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SOME ECOLOGICAL OBSERVATIONS ON CRUSTACEAN AMPHIPODS ASSOCIATED WITH MARINE FOULING IN SUEZ CANAL (EGYPT)

BY

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ABSTRACT

Species composition, abundance and seasonal variation of amphipods associated with marine fouling at Port Said and Ismailia regions (Suez Canal Egypt) were investigated. A total of 11 species belonging to two sub-orders and 5 families are listed , among which two species; namely : Corophium acutum Chev.and Elasmopus rapax Costa ranked the highest degree of dominance. Moreover, the total number of juvenile stages, greatly exceeds that of males and females. On the other hand, the total number of females exceeds that of males, since the fouling growths represent suitable ecological sites for their reproduction. In addition, it

appears that, amphipod species occur all the year round but their relative abundance showed marked variations during different seasons, being much abundant in spring.

INTRODUCTION

Amphipods are phylogenetically very old animals. They live in all seas because they are tiny crustaceans and tolerate severe conditions exerted by most environmental factors. So, they have no difficulties to find a suitable environment for their living with all abiotic and biotic attributes that they need. From the ecological stand point, it is of interest that amphipods can be expected on almost all found surfaces, where they accumulate in great masses [2]. On the other hand, they are of great economic importance as an essential source of food for fishes, especially young ones, and probably eaten by other animals upon which fish feed [9] and [15] .

Although amphipods are the most abundant free living crustaceans associated with fouling in Egypt [4,11] yet our knowledge about these organisms in Suez Canal waters is limited to the work done by the Cambridge Expedition (1924) and published by Schellenberg [14] who surveyed the distribution of benthic amphipods along the coast of Suez Canal. To the best of the auther's knowledge, the only notable ecological studies of amphipoda from Egyptian waters are

that given by Ezzat [5] . Atta [1] and Ramadan [13].

The object of the present work is to make more critical ecological survey in order to revise the records of amphipod species of the investigated areas and to reveal certain aspects that are left uncovered by the Cambridge Expedition. The ecological investigation is based on the study of the population of these amphipods in two different localities, in Ismailia and Port-Said, aiming to an estimate of the relative abundance of the species present.

MATERIALS AND METHODS

1. Sites of collection:

Specimens used in the present work were collected from Lake-Timsah (Ismailia region) and Port said during April 1985 to March 1986. The samples were obtained from fouling communities attached to submerged surfaces, 40-100cm in depth, by scraping with a sharp knife. Sampling was obtained from a fixed weight equal to 2 kgms. The specimens were narcotized using magnesium sulphate. Fully narcotized samples were then fixed in 10% formalin . Owing to the relative small size of the investigated samples they were washed many times throughout 0.1mm mesh sieve. These washed samples were further sorted into amphipods

and isopods. The investigated amphipod samples were then stored in a solution consisting of 4% formalin (one volume) and glycerine (half volume) .

2. Biological studies:

2.1. Counting:

After sorting, investigated specimens were dried, weighed, and random samples were taken from it, each sample weighed 1/2 gm and counted under a stereo-binocular microscope.

2.2. Isolation into stages :

Investigated specimens were primarily distinguished into two stages: Juveniles and Matures. were further divided into males, females and ovigerous.

3. Statistical analysis:

3.1. Classification of dominance values:

The method adopted by Heydeman (1960) (cited from [17] was followed, according to the following formula:

$$\frac{\text{No. of individuals of species A/unit}}{\text{Total number of individuals of all species/unit}} \times 100$$

3.2. Analysis of variance:

The calculation of variance adopted by Myers[12] was followed.

RESULTS AND DISCUSSION

I. Species composition:

A list of the amphipods associated with fouling community collected from Suez Canal waters at the two investigated areas is given in Table 1. Form this table it is obvious that:

1. There are 11 recorded species belonging to two sub-orders and 5 families.
2. Suborder Gammaridea is the most prevalent and is represented by four families; Gammaridae, Stenthoidae, Corophiidae and Podoceridae. The suborder Caprellidea is very rare and is represented by one family only; Caprellidae and one species, Caprella equilibra Say.
3. Family Corophiidae is the most abundant; five species of this family were collected from Ismailia. These are Corophium acutum Cheveux; C. insidiosum Crawford; C. acherusicum Costa; C. bidentate n.sp. and Ericthonius brasiliensis, Milne-Edwards. The same species, except C. archerusicum, were collected from Port Said.
4. Family Gammaridae follows Corophiidae in abundance and is represented by three species, namely Elasmopus rapax Costa; E. pectinicrus Beta and Melita appendiculata Audouin.
5. The remaining two families are least abundant and are represented by only one species for each: Stenothoe gallensis Walker (Family Stenothoidae) and Podocerus

variegates Leach (Family Podoceridae).

6. The total number of amphipods per samples from Ismailia exceeds those from Port Said , being 33924 and 20960 individuals, respectively. This may be due to the higher degree of pollution of the water at Port Said and this foundation is supported by Habrough [6], who showed evidence that organic pollution could affect the life cycle of amphipods by increasing the time required to reach maturity.

It is interesting to note that out of the 11 species recorded here, 9 species were collected before from the benthic sea water of Suez Canal during the year (1924) by the Cambridge Expedition on occasion and very scarce numbers [14] . The additional two species Corophium insidiosum and Corophium bidentata n.sp. are recorded here for the first time from both Ismailia and Port-Said . It is worthy to mention that, another species (Corophium sextoni) was collected in the investigated localities but it was neglected due to the fewer numbers of individuals collected (5 of this species)

II. Abundance of Adults and Juveniles:

It is clear that the total of juvenile individuals greatly exceeds that of males and females (Table 1&Fig.1). This is clearly observed in Elasmopus rapax; E. pectenicrus,

Corophium bidentata n sp. and Ericthonius brasiliensis. Also, it is noticed that total number of females exceeds that of males. This may due to the fact that these amphipods find the fouling growths a suitable ecological niche for reproduction which may reflect the high abundance of females and juveniles. In addition, the authors believe that high concentration of organic matter in fouling community provides a suitable substrate for maintaining a rich bacterial flora and provides a rich source of nutrients for associated amphipods both driectly and indirectly via other organisms.

Regarding the dominance of the investigated species (Table 2) it can be recognized that Corophium acutum (40.15%) and Elasmopus rapax (39.44%) ranked the highest degree of dominance, where they represent the only eudominent species in Ismailia and Port Said , respectively. However, C. acutum (28.40%) and Ericthonius brasiliensis (15.94%) were found to be the two dominant species in Port Said , while in Ismailia three dominant ones existed; Ericthonius brasiliensis (22.05%), Elasmopus rapax (15.34%) and C. bidentata n.sp. (12.95%). On the other hand , C. insidiosum (5.86%) and C. bidentata n.sp. (6.46%) were recorded as subdominant species in Ismailia and Port Said respectively. The remaining species were considered as resident and subresident ones.

