DISTRIBUTION OF THE BOTTOM FAUNA IN LAKE EDKU

by

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ABSTRACT

Quantitative estimation of the bottom fauna in Lake Edku was carried out mothly for one year. The lake is a shallow brackish water lake ((average 1 m depth), situated at the north extremity of the Nile Delta (Egypt) and is in a direct connection with the Mediterranean Sea. Five stations were selected to represent the different habitats. Results indicate that the distribution of benthos is greatly affected by the prevailing ecological conitions. The highest biomass was recorced in areas devoid of hydrophytes (average 17,48 gm fresh wt/m2). The fauna there was composed mainly the polychaete *Nereis*, the amphipods *Corophium* and *Gammarus* and the pelecypoda *Ancylus*. The region of the lake-sea connection harboured a similar fauna but sustained a lower biomass (average 8.98 gm fresh wt./m2). The areas covered with the hydrophytes *Potamogeton* and *Ceratophyllum* were poor in benthos particularly in zones of dense plant cover. The average biomass amounted there to 6,00 gm fresh wt/m2. The Chironomid larvae were the dominant inhabitant of the plant belt. A linear relation was observed to exist between primary production and the biomass of the bottom fauna recorded in the different stations.

I - INTRODUCTION

The present investigation concerning the distribution of the macrobenthic fauna in Lake Edku was carried out in connection with the estimation of the primary production of the lake. The different ecological conditions that may affect the distribution of the different genera are also encountered. Results of the physical and chemical conditions of the lake as well as the primary production were previously published (Samaan, 1974).

Lake Edku is a shallow drain lake adjoining the Mediterranean Coast at latitude 31° 15'N and longitude 30° 15'E. Its total area amounts to about 12,600 hectare and it has an average depth of one meter. It receives its water from the Edku and Berzik Drains at its eastern extrimity and consequently the surplus water is constantly discharged into the sea through Bougaz El Maadiya located at the north western margin of the lake (fig. 1)). The average amount of the drain water discharged into the lake amounts to about 6 million cubic metres per day. This is in comparison with 110 million cubic meters which represents the water budget of the lake. Sea water may also be introduced into the lake during windy days, invading the area of the lake-sea connection (i.e. the Maadiya District), and on rare occasions it may reach the center of the lake. However, the normal flow of the lake water will expell quickly any sea water that may be introduced into the lake.

The water temperature usually follows that of the air. Thus, the lowest value was attained during the winter reaching 12.3°C (in January, 1970), while the highest tempature was recorded in July, reaching 28.5° C. The annual range of the water temperature is about 16°C.

The chlorosity of the lake water fluctuates between 0.48 and 2.0 gm Cl/l. On rare occasions the chlorosity may increase to 17.7 gm Cl/l at the Maadiya District and 5.4 gm Cl/l 5.4 gm Cl/l in the middle lake when the sea water invades the lake. The pH values range between 8.0 and 9.45 i.e. it lies on the alkaline side. The total alkalinity fluctuates between 3.7 and 6.2 milli.eq./l. The lower alkalinity values are usually observed in areas covered with macrophytes during their growth periods.

The lake bottom is composed mainly of clay and to a less extent of sand. The percentage of the later increases as we approach the western section particularly around Bougaz El Maadiya. Also plenty of empty shells of mollusca including *Cardium edule* L., *Melanoides tuberculata* (Müller) and *Perinella conica* (Blainville) as well as calcarious remains of the tube worm *Mercierella enigmatica* Fauvel are widely distributed allover the lake bottom.

Lake Edku is considered as mesotrophic lake as regards the phytoplankton production which amounts to an average value of about 604 mg C/m² /day. On the other hand, the production of the organic carbon through the growth of the hydrophytes *Potamogeton pectinatus* L. and *Ceratophyllum demersum* L. which

