Fig. (55) : *Pirenella conica*
Aperture and opposite side.
(mm division)

Fig.(56): *Nassarius cuvierii*
Aperture and opposite side
(mm division)

Table (19): Seasonal frequencies of *Nassarius cuvierii* (No./m^2 and G.F.W./m^2) in lake Qarun .

St.No.	Winter		Spring		Summer		Autumn		Average	
	No/m^2	gm/m^2	No/m^2	gm/m^2	No/m^2	gm/m^2	No/m^2	gm/m^2	No/m^2	gm/m^2
I	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve
II	40	27.42	-ve	-ve	-ve	-ve	-ve	-ve	10	6.85
III	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve
IV	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve
V	-ve	-ve	20	15.58	-ve	-ve	-ve	-ve	5	3.89
VI	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve
VII	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve	-ve
VIII	-ve	-ve	-ve	-ve	-ve	-ve	40	35.20	10	8.8
Avg.	5	3.42	3	1.94	-ve	-ve	5	4.40	3	2.44

2.2.3.4. Species composition and classification of Mollusca in the feeding drains :

Molluscs recorded in the two feeding drains included three gastropods , namely , *Theodoxus niloticus* , *Cleopatra bulimoids* and *Physa acuta* , and one bivalve , namely *Corbicula consbrina*.

Although the molluscs were weakly represented by numbers of individuals (Fig. 14) , their biomass constituted the major part of the total benthic fauna biomass , especially in El-Wadi Drain (Fig. 15) .

Mollusca was classified as follows :

Phylum : Mollusca

Class: Gastropoda

Order : Prosobranchia

Family : Neritidae

Genus : Theodoxus

Theodoxus niloticus (Reeve , 1856)

Family : Thiaridae

Genus : Cleopatra

Cleopatra bulimoides (Oliver , 1804)

Family : Physidae

Genus : Physa

Physa acuta (Draperoud , 1805)

Class: Bivalvia

Order : Heterodonta

Family : Corbiculidae

Genus : Corbicula

Corbicula consbrina

2.2.3.5. Distribution and seasonal variations of the molluscs species in the feeding drains :

2.2.3.5.1. *Theodoxus niloticus* (Reeve , 1856)

(Fig. 57)

This species was previously recorded from Nile River at Sudan and in lower Egypt (Martine , 1968) and El-Fayoum Depression (Gardner , 1932).

Theodoxus niloticus was completely absent from the investigated localities in El-Wadi Drain where 10 organisms/m^2 weighing 0.60 G.F.W./m^2 were recorded during winter .

2.2.3.5.2. *Cleopatra bulimoides* (Oliver , 1804)

Fig. (58)

This species is of wide distribution in Africa , mainly in Egypt (Brown , 1980).

Cleopatra bulimoides was recorded from El-Bats drain only during autumn with a P.D. value of 100 organisms/m^2 and a biomass of 2.88 G.F.W./m^2, and from El-wadi Drain only during winter with P.D. value of 40 organisms/m^2 and a

