Jan.	9,0	4,5	8,5	5,0	7,0	5,0	5,0	3,0	3,0	7,5	2,5	3,5
Feb.	6,5	4,0	8,0	5,0	8,0	4,5	4,0	2,5	5,0	5,0	3,5	3,0
Mar.	5,0	5,5	8,0	5,0	8,0	5,5	4,0	2,5	2,5	8,5	6,0	6,5
Apr.	6,5	2,0	5,0	2,5	10,0	4,0	4,5	2,0	5,0	8,0	4,0	2,0
May	7,0	2,5	4,0	2,5	4,5	4,0	5,5	2,0	5,5	2,0	7,0	6,5
Jun.	6,5	3,5	7,0	1,5	4,0	3,5	4,0	1,5	5,5	6,0	2,0	6,0
Jul.	10,0	1,5	8,0	3,5	9,0	3,5	3,5	1,0	5,0	6,0	1,5	5,5
Aug.	7,0	7,0	7,0	5,5	6,0	6,0	5,0	2,5	5,0	9,5	3,5	7,0
Sep.	4,0	4,0	4,0	4,0	11,5	4,0	3,5	1,5	5,0	7,0	1,5	6,0

x - not sampled.

RESULTS

Mysidopsis tortonesi Bacescu

Abundance — *Mysidopsis tortonesi* was the most abundant species with a wide distribution in the area studied. The frequency of the species, in the samples collected, was 45.69%. A total of 62,489 specimens was found in the monthly collections and 1,647 in the samples of the vertical distribution. It occurred throughout the year (Table VI).

T A B L E VI

NUMBER OF SPECIMENS OF <u>MYSIDOPSIS</u> <u>TORTONESI</u> COLLECTED AT EACH STATION DURING THE PERIOD OF SEP/69 TO SEP/70

DATA	DEVELOPMENTAL STAGES	STATION												TOTAL
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Sep/69	young	69	43	1.316	21		1	5.796	-	117	53	-	-	7.416
	male	-	-	18	2		-	998	-	-	-	-	-	1.018
	female	-	-	(1) 2	-	x	-	(127) 340	-	1	1	-	-	344
Oct/69	young	304	51	17.544	453	13.204	955	229	26	1	1.129			[illegible].897
	male	30	1	1.220	-	249	5	6	1	-	21			[illegible].533
	female	17	-	(28) 534	-	(11) 191	7	1	1	-	(1) 7	x		758
Nov/69	young	34	2	-	-		-	-	29	-	-	-		65
	male	3	-	-	-		-	-	2	-	-	-		5
	female	4	1	-	1	x	-	-	4	-	-	-	x	10
Dec/69	young	222	-	-	2		-	20	-	-	-	-		244
	male	-	-	-	-		-	-	-	-	-	-	-	-
	female	-	-	-	-	x	-	-	-	-	-	-	-	-
Jan/70	young	66	-	36	242	-	-	10	33	-	-	-	-	387
	male	-	-	-	1	-	-	-	3	-	-	-	-	4
	female	-	-	-	1	-	-	-	1	-	-	-	-	2
Feb/70	young	22	194	327	-	-	-	-	-	-	-	-	-	543
	male	3	20	22	-	-	-	-	-	-	-	-	-	45
	female	(2) 4	(9) 21	(6) 11	-	-	(1) 2	-	-	-	-	-	-	38
Mar/70	young	-	-	-	-	1	1	-	-	-	-	-	-	2
	male	-	-	-	-	-	-	-	-	-	-	-	-	-
	female	-	-	-	-	-	-	-	-	-	-	-	-	-
Apr/70	young	-	5	9	-	7	-	115	-	-	-	-	-	136
	male	-	-	-	-	1	-	66	-	-	-	-	-	67
	female	-	1	-	-	(1) 1	-	(72) 79	-	-	-	-	-	81
May/70	young	11.967	5	1	-	-	2	-	-	-	-	-	-	11.975
	male	8	-	-	-	-	-	-	-	-	-	-	-	8
	female	(10) 11	-	-	-	-	-	-	-	-	-	-	-	11
Jun/70	young	34	46	29	1	46	25	29	-	-	-	-	-	210
	male	-	1	3	-	-	-	-	-	-	-	-	-	4
	female	-	(1) 2	1	-	(3) 4	1	-	-	-	-	-	-	8
Jul/70	young	449	-	471	-	14	23	186	-	-	-	-	-	1.143
	male	8	-	71	-	4	1	3	-	-	-	-	-	87
	female	1	-	(15) 70	-	2	1	(3) 7	-	-	-	-	-	81
Aug/70	young	502	530	319	1	13	-	591	-	-	-	-	-	1.956
	male	-	-	-	-	1	-	32	-	-	-	-	-	33
	female	1	-	-	-	1	-	(1) 20	-	-	-	-	-	22
Sep/70	young	60	-	44	4	234	12	-	-	-	-	-	-	354
	male	-	-	-	-	1	-	1	-	-	-	-	-	2
	female	-	+	-	-	-	-	-	-	-	-	-	-	-
TOTAL		13.819	923	22.048	729	13.974	1.036	8.529	100	119	1.211	-	1	