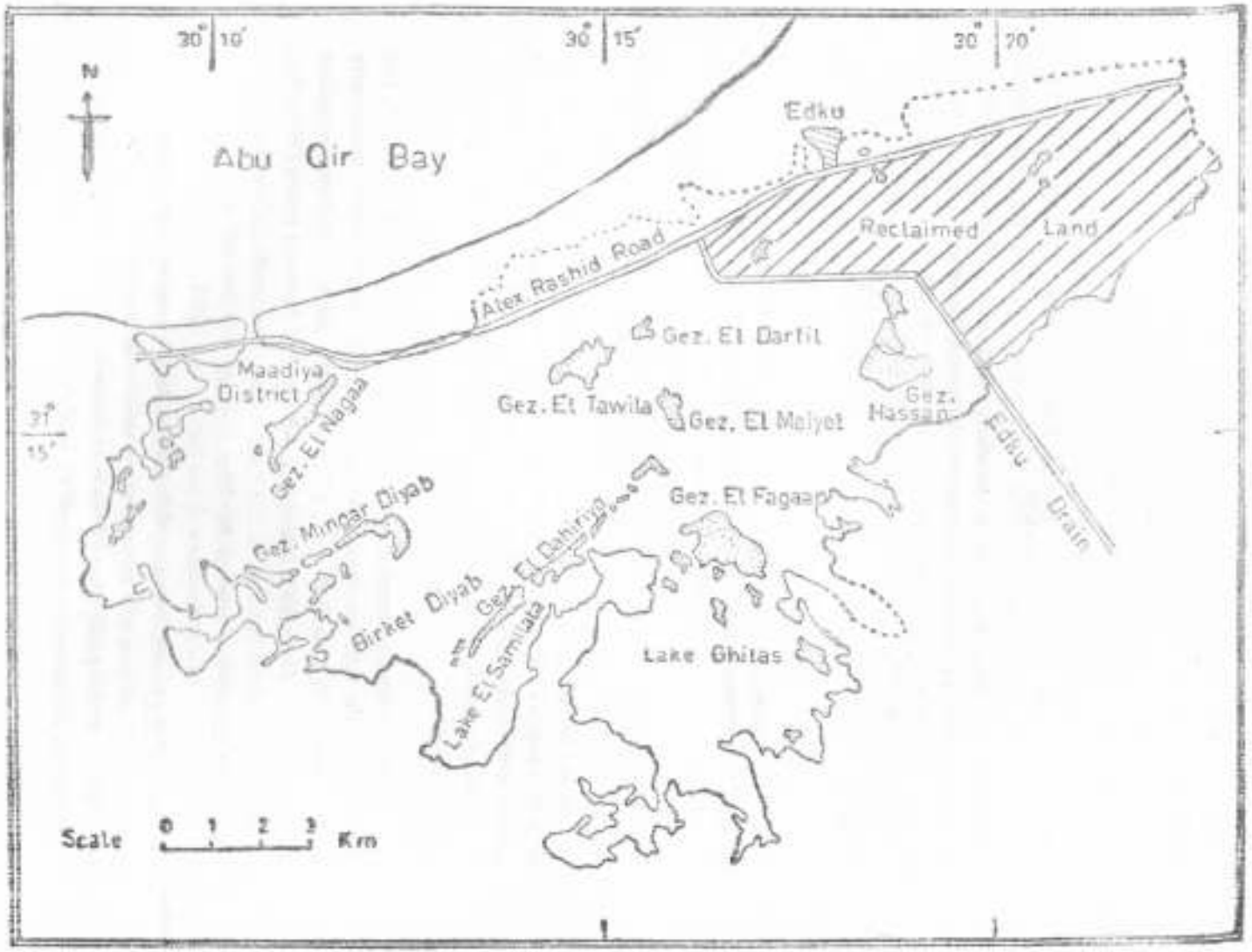

Fig. 1. Morphometry of Lake Edku

cover alltogether about 50% of the total area of the lake (mainly at the eastern section and around the lake margins) is about 1, 320 mg C/m² /day. This can be explained as due to the prevailing hydrological conditions since thelake is considered as a slow stream of drainage water. Such conditions will give but little opportuniy for the phytoplankton to flourish well.

II - METHODS OF COLLECTION AND TREATMENT OF THE SAMPLES

Two dredgings were taken monthly at each station by using a modified Ekman bottom sampler. These represent an area equivalent to 0.05 square meter of the upper layer of the bottom deposits containing the bottom fauna. The samples were then washed in the field through a small hand net of bolting silk (23 mesh/cm) and preserved in polyethlene jars by adding 6% formaline solution. The samples were washed again throughly in the laboratory with tap water through the same hand net to get rid of any silt that may be remained within them. Sorting was carried out by taking small portions of the sample under examination in a petri dish with a white back ground. The animals were separated into groups and each group was counted and weighed separately after being left being for five minutes to dry on a filter paper. The biomass of the animals is expressed in gm (fresh weight/m²)