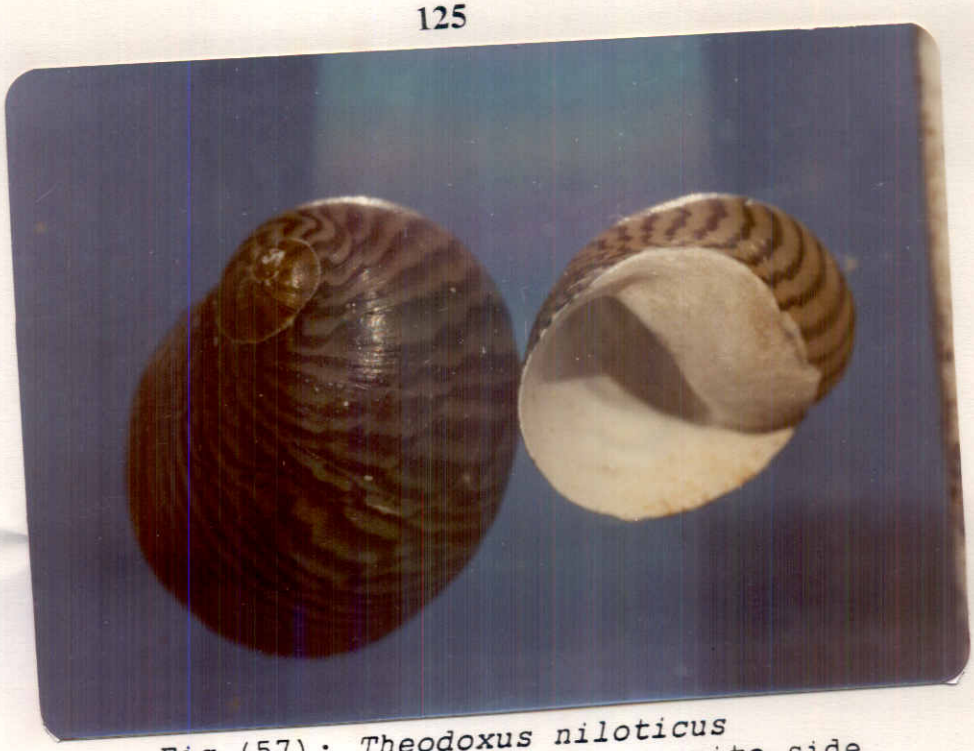

Fig.(57) : *Theodoxus niloticus*
Aperture and opposite side
(mm division)

Fig.(58) : *Cleopatra builimoides* , (Aperture)
(mm division)

Table (20): Seasonal frequencies of *Cleopatra builimoides* (No./m^2 and G.F.W./m^2) in the feeding drains.

Drain	Winter		Spring		Summer		Autumn	
	No./m^2	gm/m^2	No/m^2	gm/m^2	No/m^2	gm/m^2	No/m^2	gm/m^2
El-Bats	-ve	-ve	-ve	-ve	-ve	-ve	100	2.88
El-Wadi	40	7.54	-ve	-ve	-ve	-ve	-ve	-ve

biomass of 7.54 G.F.W./m^2 (Table 21) .

2.2.3.5.2. *Physa acuta* (Draperoud , 1805)

(Fig. 59)

Physa acuta is common in lower Egypt and is also known from some localities in Sudan(Mandahl-Barth, 1973).

This species was completely absent from El-Bats Drain. It was observed in El-Wadi Drain only during winter recording a P.D. values of 10 Organisms/m^2 and biomass value of 0.72 G.F.W./m^2.

2.2.3.5.4. *Corbicula consbrina*

Fig. (50)

This species was recorded from El-Bats drain only during spring with a P.D. of 20 Organisms/m^2 and a biomass of 10.36 G.F.W./m^2 . In El-Wadi Drain , it was a perennial species . Its highest P.D. (1320 Organisms/m^2) was recorded during autumn and its highest biomass (775.78 G.F.W./m^2) was hauled during winter, while its lowest standing crop (20 Organisms/m^2 weighing 7.72 G.F.W./m^2 was recorded during spring (Table 21) . Inspite of the similarity of P.D. during spring in the two drains , the biomass in EL-Bats Drain was more than its value in EL-Wadi Drain , i.e. the individuals in El-Wadi Drain were smaller than those in El-Bats Drain. As well , comparing the biomass and P.D. during the different seasons in El-

Fig.(59) : *Physa acuta*
Aperture and opposite side
(mm division)

Fig.(60): *Corbicula consibrina* .
Outer surface (upper) , and inner surface (lower).
(mm division)

Table (21): Seasonal frequencies of *Corbivula consbrina* (No./m^2 and G.F.W./m^2) in the feeding drains.

Drain	Winter		Spring		Summer		Autumn	
	No./m^2	gm/m^2	No./m^2	gm/m^2	No./m^2	gm/m^2	No./m^2	gm/m^2
El-Bats	-ve	-ve	20	10.36	-ve	-ve	-ve	-ve
El-Wadi	640	775.78	20	7.72	80	23.24	1320	527.32

Wadi Drain revealedthat the average individual biomass recorded the lowest value (0.2905 G.F.W) during summer and the highest value (1.2122 G.F.W.) during winter,while the values during spring (0.386 G.F.W.) and autumn (0.3995 G.F.W.) were nearly equal .