III. Seasonal Variation:

In order to assess the seasonal variation of amphipods associated with fouling growths in Ismailia and Port Said waters catches were taken monthly at the middle of each month, the arithmetic mean of number of each amphipod species of the catches of three successive months is considered as the amphipod index per season. The percentage of each stage and of both males, females, and ovigerous females is considered in part of this work . The studies conducted throughout the year 1985 and 1986, clearly demonstrate that the continuous feed-back of fouling growths with adults reaches its maximum during Spring in both areas under investigation as shown in Table 3 and 4, and Figures 2 and 3. Also, the relative abundance of juvenile stages reaches its minimum in Autumn but gradually increases reaching its climax during Spring (Table 3 and 4 ; Figs. 2 and 3.) . After that a sharp decline takes place towards autumn season. The results presented in this work indicate that amphipods are found all the year round, but the relative abundance of these crustaceans varied from one season to another, being much abundant in Spring . For instance, 80.29% Of the total amphipods were collected during spring months in Ismailia compared with 46.93% in Port Said . The lowest record was observed in the relatively hot months and being 5.97% and 2.79% during Summer and Autumn, respectively in Ismailia and 11.9% in Port Said during the same seasons.

Regarding the adult male relative abundance , 78.23% of the total males were collected during Spring while 7.6%, 3.6% and 10.51% were collected during Summer; Autumn and Winter, respectively at Ismailia (Table, 5). In Port-Said the relative abundance of males were found to be 10.6% , 13.o2%, 33.75% and 42.57% during Summer, Autumn, Winter and Spring, respectively (Table 5).

Concerning the adult females, 77.24% and 42.42% of their total number were collected during Spring from Ismailia and Port Said , respectively . These values greatly decreased, being 6.37%, 3% and 13.38% during Summer, Autumn and Winter in Ismailia, respectively, compared with 10.37% 16.33% and 30.87% in Port Said . , respectively. Out of the total ovigerous females 84.27% and 50.31% were collected during Spring from Ismailia and Port Said , respectively. This ratio declined to 3.23% and 3.90% during Summer in Ismailia and Port Said , respectively, and 4.36% and 4.14% during Autumn and Winter in Ismailia instead of 25.66 % and 20.12% in Port-Said , respectively. This foundation is in agreement with Bousfields [3, 15, 8, 10]. These authors reported that ovigerous females of amphipods may be found through the year but that breeding activity reaches a peak during early Spring. On the other hand, the present foundation contradicts with that of Harrison [7] who stated; without giving supporting data, that some amphipods breed in the spring

and summer months only.

As for the juvenile stages, 82.67% and 50.44% of the total were collected during Spring from Ismailia and Port Said resepectively . During summer, autumn and winter months the values were 5.20%, 1.70% and 10.43% in Ismailia and 14.09% , 7.76 % and 27.20% in Port Said , respectively (Table 5).

From the previously mentioned data it can be generally stated that the amphipod species are present all the year round but the process of breeding shows marked variation during different seasons and manifests itself in extreme abundance in Spring. So, the authors may consider that adults amphipods associated with fouling in our marine water have one peak of seasonal abundance during Spring.

IV. Seasonal Variation of the Major Amphipod Species:

As mentioned above there are four eudominant and dominant ones. These species may be considered as constant species for fouling growths. These are : Elasmopus rapax, Ericthonius brasiliensis, Corophium acutum and Corophium bidentata n.sp. These species occur through the whole year in numbers that permit studying their seasonal variations as shown below:

1. The highest numbers are those of Corophium acutum in

both Ismailia and Port Said ; followed by Ericthonius brasiliensis, Corophium bidentata n.sp. and Elasmopus rapax in Ismailia. In Port-Said , C. acutum is still the most abundant one, followed by Elasmopus rapax, Ericthonius brasiliensis and Corophium bidentata.

2. The relative abundance of these species varied greatly from one season to another and between different species , but being more abundant during Spring

3. In Ismailia, Corophium acutum was very scarce in Summer, Autumn and Winter (Tables 6 & 7). 0.94% , 0.52% and 7.27% of the total number of the species was collected , while a very high percentage of this species was collected during Spring (91.25%). This may be attributed to the suitability of fouling growths as ecological niche for reproduction, and hence its occurrence at a high density during the breeding season. This is also true in Port Said water, the relative abundance was found to be 3.51%, 27.44% and 67.28% during Summer, Autumn, Winter and spring, respectively (Tables 6 & 7 and Figs . 4 & 5).

The other species, Corophium bidentata n.sp. approximately follows the same distribution pattern mentioned above. The relative abundance of this species was found to be at its maximum during Spring and this was much more evident in Ismailia (Tables 6,7 and Figs. 6,7).

4. As for Ericthonius brasiliensis, it was found to be

scarce during Summer and Autumn and the population density in Winter reaching its maximum value in Port Said and during Spring in Ismailia (Tables 6 & 7 and Figs. 8 & 9).

5. Regarding Elasmopus rapax seasonal variations, the minimum density was recorded during Autumn in both Ismailia and Port Said . This increased gradually during Winter and Spring reaching its maximum during Summer in Ismailia and during Spring in Port Said , respectively (Table 6 & 7 and Figs. 10 & 11).

It may be concluded that these species of amphipods are not permanent inhabitors for fouling growths but they invade such areas at certain times for breeding during Spring or Summer according to species. The numbers increased, especially those of ovigerous females and juvenile stages, due to the breeding activity in these seasons.

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Table (1)

The faunal composition of amphipod species associated with fouling growths in Suez Canal waters at Ismailia and Port-Said during the period from April 1965 to March 1966 (Total number/2 Kgms fouling).

Amphipods	Port-Said waters					Ismailia waters					G.T.
	♂	♀	Ovig ♀	Juv.	total	♂	♀	Ovig ♀	Juv.	total	
I- Suborder: Gammaridea											
1- Family: Gammaridea					9097					5822	14919
Elasmopus rapax costa	925	2311	368	4662	8266	561	948	182	3513	5204	
E. pectenicrus Bate	150	290	39	243	722	137	189	57	227	610	
Melita appendiculata(Aud.)	45	46	0	18	109	4	4	0	0	8	
2- Family: Stenothoidae					233					85	318
Stenothoe gallensis walk	53	94	15	71	233	26	39	9	11	85	
3- Family: Corophiidae					10879					27882	38761
Corophium acutum chev	1280	1780	162	2731	5953	2949	5502	1185	3984	13620	
C. insidiosum crawf	61	95	14	61	231	527	762	74	624	1987	
C. acherusicum costa	0	0	0	0	0	122	177	41	105	445	
C. bidentata n.Sp.	460	320	38	516	1354	902	1452	575	1434	4393	
Erichonius brasiliensis Milne Edw.	583	770	175	1812	3340	1102	1690	737	3953	7482	
4- Family: Podoceridae					460					79	539
Podocerus variegatus Leach	147	127	16	170	460	24	29	7	19	79	
II- Suborder: Cyamidae											
Family: Caprellidae					292					11	303
Caprella equilibra say	67	85	54	86	292	2	6	2	1	11	
Total	3791	5918	881	10370	20900	6386	10798	2865	13871	33924	54824

Table (2)

Dominance of amphipod species associated with fouling growths in Suez Canal waters (Ismailia and Port-Said) during the period from April 1985 to March 1986.