( ) - number of gravidic female

\+ - not sampled

Horizontal distribution — The species occurred at stations with a mean salinity ranging from 14.50‰ to 28.00‰ but it was more abundant in salinities higher than 21.00‰. The largest abundances and frequencies of specimens occurred at stations with mean dissolved oxygen ranging from 3.68 ml/l to 4.51 ml/l. The largest occurrence of this species was found at Sts. I, III, V and VII where the mean depth was always greater than 4,5 m.

Seasonal variation — Two maxima periods of occurrence — Sept./Oct. (1969) and May (1970), plus three periods of minimum occurrence — November (1969), March and August (1970) — were recorded. The largest occurrences were registered during the months when the mean temperature varied from 20.93°C to 25.30°C.

Number of specimens of *M. tortonesi* found by season:

	Spring	Summer	Autumn	Winter
Number of specimens	45,046	1,263	12,280	3,544

Vertical distribution — 19.61% of specimens were found at the surface, 5,03% at 4 m depth and 75.34% over the bottom (8 m deep). The largest occurrence at the surface was recorded at 12:00 p.m. and 16:00 p.m. and at the greatest depth at 08:00 a.m. and 12:00 a.m. The young specimens migrate to the surface layers and the adults remain close to the bottom (Table XI).

Biological cycles — The total populations of *Mysidopsis tortonesi* at all stations during the period of 13 months was composed of 93.34% young and 6.65% adult specimens. The results of each month showed that the percentage of young specimens ranged from 100% to 81.25% excepting in April when the percentage of young specimens was 47.88%.

The percentual occurrence of male and female varied throughout the period of collection. Males were dominant in September, October and November 1969 and females in May, June, July and August 1970.

The frequency of gravidic females in the samples in which the species occurred was 29.41%. The larger percentages of gravidic females among adult females was found in April and in May 1970.

The large number of adult specimens in September and October 1969 occurs at the same time as the larger and wider penetration of the species into the estuary.

Brasilomysis castroi Bacescu

Abundance — *Brasilomysis castroi* was the second species in abundance with a wide distribution in the area studied. The monthly frequency of the species was 33.74%. A total of 3,930 specimens was found in the monthly collections and 43 in the samples taken for the study of the vertical distribution. The species occurred throughout the year (Table VII).

Horizontal distribution — The species was found at stations with mean salinities ranging from 17.40‰ to 28.00‰, although it was more abundant at stations with mean salinities higher than 23.00‰, and mean dissolved oxygen ranging from 3,97 ml/l to 4,63 ml/l. The largest occurrence of *Brasilomysis castroi* was found at St. I and III where the average depth was higher than 6 m.

Seasonal variation — One period of maximum abundance — January/February 1970 — and three of minimum numbers — November/December 1969, March and July 1970 — were registered.- The largest abundance of specimens occurred in waters with temperature greater than 25.00°C.

Total number of *Brasilomysis castroi* per season:

	Spring	Summer	Autumn	Winter
Number of specimens	387	2,771	531	237

Vertical distribution — *Brasilomysis castroi* was scarcely represented by 43 specimens in this collection. The samples were taken in July during the minimum occurrence of this species. They were mostly collected at 4 m (Table XI).

Biological cycles — The total population of *Brasilomysis castroi* obtained at all stations throughout 13 months was composed by 91.98%