2.2.4 . Phylum: Coelentrata

Coelentrata was less represented in the lake in comparsion with other benthic organisms (Fig. 12 and 13). This group was represented by an odd species of sea anemone namely *Aiptasiogeton cf. comatus*

Aiptasiogeton cf. comatus **(Andres , 1881)**

2.2.4.1. Classification

Phylum : Coelentrata

Subphylum : Anthozoa

Class: Zoantharia

Order : Actinaria (Sea anemone)

Family: Aiptasiidae

Genus : Aiptasiogeton

Aiptasiogeton cf. comatus

(Andres ,1881)

The present record of *A. cf. comatus* is the first not only from Lake Qarun but also from the whole Egyptian waters (Fig.61). Schimdt (1972) recorded it in the Mediterranean waters in the Gulf of Neapel in Banyuls .

Fig.(61): *Aiptasiogeton cf. comatus*
(mm division)

2.2.4.2. Distribution and seasonal variations:-

As shown in Table (22) , the present species was not perennial in any of the investigated localities . In stations III and IV , it was recorded through three seasons of the year , while in station II, V and VI ,it was recorded through 2 seasons and in station I, VII and VIII it was recorded only through one season. The seasonal variations , distribution and abundance of *A. cf. comatus* in Lake Qarun during the period of investigation are given as follows:

* **Winter**

During winter , *A. cf. comatus* was distributed all over the Lake except 3 localities namely station I , IV and V . Two equal P.D. peaks (40 Organisms/m^2) appeared in station II and VI (Fig. 62) , while the P.D. in each of the other 3 sites (Station II , VII and VIII) attained half of the peak value . The biomass of the species population did not form a positive correlation with P.D. (Fig. 62). The individuals in the eastern part of the lake (Stations II and III) were larger than the western part individuals . The sites can be arranged in a descending array according to the average weight of individual as II,III , IV and VIII where 0.0160 , 0.0250 , 0.0060 , 0.0035, 0.0004 G.F.W of individual were recorded respectively . The highest percentage of both the species P.D./ total P.D. and species biomass/total biomass exhibited its highest value in station II, and its lowest

Table (22): Stabding Crop (No. of organsims/m2) and biomass (G.F.W./m2) of Apitasiogeton comatus and their percentage abundance to the total bottom fauna in lake Qarun .

St.No.	Winter				Spring				Summer				Autumn				Average			
	No/m2	%	gm/m2	%	No/m2	%	gm/m2	%	No/m2	%	gm/m2	%	No/m2	%	gm/m2	%	No/m2	%	gm/m2	%
I	-ve	0	-ve	0	-ve	0	-ve	0	-ve	0	-ve	0	400	15.87	14.72	11.2	100	8	3.68	7.15
II	40	8.69	0.64	1.77	60	0.04	2.36	49.37	-ve	0	-ve	0	-ve	0	-ve	0	25	4.76	0.75	3.13
III	20	1.33	0.5	0.61	160	26.66	0.80	1.15	760	21.83	4.04	6.2	-ve	0	-ve	0	235	16.6	1.26	1.99
IV	-ve	0	-ve	0	120	6.7	1.85	5.11	120	25	0.44	9.28	280	5.73	1.1	1.77	130	5.69	0.84	2.21
V	-ve	0	-ve	0	120	7.59	1.64	1.42	-ve	0	-ve	0	800	13.24	4.32	1.96	230	6.65	1.49	0.89
VI	40	0.52	0.14	0.1	20	0.89	0.3	0.19	-ve	0	-ve	0	-ve	0	-ve	0	15	0.38	0.11	0.04
VII	20	3.44	0.12	0.29	-ve	0	-ve	0	-ve	0	-ve	0	-ve	0	-ve	0	5	2.38	0.03	0.16
VIII	20	6.06	0.01	0.44	-ve	0	-ve	0	-ve	0	-ve	0	-ve	0	-ve	0	5	1.47	0.002	0.004
Avg.	18.0	0.87	0.17	0.29	60	4.76	0.86	1.42	110	7.82	0.56	0.61	185	9.34	2.51	2.17	93.00	5.54	1.02	1.26

one in station VI (Table 22). During winter the average P.D.and biomass of *A. cf. comatus* for the whole lake attained 18 individuals/m^2 and 0.17 G.F.W./m^2 respectively representing 0.87 % and 0.29 % in the order mentioned of the corresponding whole benthic P.D. and biomass .