Species	Ismailia			Port-Said		
	No.	%	Dominance class	No.	%	Dominance class
Elasmopus rapax	5204	15.34	B	8266	39.44	A
C. acutum	13620	40.15	A	5953	28.40	B
Erichthonius brasilienesis	7482	22.05	B	3340	15.94	B
C. bidentata n.Sp.	4393	12.95	B	1354	6.46	C
Elasmopus pectenicrus	610	1.80	d	722	3.44	d
Podocerus variegatus	79	0.33	e	460	2.19	d
Caprella equilibra	11	0.03	e	292	1.39	d
Stenothoe gallensis	65	0.25	e	233	1.11	d
Corophium insidiosum	1987	5.86	C	231	1.10	d
Melita appendiculata	8	0.02	e	109	0.53	e
Corophium acherusicum	445	1.31	d	0	0	o
Total	33924			20960		

Dominance classes:

A = Eudominant Over 30%

B = Dominant 10 - 30%

C = Subdominant 5 - 10%

D = Recedent 1 - 5%

E = Subrecedent under 1% .

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(Table 3)

Seasonal variation of the amphipod species expressed in avarage number/2Kgm fouling growths at Ismailia

Family and species	Summer					autumn					winter					spring					Total
	♂	♀	ovig ♀	Juv.	Total	♂	♀	ovig ♀	Juv.	Total	♂	♀	ovig ♀	Juv.	Total	♂	♀	ovig ♀	Juv.	Total	
1- Family: Gammaridae																					
Elasmopus rapax	103	134	23	150	416	7	17	3	17	44	27	75	4	78	184	47	91	39	131	208	946
E. pectenicrus	9	14	3	22	48	2	3	2	3	10	9	11	-	12	32	26	35	15	40	116	206
Melita appendiculata	-	-	-	-	0	-	-	-	-	0	4	4	-	-	8	-	-	-	-	0	8
2- Family: Stenothoidae																					
Stentothoe gallensis	20	30	-	7	57	2	4	1	2	9	-	-	-	-	0	4	5	8	2	19	85
3- Family: Corophiidae																					
Corophium acutum	13	20	-	10	43	12	4	1	7	24	59	172	9	92	332	903	1645	385	1230	4163	4562
C. insidiosum	18	25	5	10	58	9	30	23	17	79	9	26	3	25	63	147	182	13	174	516	716
C. acherusicum	-	-	-	-	0	29	40	4	11	84	7	21	3	8	39	24	25	10	22	81	204
C. bidentata n.Sp.	6	11	-	-	19	16	6	3	3	28	16	43	4	26	89	279	430	88	450	1247	1383
Ericthonius brasiliensis	2	1	-	3	6	1	2	1	4	8	103	136	16	162	417	335	426	229	1153	2143	2574
4- Family: Podoceridae																					
Podocerus variegatus	-	-	-	-	0	4	5	3	2	14	4	4	-	1	9	5	7	4	8	24	47
5- Family: Caprellidae																					
Caprella equilibra	-	-	-	-	0	-	-	-	-	0	-	2	-	1	3	2	4	2	-	8	11
Total	173	235	31	202	641	82	111	41	66	300	238	494	39	405	1176	1772	2850	793	3210	8625	10742
																					G.T.

(Table 4)

Seasonal variation of the amphipod species expressed in avarage number/2Kgm fouling growths at Port-Saied.

Family and species	Summer					autumn					winter					spring					Total
	♂	♀	ovig. ♀	Juv.	total	♂	♀	ovig. ♀	Juv.	total	♂	♀	ovig. ♀	Juv.	total	♂	♀	ovig. ♀	Juv.	total	
1- Family: Gammaridae																					
Elasmopus rapax	158	243	12	754	1167	97	265	94	275	751	90	305	11	430	836	115	333	27	950	1425	4179
E. pectenicrus	4	7	2	12	25	28	69	8	80	185	45	45	16	33	133	7	13	3	14	37	380
Melita appendiculata	-	-	-	-	0	45	46	-	18	109	-	-	-	-	0	-	-	-	-	0	109
2- Family: Stenothoidae																					
Stenothoe gallensis	2	3	-	10	15	27	55	3	36	121	-	-	-	-	0	24	36	12	25	97	233
Family: Corophiidae																					
Corophium acutum	40	52	-	26	120	20	24	6	6	60	226	384	33	294	937	457	610	52	1178	2297	3414
C. insidiosum	8	16	-	8	32	6	12	4	4	26	11	23	-	11	45	15	16	6	17	54	157
C. acherisicum	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	0
C. bidentata n.Sp.	24	16	-	9	149	10	7	-	3	20	260	56	11	56	383	89	118	14	225	444	896
Erichthonius brasiliensis	7	14	5	10	36	20	27	4	19	70	137	237	33	792	1199	196	226	65	490	967	2272
4- Family: Podoceridae																					
Podocerus variegatus	3	5	-	8	16	48	35	4	19	106	-	-	-	-	0	25	27	12	62	126	248
5- Family: Caprellidae																					
Caprella equilibra	-	-	-	-	0	-	-	-	-	0	11	9	-	3	23	56	76	54	83	269	292
Total	246	356	19	839	1460	301	560	125	462	1448	730	1059	98	1619	3556	984	1455	245	3032	5716	12180 G.T.

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Table (5)

Relative abundance of ♂, ♀, ovig ♀ and juvenile stages of the total amphipod species collected from Ismailia and Port-Said waters (Suez Canal, Egypt) during the year 1965 and 1966.

Seasons	Ismailia					Port-Said				
	♂	♀	♀ ovig.	Juv.	Total	♂	♀	♀ ovig	Juv.	Total
Summer	7.6	6.37	3.23	5.20	5.97	10.6	10.37	3.90	14.09	11.99
autumn	3.6	3	4.36	1.70	2.79	13.02	16.33	25.66	7.76	11.90
Winter	10.51	13.3	4.14	10.43	10.93	33.75	30.87	20.12	27.20	29.20
Spring	78.23	77.24	84.27	82.67	80.29	42.57	42.42	50.31	50.44	46.93

Table (6): Seasonal variation for the dominant amphipod species at Ismailia and Port-Saied during the period from April 1985 to March, 1986.

Species	Males					Females					Ovigerous ♀					Juvenile					Total				G.T.
	Su.	A.	W.	Sp.	To.	Su.	A.	W.	Sp.	To.	Su.	A.	W.	Sp.	To.	Su.	A.	W.	Sp.	T.	Su.	A.	W.	Sp.	
Ismailia:																									
1) Elasmopus rapax	103	7	27	47	184	134	17	75	91	317	23	3	4	39	69	150	17	78	131	376	410	44	184	308	946
2) Ericthonius brasiliensis	2	1	103	335	441	1	2	136	426	565	-	1	16	229	246	3	4	162	1153	1392	6	8	417	2143	2574
3) Corophium acutum	13	12	59	903	987	20	4	172	1645	1841	-	1	9	385	395	10	7	92	1230	1339	43	24	332	4163	4562
4) Corophium bidentata n.Sp	8	16	16	279	319	11	6	43	430	490	-	6	4	88	98	-	3	26	450	479	19	28	89	1247	1383
Port-Saied:																									
1) E. rapax	158	97	90	115	460	243	285	305	333	1166	12	94	11	27	144	754	275	430	950	2409	1167	751	836	1425	4179
2) Ericth. brasiliensis	7	20	137	196	360	14	27	237	226	504	5	4	33	65	118	10	19	792	480	1301	36	70	1199	967	2272
3) Corophium acutum	40	20	226	457	743	52	24	384	610	1070	-	8	33	52	93	28	8	294	1178	1508	120	60	937	2297	3414
4) C. bidentata n.Sp.	24	10	260	89	383	16	7	56	118	197	-	-	11	14	25	9	3	56	223	291	49	20	383	444	896

Table (7)

Relative abundance of the major amphipod species collected from fouling growths at Ismailia and Port-Saied waters. (Suez-Canal, Egypt) during the year 1985 - 1986.