TABLE VII

NUMBER OF SPECIMENS OF BRASILOMYSIS CASTROI AT EACH STATIONS DURING THE PERIOD SEP/69 TO SEP/70

DATA	DEVELOPMENTAL STAGES	STATIONS												TOTAL
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Sep/69	young	6	5	10	1		-	9	-	5	2	-	-	38
	male	-	2	1	1	x	-	-	-	-	-	-	-	4
	female	-	-	4	-		-	-	-	-	-	-	-	4
Oct/69	young	1	-	66	-	241	6	2	-	-	1		-	317
	male	-	-	3	-	3	-	-	-	-	-	x	-	6
	female	-	-	(1)5	-	(1)3	-	-	-	-	-		-	8
Nov/69	young	-	-	-	1		-	-	-	-	-	-		1
	male	-	-	-	-	x	-	-	-	-	-	-	x	-
	female	-	-	-	-		-	-	-	-	-	-		-
Dec/69	young	2	-	1	1		-	1	-	-	-	-	-	5
	male	-	-	-	-	x	-	-	-	-	-	-	-	-
	female	-	-	1	-		-	-	-	-	-	-	-	1
Jan/70	young	162	-	377	453	-	-	52	127	-	-	-	-	1.171
	male	-	-	-	3	-	-	-	7	-	-	-	-	10
	female	-	-	-	(2)7	-	-	-	(7)12	-	-	-	-	19
Feb/70	young	72	88	1.189	7	-	2	-	-	-	-	-	-	1.358
	male	7	12	49	-	1	1	-	-	-	-	-	-	70
	female	(8)19	(16)24	(48)93	(1)1	-	-	-	-	-	-	-	-	137
Mar/70	young	-	-	-	-	1	-	-	-	-	-	-	-	1
	male	-	-	-	-	1	-	-	-	-	-	-	-	1
	female	-	-	-	-	-	-	-	-	-	-	-	-	-
Apr/70	young	-	1	5	-	10	-	26	-	-	-	-	-	42
	male	-	-	-	-	1	-	5	-	-	-	-	-	6
	female	-	-	-	-	(2)8	-	(9)19	-	-	-	-	-	27
May/70	young	435	1	1	-	8	-	-	-	-	-	-	-	445
	male	1	-	-	-	-	-	-	-	-	-	-	-	1
	female	(1)8	-	-	-	-	-	-	-	-	-	-	-	8
Jun/70	young	-	47	35	1	8	-	-	-	-	-	-	-	91
	male	-	2	-	-	-	1	-	-	-	-	-	-	3
	female	-	(1)1	-	-	-	(1)3	-	-	-	-	-	-	4
Jul/70	young	-	-	1	-	-	-	-	-	-	-	-	-	1
	male	-	-	1	-	-	-	-	-	-	-	-	-	1
	female	-	-	-	-	-	-	-	-	-	-	-	-	-
Aug/70	young	124	-	7	-	-	-	2	-	-	-	-	-	133
	male	1	-	-	-	-	-	-	-	-	-	-	-	1
	female	(2)3	-	-	-	-	-	-	-	-	-	-	-	3
Sep/70	young	6	-	1	1	4	-	-	-	-	-	-	-	12
	male	-	-	-	-	-	-	-	-	-	-	-	-	-
	female	(1)1	-	-	-	-	-	-	-	-	-	-	-	1
TOTAL		848	183	1.850	477	289	13	116	146	5	3	-	-	

( ) - number gravidic female

+ - not sampled

of young and 8,01% of adult specimens. The percentage of young ranged from 97.80% to 56.00% during the months in which more than 10 specimens occurred. The percentage of females among adults varied from 50.00% to 81.81% discarding the data of November-December 1969, March-April and September 1970, when the adults were represented by only one specimen.

A small amount of gravidic females were found throughout the period, excepting in November 1969, March and July 1970 when the species was scarcely represented. The larger occurrence of gravidic females coincides with the larger penetration of the species into the estuary.

Brasilomysis castroi showed a regular penetration in the main channel up to St. VII, but in January 1970 it was present in large number, including adult specimens, at the mouth of the "marigot" Nobrega.

Metamysidopsis elongata (Holmes) *atlantica* Bacescu

Abundance — *Metamysidopsis elongata atlantica* was the third species in abundance with a wide distribution in the area studied. The frequency of the species in samples studied was 35.09%, with a total of 2,823 specimens in the monthly collection, and 22 in the vertical migration samples. It occurred throughout the year (Table VIII).

Horizontal distribution — The species occurred at stations with mean salinity ranging from 14.00‰ to 28.00‰, although it was more abundant at stations with mean salinities higher than 23.00‰, and mean dissolved oxygen ranging from 3.28 ml/l to 4.51 ml/l. It was more abundant in water with dissolved oxygen higher than 4.22 ml/l. The higher occurrence of this species was found in the St. I, IV and VI where the mean depth ranged from 3.5 to 6.5 m.

Seasonal variation — Two maxima of abundance — September-October 1969 and August 1970 — and one minimum — July 1970 — was registered. The largest number was found in the months with temperature varying from 19.00°C to 23.00°C.

Number of *Metamysidopsis elongata atlantica* specimens per season:

Number of specimens	Spring	Summer	Autumn	Winter
	1,652	150	130	863

Vertical distribution — *Metamysidopsis elongata atlantica* was scarcely represented in this collection. Only 7 specimens out of 22 were found at midnight at the surface. Adults were absent (Table XI).