Five stations were chosen to represent the different habitats in the lake (fig. 2) . These stations are further grouped into three sections as follows :

a - *Station I*; It represents the area of the lake-sea connection which is known as the Maadiya District. It is nearly separated from the rest of the lake by El-Nagaa Island and is frequently affected by the sea water introduced into the lake during rough weather. This station is devoid of hydrophytes all the year round.

b - *Stations II and III* ; They represent the bare area (devoid of hydrophytes) and they are located about the center of the lake.

c - *Stations IV and V* ; They represent the *Potamogeton-Ceratophyllum* plant belt located at the eastern part of the lake. Station IV represents the margins of the plant belt and it remains devoid of hydrophytes during the autumn and winter months, other wise these plants grow in a moderate density throughout the rest of the year. On the other hand, sation V is located about the center of the plant belt and it attains a heavy growth of hydrophytes during most of the year.

Sampling was carried out monthly at each station during the period from June , 1969 till May, 1970, covering one year cycle.

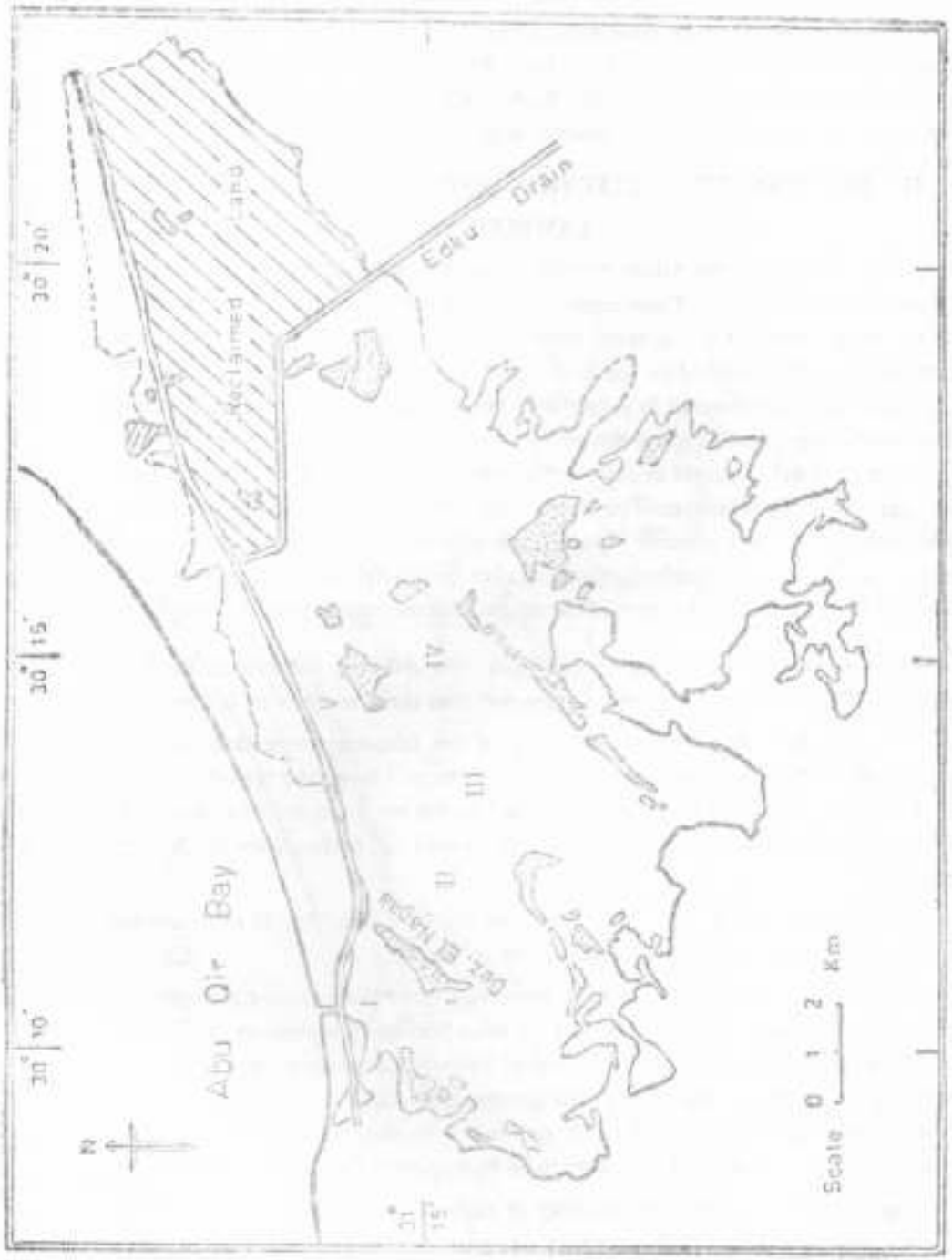

Fig. 2. Position of stations.