Seasons / Species	Ismailia				Port-Saied			
	Summer	autumn	winter	spring	summer	autumn	winter	spring
Corophium acutum	0.94	0.52	7.27	91.25	3.51	1.75	27.44	67.28
Ericthonius brasiliensis	0.23	0.31	16.20	83.25	1.56	3.08	52.77	42.56
Corophium bidentata n.Sp.	1.37	2.02	6.43	90.16	5.47	2.23	42.75	49.55
Elasmopus rapax	43.34	4.65	19.45	32.56	27.92	17.97	20.0	34.09

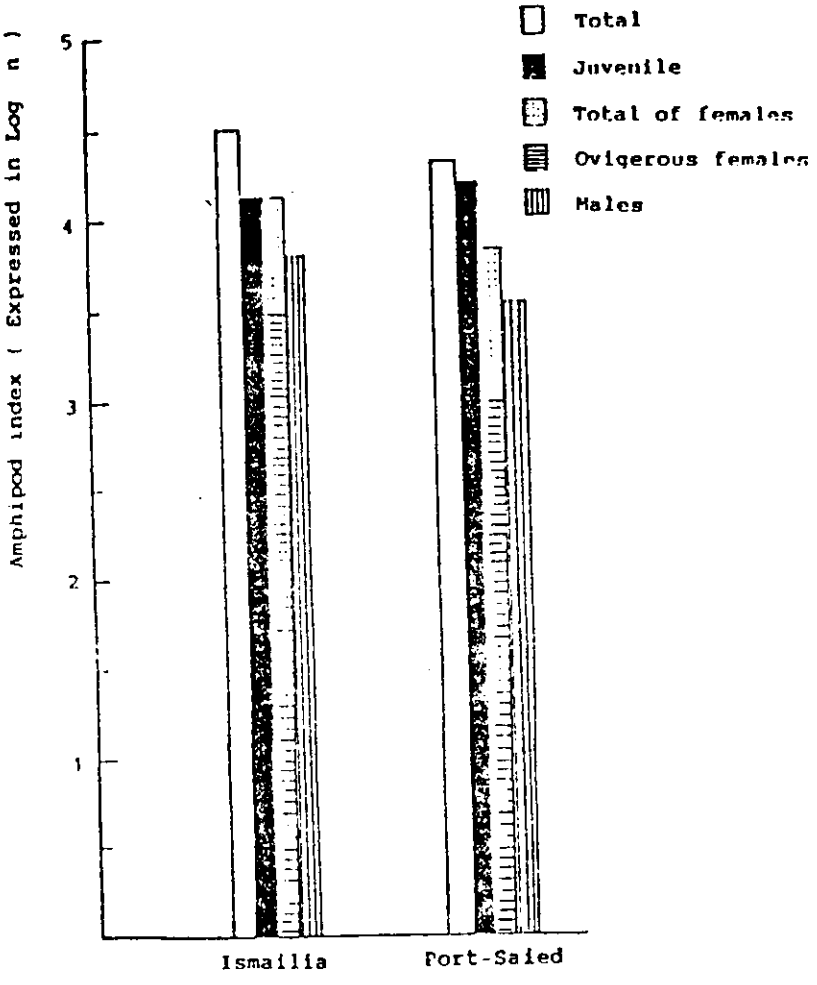

Fig (1) : The relative abundance of females, ovigerous females, males and juveniles of Amphipods associated with marine fouling in Suez Canal at Ismailia and Port-Saied throught one year (April 1985- March 1986) .

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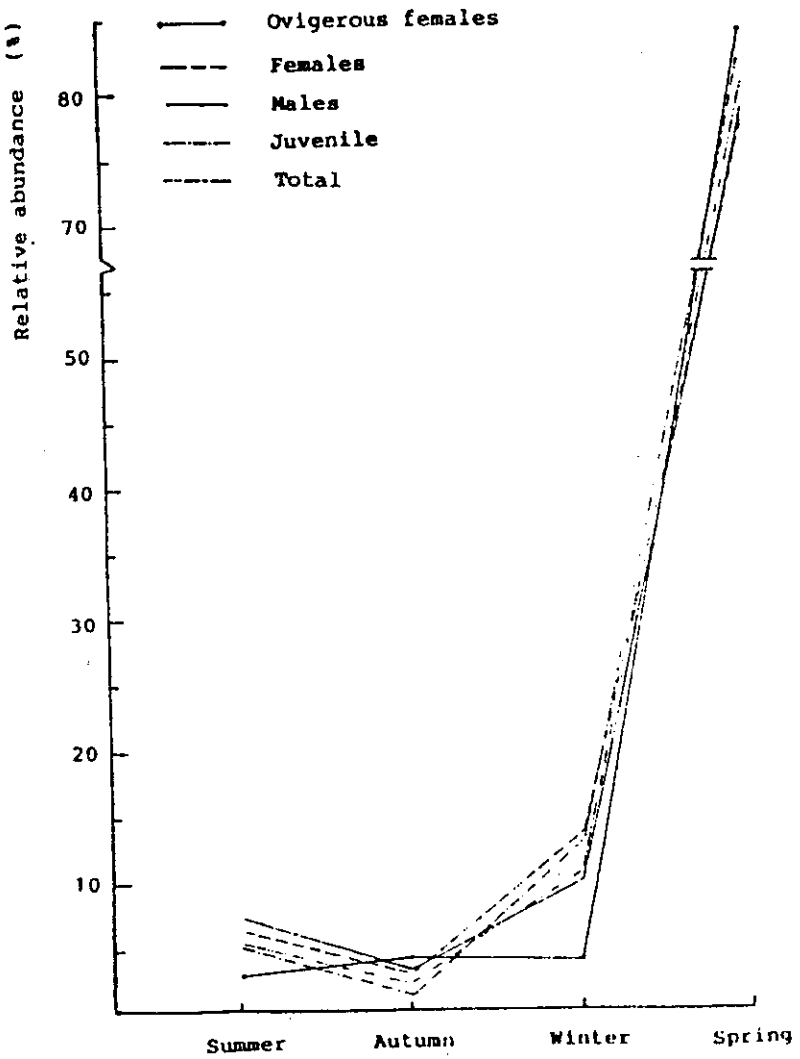

Fig (2) : Relative abundance of Amphipod Species associated with marine fouling at Ismailia (Suez Canal, Egypt)