The results of a monthly superficial collection made at St. IV (1968-1969), every 4 hours at night and every 2 hours during daylight showed the following number of specimens/m^3.

Data	Time				
	8 p.m.	12 p.m.	4 a.m.	6 a.m. to 4 p.m.	6 p.m.
25-26/09/68	766	666	5,733	—	—
30-31/10/68	133	—	333	—	—
27-28/11/68	—	—	33	—	—
20-21/01/69	33	—	—	—	—
17-18/06/69	300	33	—	—	—
27-28/08/69	200	—	—	—	33

The collection was obtained by filtration of a 30 litres samples through a meshed net 50 μ, a process carried out by the staff of the Plankton Section of the Instituto Oceanográfico — Universidade de São Paulo.

Biological cycles — The total population of *Metamysidopsis elongata atlantica* obtained from all the stations throughout the 13 months was composed by 89,44% young and 10.55% adult specimens. The occurrence of young specimens varied from 14.28% to 99.40%. The monthly percentage of young specimens ranged from 14.28% to 99 40%. Among adults, 60.73% were female and 34.08% were male and the monthly results showed a higher number of females

TABLE VIII

NUMBER OF SPECIMENS OF <u>METAMYSIDOPSIS ELONGATA ATLANTICA</u> COLLECTED AT EACH STATION DURING THE PERIOD SEP/69 TO SEP/7

DATA	DEVELOPMENTAL STAGES	STATIONS												TOTAL
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Sep/69	young	517	32	94	16		-	-	-	14	85	-	-	758
	male	25	-	-	1	x	-	-	-	-	-	-	-	26
	female	-	-	-	-		-	-	-	-	-	-	-	-
Oct/69	young	155	7	32	89	2	385	3	-	17	38		-	728
	male	1	-	-	-	1	18	4	-	-	11	x	-	35
	female	2	-	(4)4	-	(1)10	(1)52	2	-	2	11		-	83
Nov/69	young	-	15	-	4		-	-	-	-	-		-	19
	male	-	-	-	1	x	-	-	-	-	-	x	-	1
	female	-	1	(1)1	-		-	-	-	-	-		-	2
Dec/69	young	58	-	-	26		-	-	-	-	-	-	-	84
	male	7	-	-	-	x	-	-	-	-	-	-	-	7
	female	11	-	-	-		-	-	-	-	-	-	-	11
Jan/70	young	3	-	-	-	-	-	1	-	-	-	-	-	4
	male	2	3	-	-	-	-	-	-	-	-	-	-	5
	female	2	1	-	-	-	-	-	1	-	-	-	-	4
Feb/70	young	8	-	10	2	-	3	-	-	-	-	-	-	23
	male	-	-	2	-	-	-	-	-	-	-	-	-	2
	female	(1)1	-	(8)8	1	-	-	-	-	-	-	-	-	10
Mar/70	young	5	-	3	3	-	-	-	-	-	-	-	-	11
	male	7	-	-	-	-	-	-	-	-	-	-	-	7
	female	(2)3	-	-	-	-	-	3	-	-	-	-	-	6
Apr/70	young	-	1	6	-	-	-	5	-	-	-	-	-	12
	male	-	7	13	-	-	-	6	-	-	-	-	-	26
	female	-	(5)9	(13)19	-	(3)4	-	(12)13	(1)1	-	-	-	-	46
May/70	young	9	-	-	-	-	-	-	-	-	-	-	-	9
	male	3	-	-	-	-	-	-	-	-	-	-	-	3
	female	(8) 9	1	-	-	-	-	-	-	-	-	-	-	10
Jun/70	young	8	4	3	-	-	-	-	-	-	-	-	-	15
	male	3	-	-	-	-	-	-	-	-	-	-	-	3
	female	(2)3	-	-	-	2	-	-	-	-	-	-	-	5
Jul/	young	1	-	-	-	-	-	-	-	-	-	-	-	1
	male	-	-	-	-	-	-	-	-	-	-	-	-	-
	female	-	-	-	-	-	-	-	-	-	-	-	-	-
Aug/70	young	146	-	97	559	-	1	17	12	-	2	-	-	834
	male	1	-	-	2	-	-	-	-	-	-	-	-	3
	female	1	-	-	-	-	-	-	(1)1	-	-	-	-	2
Sep/70	young	26	-	-	-	-	1	-	-	-	-	-	-	27
	male	-	-	-	-	-	-	-	-	-	-	-	-	-
	female	1	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL		1.018	81	292	704	19	460	54	15	33	147	-	-	

( ) - number of gravidic female

+ - not sampled

than males. Gravid females occurred during the four seasons and its percentage among adult females was 28,30%.

d — *Bowmaniella* (*C.*) *brasiliensis* Bacescu

Abundance — *Bowmaniella* (*C.*) *brasiliensis* was the fourth species in abundance with a distribution limited to the entrance of the main channel (St. I and III). A total of 348 specimens in the monthly and 132 specimens in the samples of the vertical collections were obtained. It occurred throughout the year, excepting in November (Table IX).