*** Spring :**

As in the preceding season , the species was recorded during spring from five localities in the lake . These localities lie in the region from station II to station VI. It disappeared from the sites facing El-Bats drain (Station I) , El-Wadi Drain (station VIII) and near the saltworks (Station VII) . Compared with winter , the species proved a sharp increase in P.D. from all the localities where it appeared except station VI, where the P.D. showed a sharp decline recording half the winter value (Table 22). The highest P.D. (160 individuals/m^2) was procured from station III while the lowest (20 Organisms/m^2) was recorded in station VI.

As observed during winter , the biomass didn't have a positive correlation in most sites (Fig. 63) . The average individual biomass recorded the largest value (0.039 G.F.W./m^2) in station II , while the lowest value (0.0137 G.F.W./m^2) was recorded in station V . We can observe , from the stations(where the species was recorded during winter) , that the individual average biomass increased during spring . While, the percentage of P.D. of the species in station III to the total P.D. of the

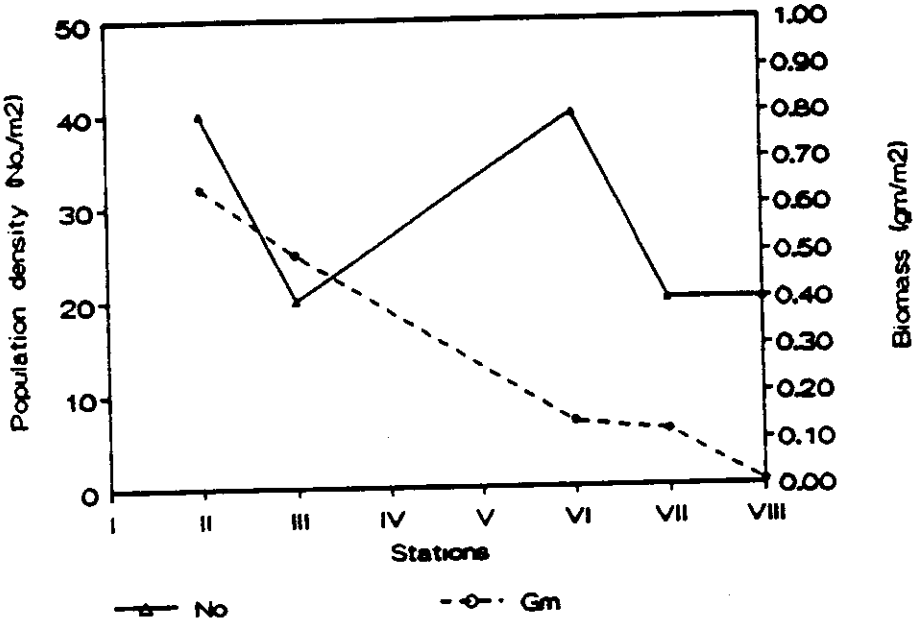

Fig. (62) : Frequency and biomass of *Aiptasiongenten cf comatus* of the investigated area during winter