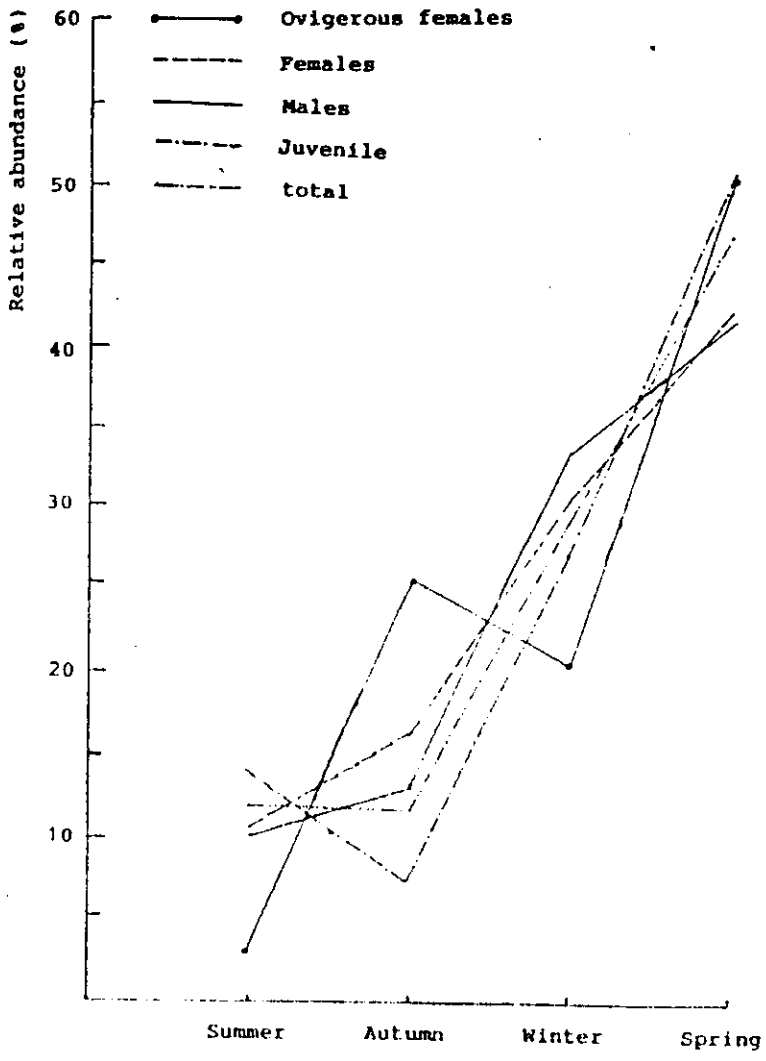

Fig (3) : Relative abundance of Amphipod Species associated with marine fouling at Port- Saied (Suez Canal, Egypt).

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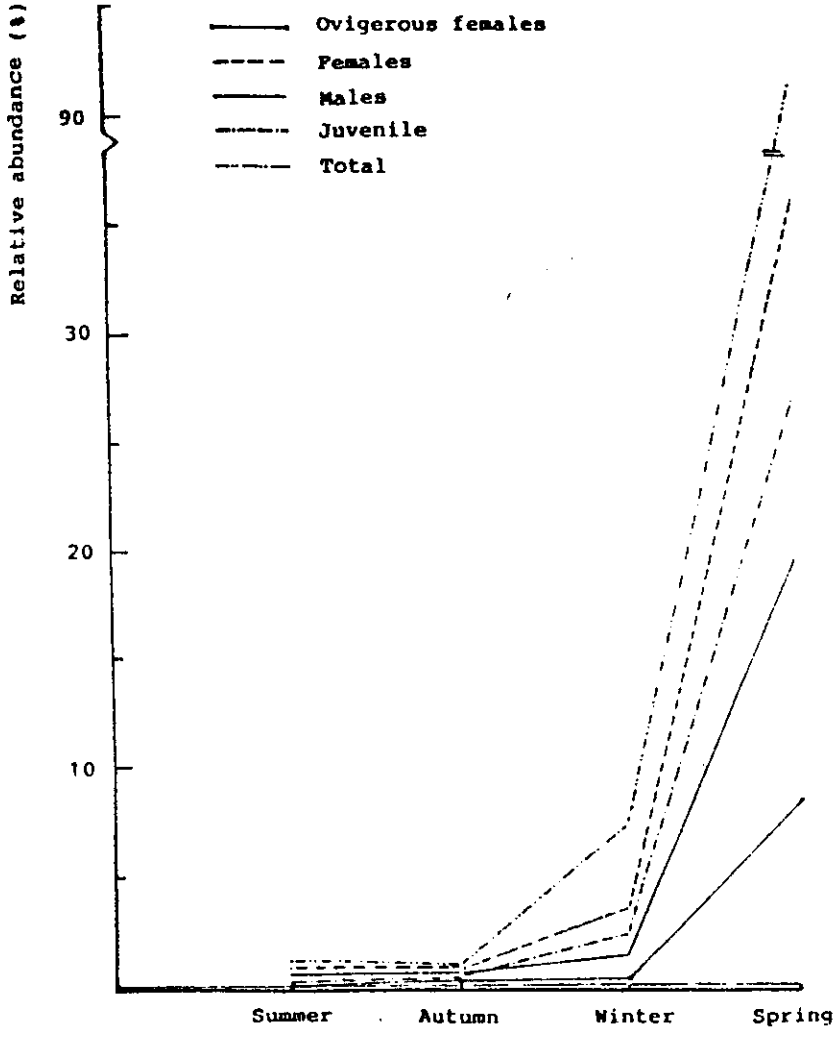

Fig (4) : Relative abundance of Corophium acutum from marine fouling at Ismailia.