Horizontal distribution — It was found at St. I and III, where the mean salinity ranged from 26.00‰ to 28.00‰, although it occurred sporadically up to St. XII with an average salinity of 10.03‰, and a mean of dissolved oxygen between 4,48 ml/l to 4,51 ml/l. The average depth at these two stations was higher than 6 m (Table XII).

Seasonal variation — The maximum abundance was found in autumn and the minimum in summer. The largest amount of specimens was found in April, May and August when the mean temperature ranged from 25.85°C to 19.75°C.

Number of specimens of *Bowmaniella* (*C.*) *brasiliensis per season*:

	Spring	Summer	Autumn	Winter
Number of specimens	79	19	151	98

Vertical distribution — A percentage of 35.60% was found at the surface, 4.54% at 4 m depth and 59.85% at the bottom (8 m depth). At the surface, during daylight, it was represented by only 3 specimens. Adult specimens were found only at the bottom (Table XI).

Biological cycles — The total population of *Bowmaniella* (*C.*) *brasiliensis* obtained, at all stations, throughout 13 months was composed by 95.11% young and 4.87% adult specimens. The frequency of gravidic females, at the stations where the species occurred was 7.40%.

Promysis atlantica Tattersall

Abundance — *Promysis atlantica* was the fifth species in abundance. Its distribution was mainly limited to stations I, II and III, but it occurred up to St. VII. The monthly frequency of the species was 5.96%. It was represented by 133 specimens in the monthly collection and only by 2 specimens in the vertical distribution samples (Table X).

Horizontal distribution — The larger occurrences of *Promysis atlantica* were found at stations I and III, where the mean salinity ranged from 26.00‰ to 28.00‰, the mean dissolved oxygen from 4.48 ml/l to 5.51 ml/l, and the mean depth was higher than 6 m.

Biological cycles — The species occurred only in winter months. Young and adult specimens were found. The total population was composed by 34.51% young and 65.48% adult specimens. Among adults the percentage of females ranged from 60.00% to 75.80%. The percentual occurrence of gravidic females among adult females was higher than the other species, it varied from 34.04% to 50.00%. The frequency of gravidic females in samples in which the species was present totalled 88.88%.

Mysidopsis coelhoi Bacescu

This species occurred occasionally at St. I and III. One specimen was found at St. II and another at St. III in August 1970. In September 1970 only one specimen was found at St. III. It was represented by 4 specimens at the depth in the vertical distribution samples. All specimens collected were adults, 5 were males and 2 females.

DISCUSSION AND GENERAL CONCLUSIONS

The six species had already been found in Brazilian coastal waters and in the eastern coast of the United States (Bacescu, 1868a, b, c; Tattersall, 1923, 1951; Brattegard, 1969; Costa, 1964; Wigley & Burns, 1971; Almeida Prado, 1972, in press). All these data refer only to systematics and occurrences.

TABLE IX

NUMBER OF SPECIMENS OF BOWMANIELLA (C.) BRASILIENSIS COLLECTED AT EACH STATIONS DURING THE PERIOD OF SEP/69 TO SEP/70.