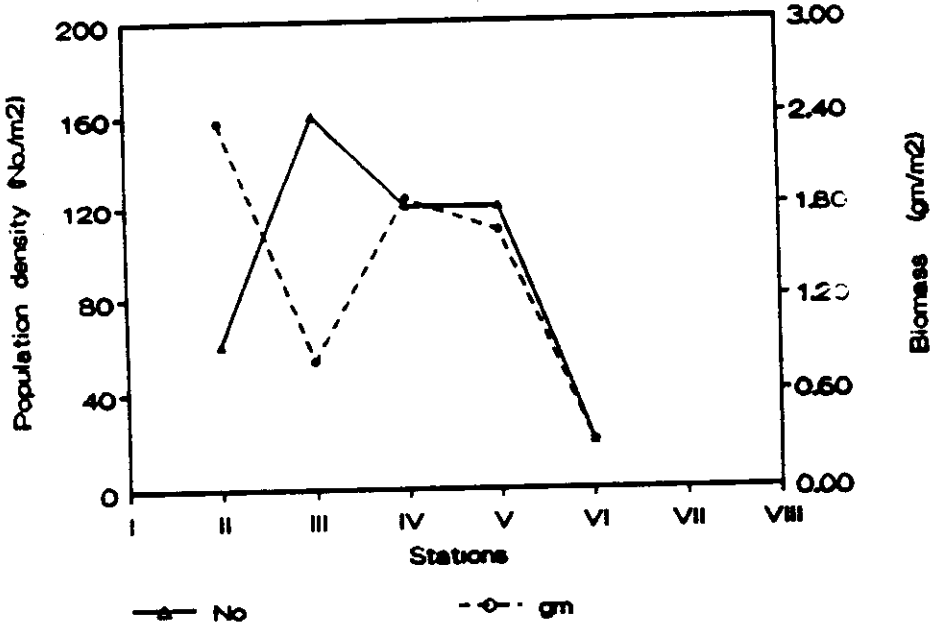

Fig. (63) : Frequency and biomass of *Aiptasiongenten cf comatus* of the investigated area during spring

community was the highest value (26.66 %) , the percentage of the corresponding biomass didn't exceed 1.15 % . Meanwhile the percentage of the species P.D./total P.D. in station II (0.04%)) was the lowest recorded during spring and the corresponding biomass percentage (49.37 %) was the highest recorded value.

Both the average P.D. of *A. cf. comatus* for the whole lake and its percentage to the total community P.D. and the average biomass and its percentage to the total community biomass increased much more than the corresponding values during winter.

* **Summer :**

The appearance of the species during summer was limited to station III and IV , station III harboured a large population of the species and biomass (760 Organisms/m^2) weighing 4.04 G.F.W./m^2) than station IV (120 Organisms/m^2 weighing 0.44 G.F.W./m^2) . Also , the average individuals biomass in station III (0.0053 G.F.W./m^2) was heavier than that in station IV (0.0037 G.F.W./m^2) . On contrary , the percentage of species P.D. or biomass/total P.D. or biomass was larger in station IV than in station III . Compared with spring season , the P.D. and biomass showed a sharp growth at station III during summer, while at station IV , the biomass was sharply decreased to 0.44 G.F.W./m^2(Fig. 64). The average P.D. of the species in the whole lake and its percentage to the total benthos P.D. was sharply increased to about double of the spring value , while each of the

corresponding biomass and its percentage to the total biomass sharply decreased to about half of its spring value.

* **Autumn :**

The distribution of this species in the lake during autumn was limited to only three localities (Station I close to El-Bats Drain outlet , station IV in Khor Maiuf and station V (East of El-Qarn Island). In station I , the autumn population was the odd population of this species appeared in this locality , its percentage to the total benthos population (400 individuals/m^2) amounted to 15.87 % and its biomass (14.722 G.F.W./m^2) was the highest record during this season , as well was its ratio to the total benthos biomass (Table 22). In station IV , the P.D. was the highest recorded for this species from this locality during the period of investigation (Fig. 64) . In spite of that , its percentage to the total benthos P.D. was the least value recorded in this station (Table 22), as well , its biomass and its percentage to the total benthos biomass were the least values recorded during this season . In station V the P.D. (800 individuals//m^2) was the highest recorded not only from this locality during this season but also from any locality in the lake during the whole period of investigation . The average individual biomass in station IV increased during this season than that recorded during summer . Meanwhile it represented the lowest recorded value in the lake during