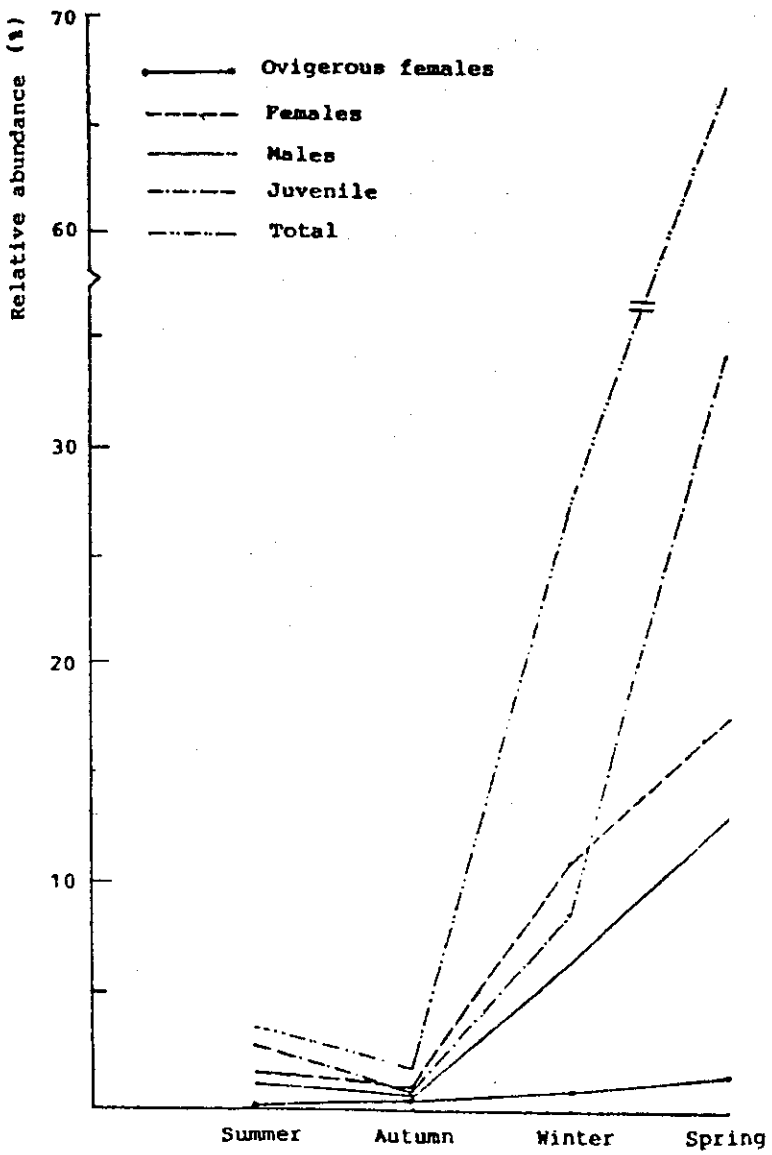

Fig (5) : Relative abundance of Corophium acutum from marine fouling at Port-Said.

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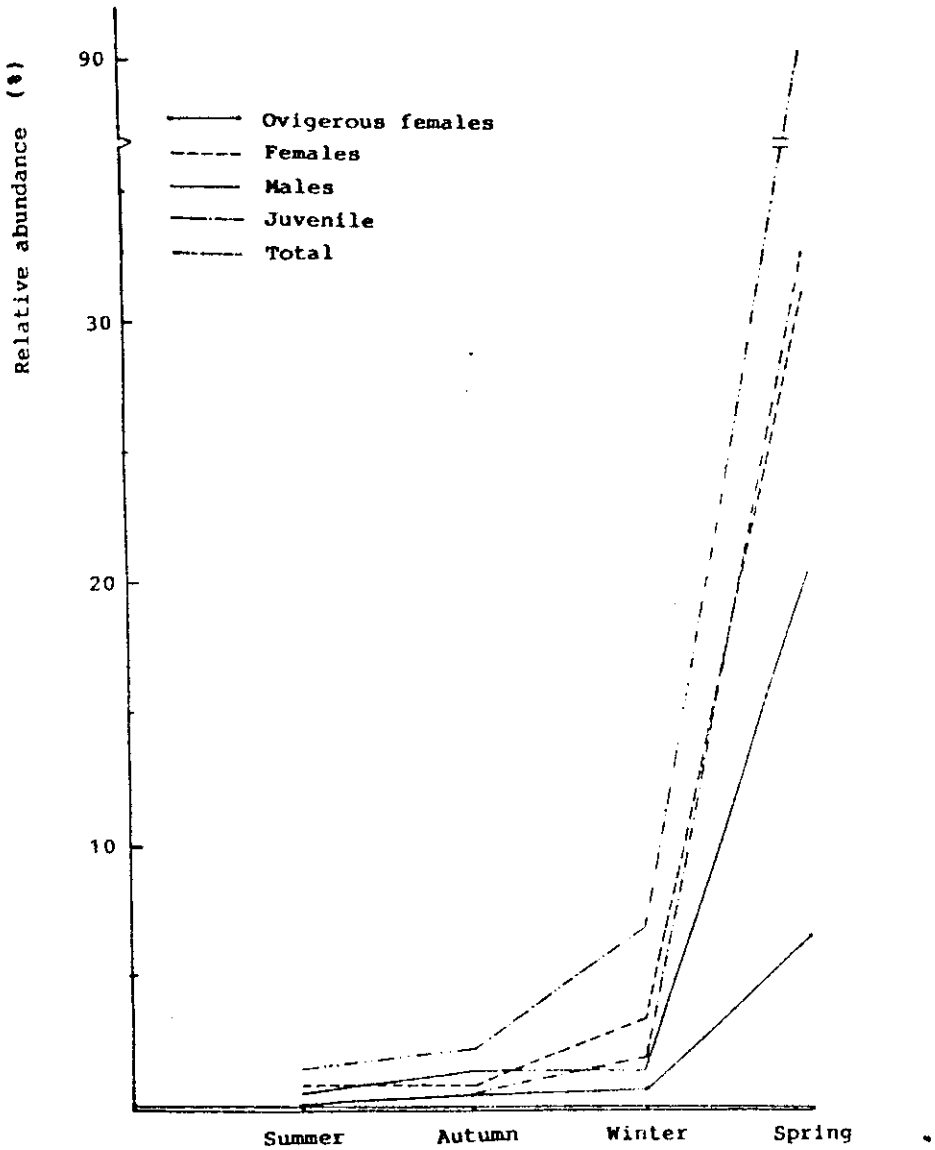

Fig (6) : Relative abundance of Corophium bidentata n.sp. from marine fouling at Ismailia.

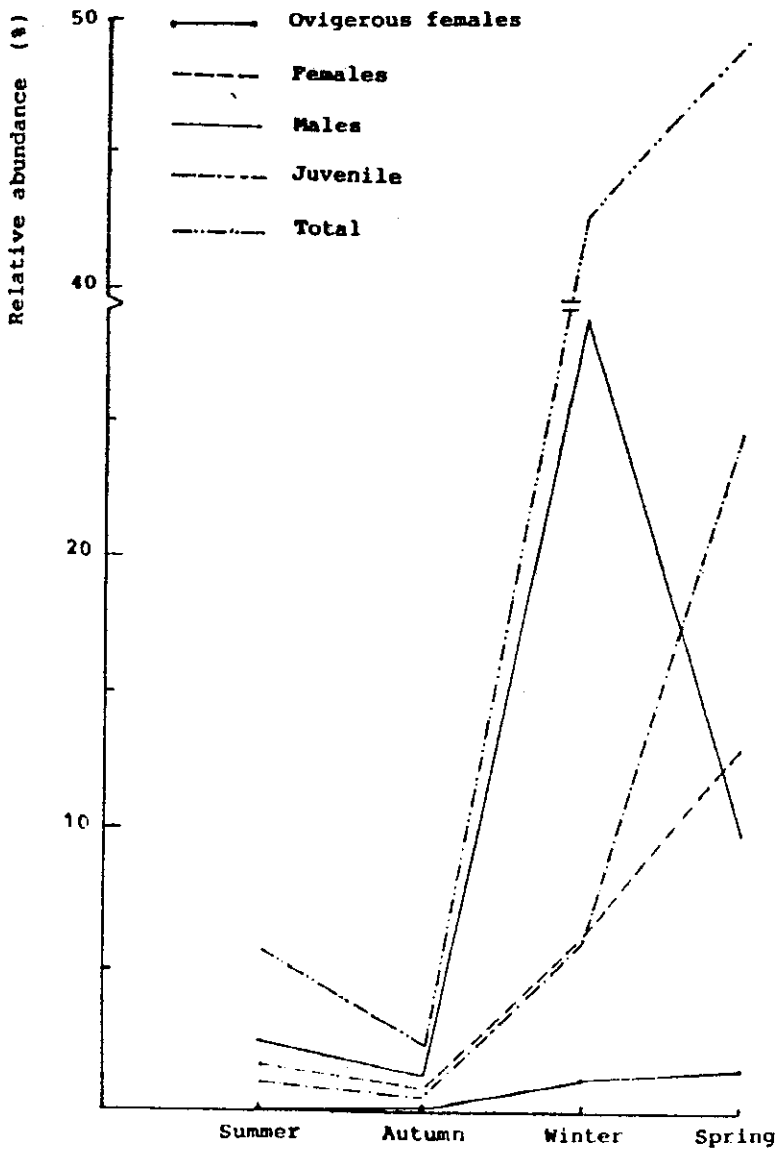

Fig (7) : Relative abundance of Corophium bidentata n.sp. from marine fouling at Port-Saied.