DATA	DEVELOPMENTAL STAGES	STATIONS												TOTAL
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Sep/69	young	23	-	-	-		-	-	-	-	-	-	-	23
	male	1	-	-	-	x	-	-	-	-	-	-	-	1
	female	4	-	-	-		-	-	-	-	-	-	-	4
Oct/69	young	-	-	47	-	2	1	-	-	-	-		1	51
	male	-	-	-	-	-	-	-	-	-	-	x	-	-
	female	-	-	-	-	-	-	-	-	-	-		-	-
Nov/69	young	-	-	-	-		-	-	-	-	-	-		-
	male	-	-	-	-	x	-	-	-	-	-	-	x	-
	emale	-	-	-	-		-	-	-	-	-	-		-
Dec/69	young	6	-	-	-		-	-	-	-	-	-	-	6
	male	-	-	-	-	x	-	-	-	-	-	-	-	-
	female	-	-	-	-		-	-	-	-	-	-	-	-
Jan/70	young	3	-	-	-	-	-	-	-	-	-	-	-	3
	male	-	-	-	-	-	-	-	-	-	-	-	-	-
	female	-	-	-	-	-	-	-	-	-	-	-	-	-
Feb/70	young	4	3	-	-	-	-	-	-	-	-	-	-	7
	male	1	-	-	-	-	-	-	-	-	-	-	-	1
	female	(?)2	-	-	-	-	-	-	-	-	-	-	-	2
Mar/70	young	1	-	-	-	-	-	-	-	-	-	-	-	1
	male	-	-	-	-	-	-	-	-	-	-	-	-	-
	female	-	-	-	-	-	-	-	-	-	-	-	-	-
Apr/70	young	23	-	11	-	-	-	1	-	-	-	-	-	35
	male	-	-	-	-	-	-	-	-	-	-	-	-	-
	female	-	-	2	-	-	-	-	-	-	-	-	-	2
May/70	young	106	1	-	-	-	-	-	-	-	-	-	-	107
	male	4	-	-	-	-	-	-	-	-	-	-	-	4
	female	(1)2	-	-	-	-	-	-	-	-	-	-	-	2
Jun/70	young	7	2	8	-	-	-	-	-	-	-	-	-	17
	male	-	-	-	-	-	-	-	-	-	-	-	-	-
	female	-	-	-	-	-	-	-	-	-	-	-	-	-
Jul/70	young	11	2	8	-	-	6	2	-	-	-	-	-	29
	male	-	1	-	-	-	-	-	-	-	-	-	-	1
	female	-	-	-	-	-	-	-	-	-	-	-	-	-
Aug/70	young	38	8	5	-	-	-	-	-	-	-	-	-	51
	male	-	-	-	-	-	-	-	-	-	-	-	-	-
	female	-	-	-	-	-	-	-	-	-	-	-	-	-
Sep/70	young	1	-	-	-	-	-	-	-	-	-	-	-	1
	male	-	-	-	-	-	-	-	-	-	-	-	-	-
	female	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL		237	17	81	-	2	7		-	-	-	-	1	

( ) - number of gravidic female

\+ - not sampled

T A B L E X

NUMBER OF SPECIMENS OF PROMYSIS ATLANTICA COLLECTED AT EACH STATION DURING THE PERIOD OF SEP/69 to SEP/70

DATA	Developmental stages	STATION												TOTAL
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Sep/69	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Oct/69	-	-	-	-	-	-	-	-	-	-	-	x	-	-
Nov/69	-	-	-	-	-	x	-	-	-	-	-	-	x	-
Dec/69	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Jan/70	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Feb/70	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mar/70	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Apr/70	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May/70	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jun/70	young	4	6	21	-	-	-	-	-	-	-	-	-	31
	male	-	1	3	-	-	-	-	-	-	-	-	-	4
	female	-	(1)2	(2)3	-	(1)1	-	-	-	-	-	-	-	6
Jul/70	young	5	-	-	-	-	-	-	-	-	-	-	-	5
	male	5	-	-	-	-	-	-	-	-	-	-	-	5
	female	(2)8	-	-	-	-	(2)2	-	-	-	-	-	-	10
Aug/70	young	8	-	2	-	-	-	-	-	-	-	-	-	10
	male	14	-	1	-	-	-	-	-	-	-	-	-	15
	female	(13)43	-	(2)3	-	-	-	(1)1	-	-	-	-	-	47
Sep/70	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T O T A L		87	9	33	-	1	2	1	-	-	-	-	-	

( ) - number of gravidic female

\+ - not sampled

T A B L E XI

VERTICAL DISTRIBUTION OF MYSIDS

ST. III - DATA: 21-22/07/1970

DEPTH (m)	SPECIES	TIME																				
		20:00			24:00			04:00			08:00			12:00			16:00			20:00		
		young	male	female	young	male	female	young	male	female	young	male	female	young	male	female	young	male	female	young	male	female
0,0	Mysidopsis tortonesi	15	-	-	157	-	1	-	-	-	-	-	-	5	-	-	136	-	-	9	-	-
	Brasilomysis castroi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-
	Metamysidopsis elongata atlantica	-	-	-	6	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bowmaniella (C.) brasiliensis	35	-	-	11	-	-	-	-	-	-	-	-	1	-	-	2	-	-	10	-	-
	Promysis atlantica	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mysidopsis coelhoi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T O T A L		50	-	-	174	-	2	2	-	-	-	-	-	6	-	-	143	-	-	19	-	-
4,0	Mysidopsis tortonesi	29	2	-	9	-	-	11	-	-	26	2	4	-	-	-	-	-	-	-	-	-
	Brasilomysis castroi	-	-	-	-	-	-	-	-	-	26	2	4	-	-	-	-	-	-	-	-	-
	Metamysidopsis elongata atlantica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Bowmaniella (C.) brasiliensis	-	-	-	5	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Promysis atlantica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mysidopsis coelhoi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T O T A L		29	2	-	14		-	12	-	-	52	4	8	-	-	-	-	-	-	-	-	-
8,0	Mysidopsis tortonesi	21	6	9	30	5	(1) 6	87	7	(8) 12	330	37	(1) 62	471	71	(15) 70	13	-	-	4	-	-
	Brasilomysis castroi	-	-	-	-	-	-	-	-	-	2	1	-	1	1	-	1	-	-	-	-	-
	Metamysidopsis elongata atlantica	6	-	1	3	-	1	2	-	1	-	-	-	-	-	-	1	-	-	-	-	-
	Bowmaniella (C.) brasiliensis	38	-	-	-	-	(1) 2	2	1	-	8	-	3	8	-	-	10	3	3	1	-	-
	Promysis atlantica	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mysidopsis coelhoi	-	-	-	-	2	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
T O T A L		65	6	10	33	7	9	91	8	12	340	38	67	480	72	70	25	3	3	5	-	-