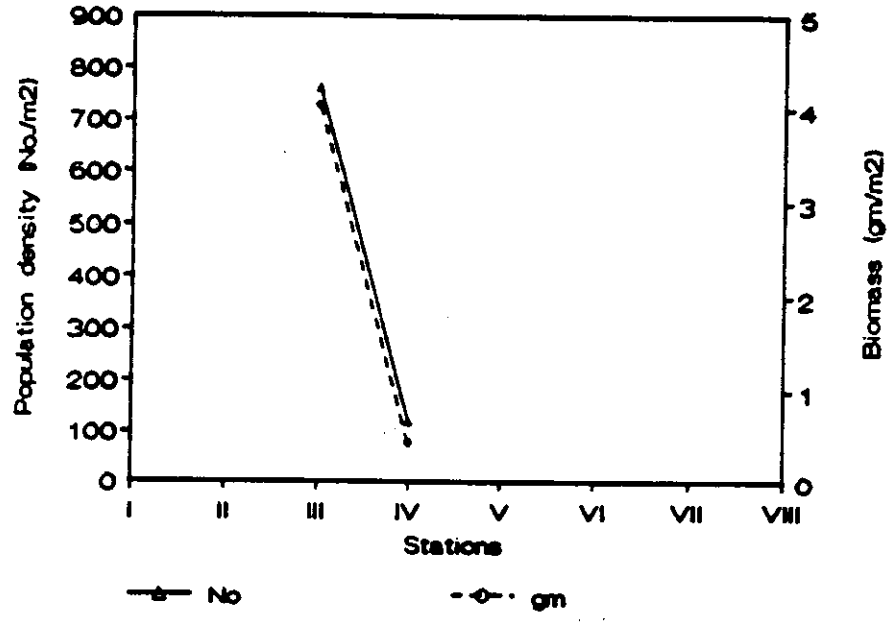

Fig. (64) : Frequency and biomass of *Aiptasiongenten cf comatus* of the investigated area during summer

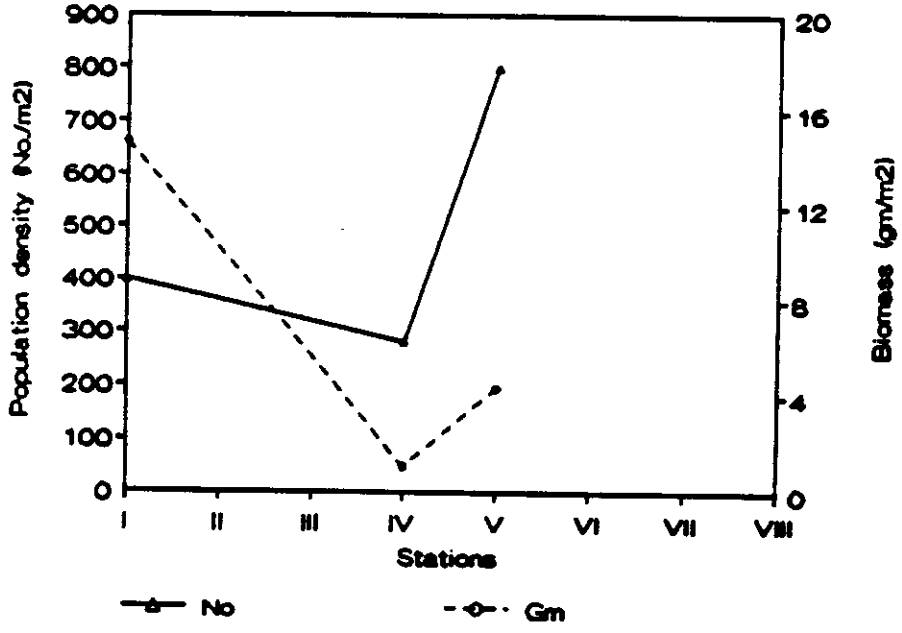

Fig. (65): Frequency and biomass of *Aiptasiongenten cf comatus* of the investigated area during autumn

autumn . The average individual biomass in station I was the highest value recorded during this season.

The average of the species P.D. and biomass , as well their ratios to the corresponding value of the total benthos during this season were the highest recorded during any season .

In general , station III and V exhibited the highest P.D. , while station VII and VIII showed the lowest P.D. The species biomass and its percentage to the total benthos biomass showed peaks in station I , while their lowest values were recorded in station VIII i.e. the two extremes appeared infront of the drains. Sampling localities can be arranged according to the individual biomass in ascending array as follows I> II > VI > V> IV > VII > III> VIII , where 0.0300 , 0.0073 , 0.0065 , 0.0060 , 0.0054 and 0.0004 G.F.W./m^2 were respectively recorded.

The average P.D. and biomass of the species from the whole lake during the whole period of the study were 93 organisms/m^2 and 1.02 G.F.W./m^2 respectively .