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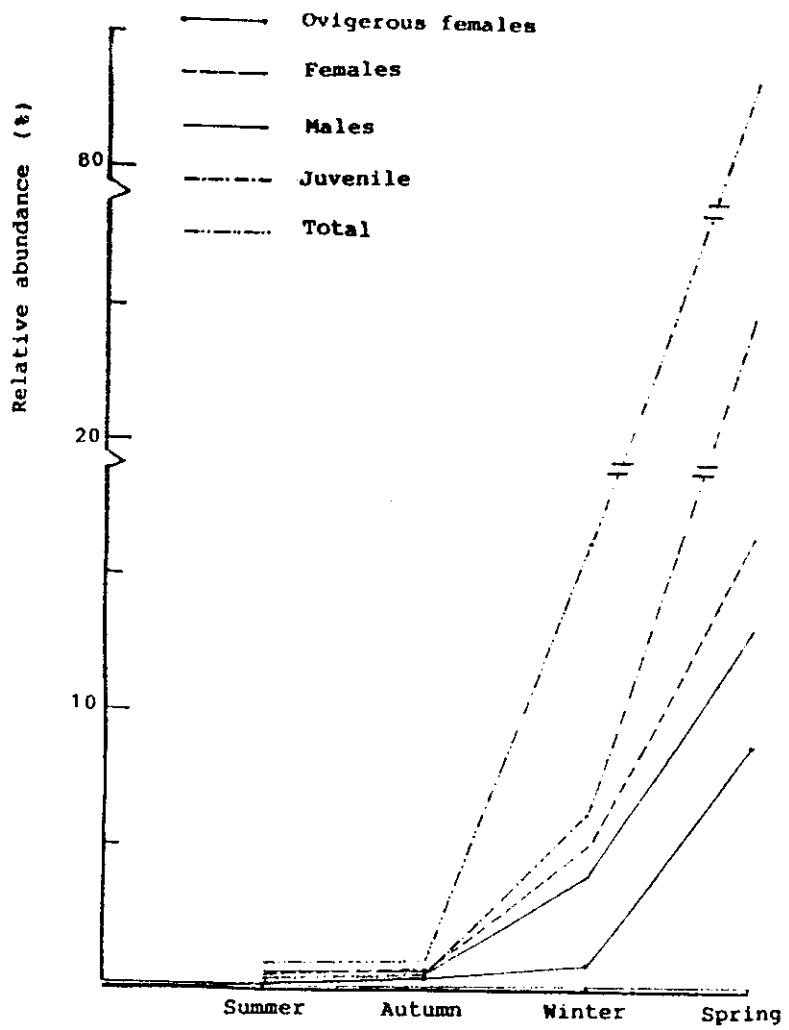

Fig (8) : Relative abundance of Ericthonius brasiliensis from marine fouling at Ismailia.

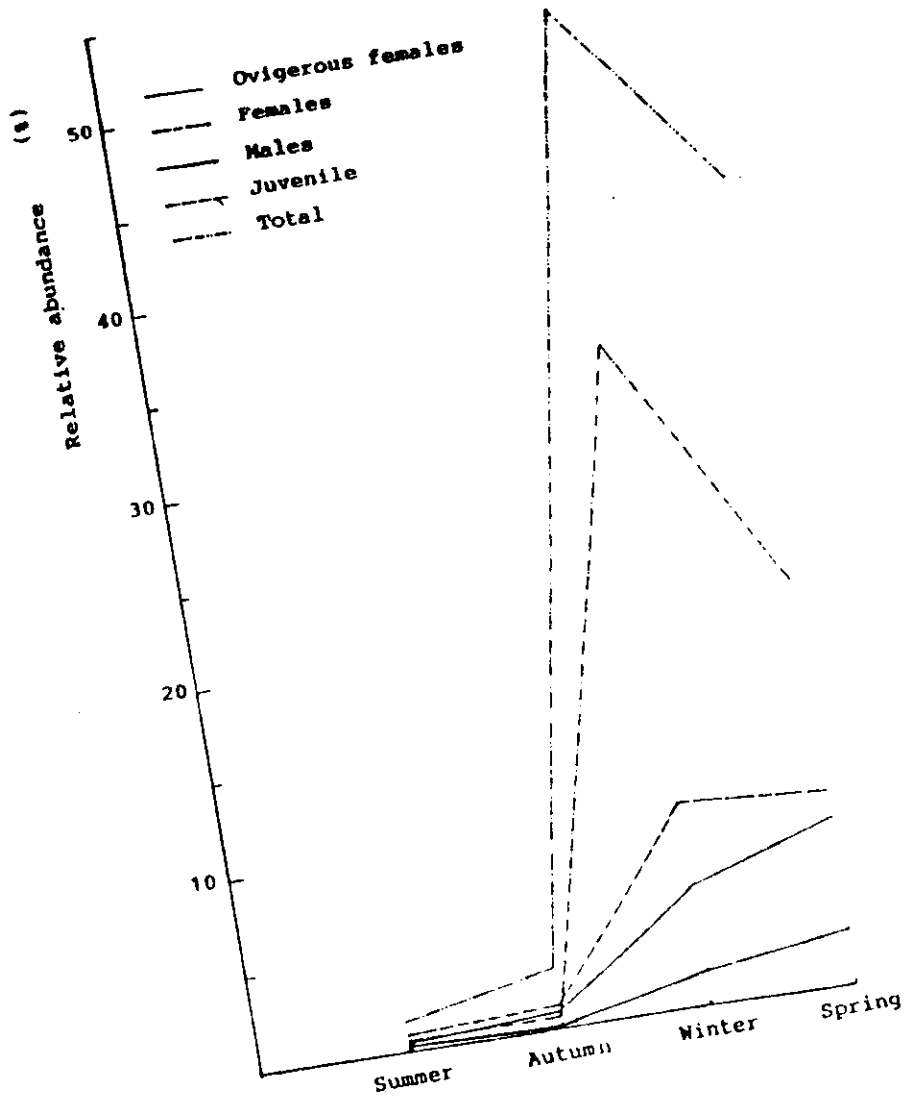

Fig (9) : Relative abundance of Ericthonius brasiliensis from marine fouling at Port-Saied.