( ) - number of gravidic female

There are many references in the literature about the distribution of Mysids in estuaries from temperate regions where salinity and dissolved oxygen are considered as important controller factors of their distributoin (Percival, 1929; Tattersall & Tattersall, 1951; Hodge, 1963; Painter, 1966; Turner & Heubach, 1966; Herman *et al.,* 1968; Heubach, 1969).

Very few ecological data have been recorded on Mysids from tropical waters (Bainbridge, 1960; Ganapati & Shyamasindari, 1959/62; Krishnamurti, 1967; Almeida Prado, 1972, in press).

Horizontal distribution — Bainbridge (1960) found Mysids mainly at stations in the central region of the estuary and scarcely registered any at the mouth of the estuary. The pattern of distribution observed by Bainbridge is the opposite of that in the Cananeia region. Ganapati & Shyamasindari (1959/62) associate the presence of Mysids in Lawson's Bay, Waltair Coast to the incursion of Oceanic Water into the bay. These findings agree with the records obtained in the Cananeia region.

The horizontal distribution of each species collected here varied according to its tolerance to salinity and dissolved oxygen, thus, the quantitative occurrence of all species decreased in low values of salinity and dissolved oxygen. *Mysidopsis tortonesi, Brasilomysis castroi* have a wide distribution in the area studied; *Bowmaniella* (*C.*) *brasiliensis* and *Promysis atlantica* have a limited distribution to the entrance of the main channel and *Mysidopsis coelhoi* was rarely found at St. I and II.

The larger occurrences of Mysids were found in the deeper stations (St. I, III and V) where the mean depth was equal to or greater than 6 m and light penetration was 1% or less than that. A 78.00% percentage of mysids in the monthly collection was obtained at the stations mentioned above.

According to Beeton (1960) the optimum light intensity for Mysids is so low that they are concentrated near the bottom during the day. Data taken by Kutner (1972) at the same time as these mysid sampling show that 1% of light penetration was as deep as 0 40 cm in St. XII (Feb./70), 5 m in St. IV (Oct./69), and 6 m in St. I (Dec./69). Light penetration is markedly reduced in the Cananeia region due to the large quantities of yellow substance (Teixeira, Tundisi, Santoro Ycaza, 1969).

The distribution of Mysids might also be controlled by the availability of food (Clutter, 1967; Ganapati & Shyamasindari, 1959/62).

The greatest abundance of Mysids were usually found during high tide. Samples containing more than a 1000 specimens taken at St. III (Sep./69), Stations III, V and VI (Oct./69), St. III (Feb./70), St. I (May/70) were collected during high tide. At St. VII (Sep./69) and St. X (Oct./69) high numbers were collected during low tide. These data suggest that the horizontal migration of Mysids into the estuary follows the tidal movements.

Seasonal variation — Many studies on seasonal variation have been carried out in colder water (Hodge, 1963; Hopkins, 1965; Van der Baan & Holthuis, 1971; Tattersall & Tattersall, 1951; Mauchline, 1965, 1967, 1968, 1969, 1970 a, b; 1971 a, b, c, d, e; Williams, 1972).

To the author's knowledge only Bainbridge (1960), Goodbody (1965), Ganapati & Shyamasindari (1959/62) and Almeida Prado (1972) have recorded seasonal variation of Mysids in tropical regions. Bainbridge (1960) recorded a marked variation in number of Mysids with the amplitude of the tidal cycles, samples collected at spring tides contained many Mysids and those taken at neap tides only a few juveniles. Ganapati & Shyamasindari (1959/62) calls attention that the peak occurrence of Mysids in March coincides with the maximum zooplankton.