III - DISTRIBUTION OF THE BOTTOM FAUNA

The important macrobenthic fauna inhabiting Lake Edku include the polychaete *Nereis diversicolor* (Mull.), the amphipods *Corophium* and *Gammarus*, the pelecypoda *Ancylus* and the chironomid larvae. Other gastropods were frequently observed adhering to the stems and leaves of *Potamogeton* at the upper water layer. These comprise mainly *Planorbis* spp and to much less extent *Lanistis carinatus* (Oliver). *Neritina nilotica* (Reeve) was rarely recorded beside the land drains.

The average biomass of the bottom fauna recorded in the lake during this investigation is highest at station III i.e. at the bare area located about the center of the lake. It decreases gradually as we approach the Maadiya District (station I) or as we go towards the eastern lake where the areas covered with a heavy growth of hydrophytes are the poorest in bottom fauna (table 1 and fig. 3).

Table 1 : Average biomass of the bottom fauna (in gm fresh wt./ m^2) recorded at the different stations during the period of investigation

Habitat	Lake-Sea connection	Bare area		Plant belt	
St. No.	I	II	III	IV	V
Biomass gm/m^2	8.98	13.84	21.12	9.20	2.81

Seasonal variations of the total bottom fauna :

The seasonal vaiations of the different groups of the bottom fauna recorded in Lake Edku vary greatly with the different stations as well as throughout the different seasons and this will be discussed sparately for each genus. The average biomass of the total bottom animals, as recorded for the five stations during the different months, are shown in table 2 and figure 4. From this table it appears that the average biomass of the bottom fauna reached a peak during the month of August, 1969 and this was mainly due to the increased numbers of both *Ancylus* and *Corophium*. The average biomass of the bottom fauna decreased again repidly during September and October. This was followed by another gradual increase which reached a peak in January of the next year. Such a peak was mainly due to the increased numbers of both *Corophium* and the chironomid larvae. The average biomass of the bottom fauna decreased again gradually during the period from February till May, 1970.