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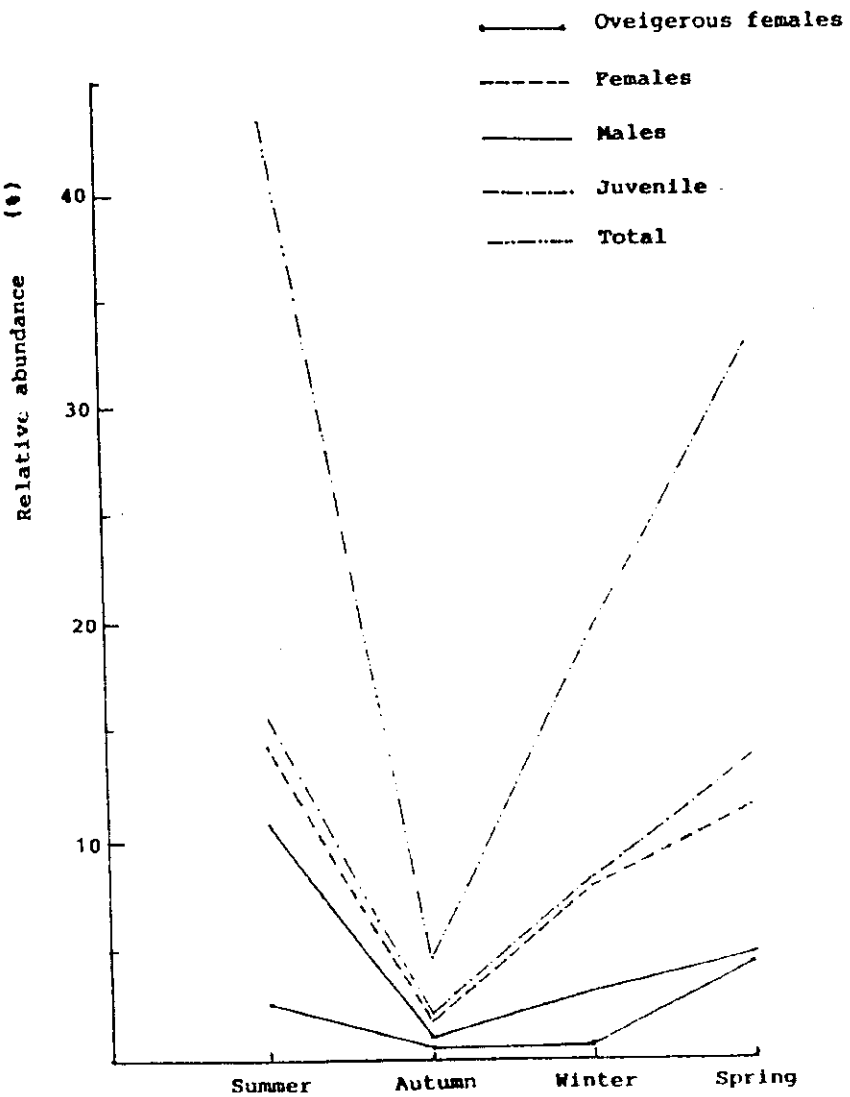

Fig (10): Relative abundance of Elasmopus rapax from marine fouling at Ismailia.

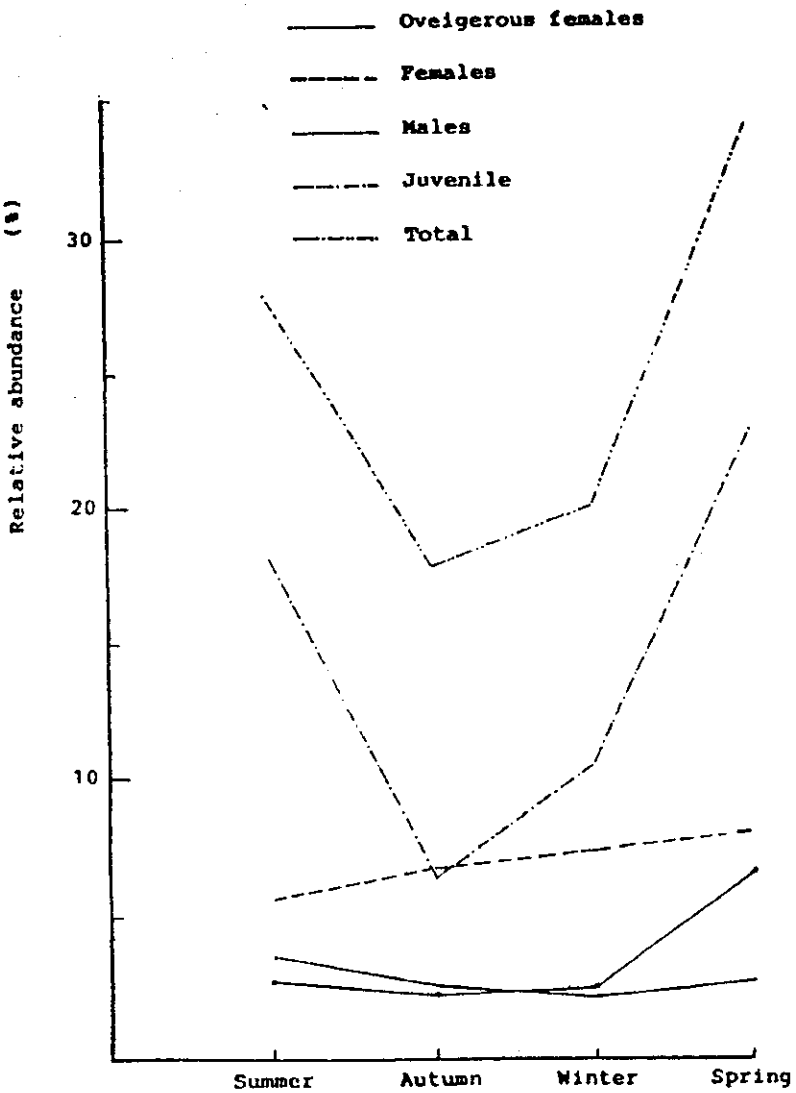

Fig (11): Relative abundance of Elasmopus rapax from marine fouling at Port- Saied.

بعض الملاحظات على قشريات الامفيبودا المرتبطة بالحشف البحرى فى قناة السويس (مصر)

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تم فى هذا البحث عمل حصر لأنواع الامفيبودا المرتبطة بالحشف البحرى فى قناة السويس وخاصة فى منطقتى الاسماعلية (بحيرة التمساح) وبورسعيد ومن هذا الحصر تبين وجود احدى عشر نوعا من الامفيبودا تنتهى الى تحت رتبتين ، وخمس عائلات ، وسبعة أجناس .

كما تبين من خلال هذه الدراسة وجود نوعين هما كوروفيوم اكيوتوم والازموبس راباكس يحتلوا أعلى درجة فى السيادة فى المنطقتين. ومن ناحية أخرى تم دراسة التغير الموسمى لهذه الأنواع وتبين عامة أن عدد الأحياء الصغيره الغير ناضجة يزيد عاى عدد الذكور والاناث الناضجة وأن عدد الاناث يزيد عاى عدد الذكور كما وجد أن المجتمع الحشفى يعد مكانا بيئيا مناسبا للتكاثر .

بالاضافه الى ذلك وجد أن أنواع الامفيبودا موجوده على مدار السنه بكميات متباينه من فصل الى أخر وأن فصل الربيع هو أكثر الفصول وفرة من ناحية تواجد الانواع .