The maximum penetration of each species into the estuary was sucessive throughout the seasons although *Mysidopsis tortonesi* was the dominant species in spring, autumn and winter and *Brasilomysis castroi* was the dominant species in summer. *Mysidopsis tortonesi, Metamysidopsis elongata atlantica* were more abundant in spring, *Brasilomysis castroi* in summer, *Bowmaniella (C.) brasiliensis* in autumn and *Promysis atlantica* only occurred during winter.

Total number of Mysids per season:

	Spring	Summer	Autumn	Winter
Number of specimens	47.162	4.203	13.092	4.877

The maximum number of mysids was registered during spring when the mean temperature at all stations varied from 20.93°C (Sep./69) to 25.30°C (Nov./69) and the minimum number during summer when the mean temperature varied from 26.09°C (Dec./69) to 27 42°C (Jan./70).

Vertical distribution — The vertical migration of Mysids is long known (Russell, 1927; Fage, 1932; Tattersall, 1936; Herman, 1963; Vinogradov, 1970; Ganapati & Shyamasindari, 1959/62; Macquart-Moulin, 1965; Beeton, 1960).

The results of the collection at St. III (21-22/07/1970) show good indications of vertical migration of mysids in this area. It was observed that vertical migration was only performed by the young specimens while the adults remained close to the bottom (Table XI).

The annual rhythm of vertical migration in the area still remains unknown as the pattern of vertical distribution registered corresponds to winter time.

The values of environmental data of this collection does not go beyond the limits of tolerance found for each species in this area.

The 84 surface zooplankton samples taken from April (1970) to May (1971) during daylight show that mysids rarely move to surface layers at this time.

The results obtained from this samples are as follows:

April — St. IV — *Metamysidopsis elongata atlantica* — 2 (1 male — 1 female)
June — St. I — *Brasilomysis castroi* — 4 (young)
Mysidopsis tortonesi — 2 (young)
July — St. I — *Mysidopsis tortonesi* — 558 (young)
Bowmaniella (C.) brasiliensis — 1 (young)
Metamysidopsis elongata atlantica — 6 (young)
July — St. IV — *Mysidopsis tortonesi* — 72 (young)
Metamysidopsis elongata atlantica — 10 (young)
Brasilomysis castroi — 2 (young)
August — St. VI — *Metamysidopsis elongata atlantica* — 1 (young).

Biological cycles — According to Tattersall & Tattersall (1951) Mysids breed only once a year in the Arctic region; in northern temperate regions breeding begins at the end of winter and continues through the summer; in more southern temperate regions, breeding goes on practically all the year round, though more slowly in winter than in summer. Mauchline (1965, 1967, 1968, 1969, 1970a, b, 1971a, b, c) records continuous breeding with a period of intense reproduction in many species of British waters.

There are few records on the breeding season of Mysids in tropical regions. Goodbody (1965) registered continuous breeding of *Mysidium columbiae* in Kingston Harbour, Jamaica.

The co-existence, throughout the year of a population composed by a great number of young specimens and small number of adults, including gravidic females, of *Mysidopsis tortonesi, Brasilomysis castroi, Metamysidopsis elongata atlantica* and *Bowmaniella* (*C.*) *brasiliensis* indicates continuous breeding of these species in this area. *Promysis atlantica* occurred only in winter time, and therefore, did not provide data to determine its biological cycles. The presence of a larger quantity of adult specimens, including gravid females, rather than young of *Promysis atlantica* suggested that it was in period of intense breeding.

A great number of Mysids was found at St. I (May/70), St. III and V (Oct./69) and in an extra-sample taken at St. I, 04:00 p.m. (30-10-69) where two more species also occurred *Metamysidopsis elongata atlantica* (16,539 young, 71 adults male and 131 adults females — 34 gravidic) and *Bowmaniella* (*C.*) *brasiliensis* (166 young and 2 adult). These results indicate swarms of mysids, and social behaviour of this species (Clutter, 1969; Mauchline, 1971 e). The data on the occurrence of the species and its developmental stages related to environmental factors can be masked by the presence of swarms.

All species are hypopelagic. About *Mysidopsis coelhoi* there were not enough data to determine its habitat.

None of these species is endemic in the area. All of them are coastal water species. They had already been registered in coastal water (Tattersall, 1923; Bacescu, 1968 a, b, c; Costa, 1964), and their quantitative distribution was higher at the entrance of the estuary.

The population of Mysids is maintained in the estuary by continuous supply of specimens from coastal waters. The horizontal migration is performed through the deeper layer where the animals follow the tidal movements. The vertical migration of the young specimens facilitates the dispersion of the species through the movements of the upper layers towards the sea or into the mangrove region.

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