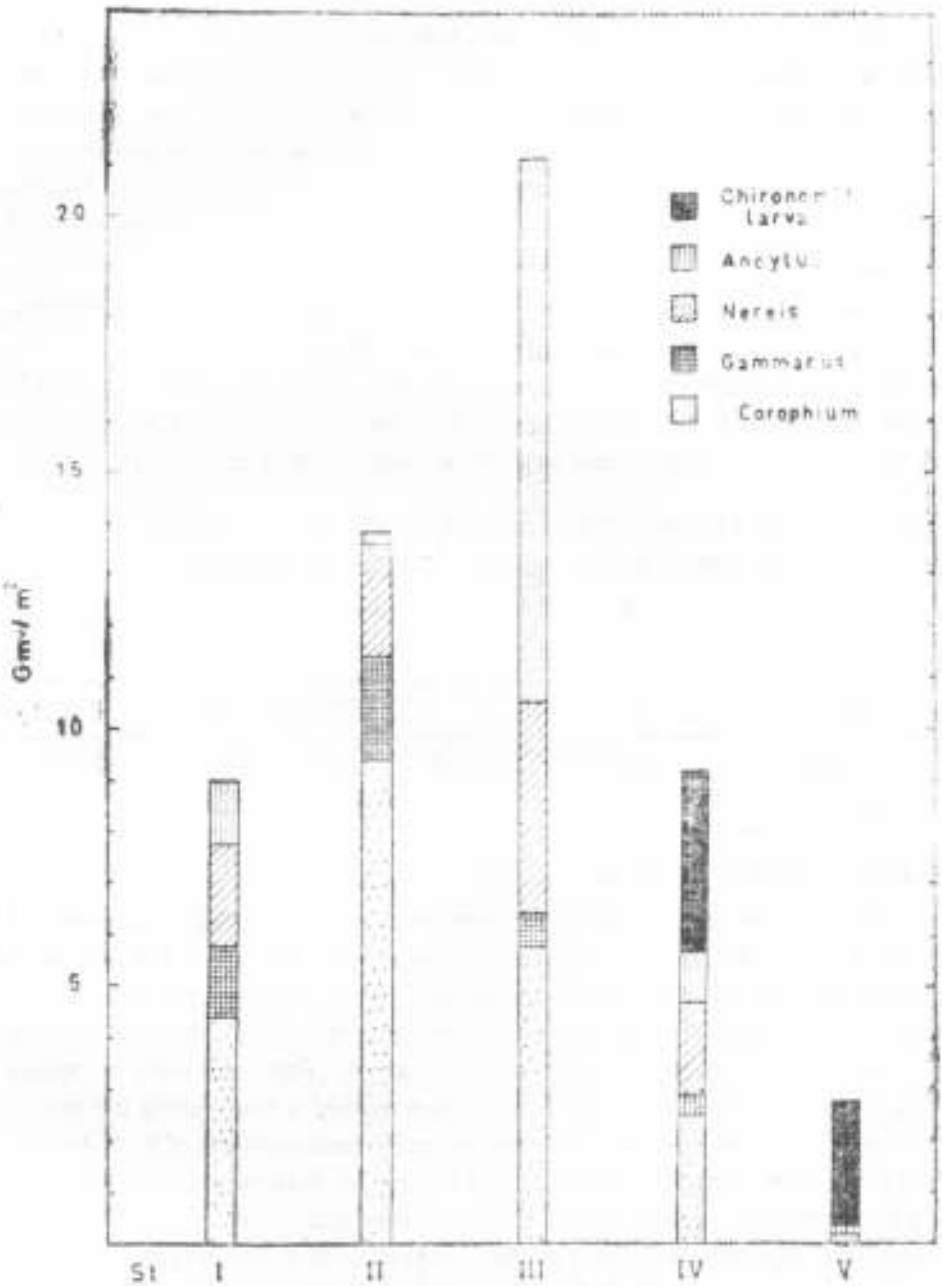

Fig. 3. Average biomass of the bottom fauna (gm/m2) recorded at the different stations during the period of investigation

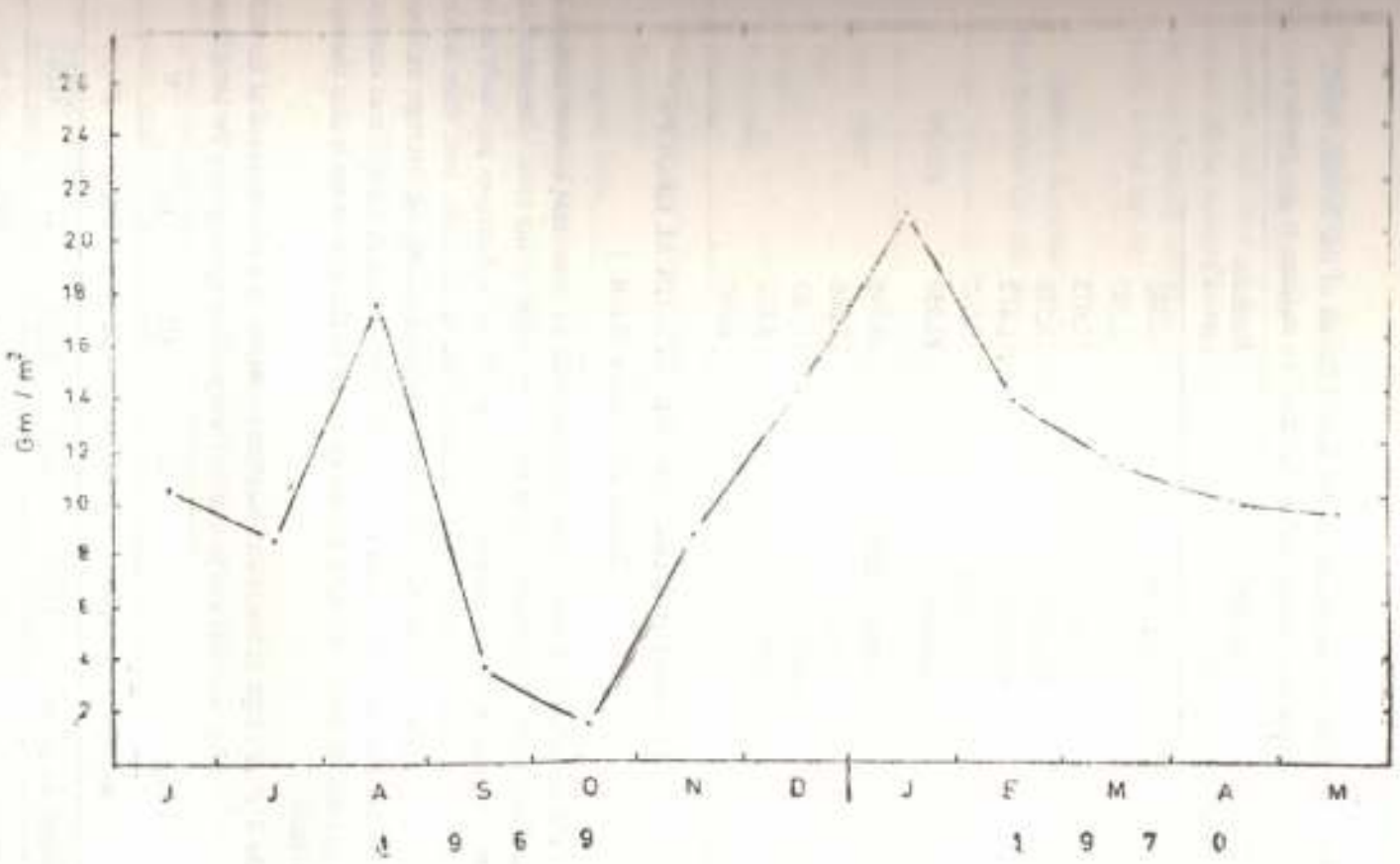

Fig. 4. Seasonal valriations of the total biomass of the bottom fauna, Data represent average values for the five stations in gm (fresh wt.) m2.

Table 2 : Seasonal variations of the total biomass of the bottom fauna. Data represent average values for the five stations in gm (fresh wt.) /m².

Month	Biomass (gm/m²)
June, 1969	10.398
July	8.387
August	17.675
September	3.550
October	1.412
November	8.662
December	13.959
January, 1970	20.746
February	13.666
March	11.183
April	9.821
May	8.961

IV - DISTRIBUTION OF THE INDIVIDUAL GROUPS

1 — **Nereis diversicolor** (Müll.)

The polychaete *Nereis diversicolor* resresents an important bottom animal in Lake Edku since it constitutes about 18.6% by weight of the total biomass of the bottom fauna. It is more frequant at station III and it decreases gradually as we approach the Maadiya District. It decreases also in the plant belt, thus attaining lowest values at station V. Table 3 and figure 5 represent the average numbers and biomass in gram per square meter of *Nereis* recorded at the different stations. The percentage composition by weight of *Nereis* to the total fauna is also shown in tha table.

Table 3 : Average numbers and biomass of *Nereis* (gm/m²) recorded at the different stations and percentage composition by weight to the total fauna

St. No.	I	II	III	IV	V
Average no/m²	359	497	652	180	9
Biomass in gm/m²	1.916	2.305	4.101	1.778	0.202
% composition by wt.	21.3	16.8	19.4	19.3	7.2

Seasonal variations of Nereis :

The average numbers of *Nereis* recorded for the five stations showed a gradual decrease from June till August, 1969. It remained at a more or less constant low values till the month of December. The number of *Nereis* increased again gradually from January till April , 1970 and this was followed by a small drop in May (table 4 and fig. 6).

Table 4. Seasonal variations of **Nereis**. Data represent average a numbers and biomass for the five stations

Month	No/m²	Gm/m²
June, 1969	480	5.217
July	290	2.500
August	110	0.266
September	136	0.600
October	154	0.335
November	172	0.961
December	48	0.284
January, 1970	176	0.951
February	431	3.530
March	704	3.190
April	938	3.736
May	624	3.355

2 — COROPHIUM

The amphipod **Corophium volutator** (Pallas) is the most important bottom animal inhabiting the lake since it constitutes about 39.6% by weight total biomass of the bottom fauna. It is found mainly at the Maadiya District and the bare area, while it remains poor at the **Potamogeton** plant belt (table 5 and fig. 7). This is particularly true due to the fact that **Corophium** browses on the detritus present in the organic muds (Hart, 1930) and it usually prefers areas devoid of hydrophytes. The same observation was also recorded in Lake Mariut (Samaan and Aleem, 1972).

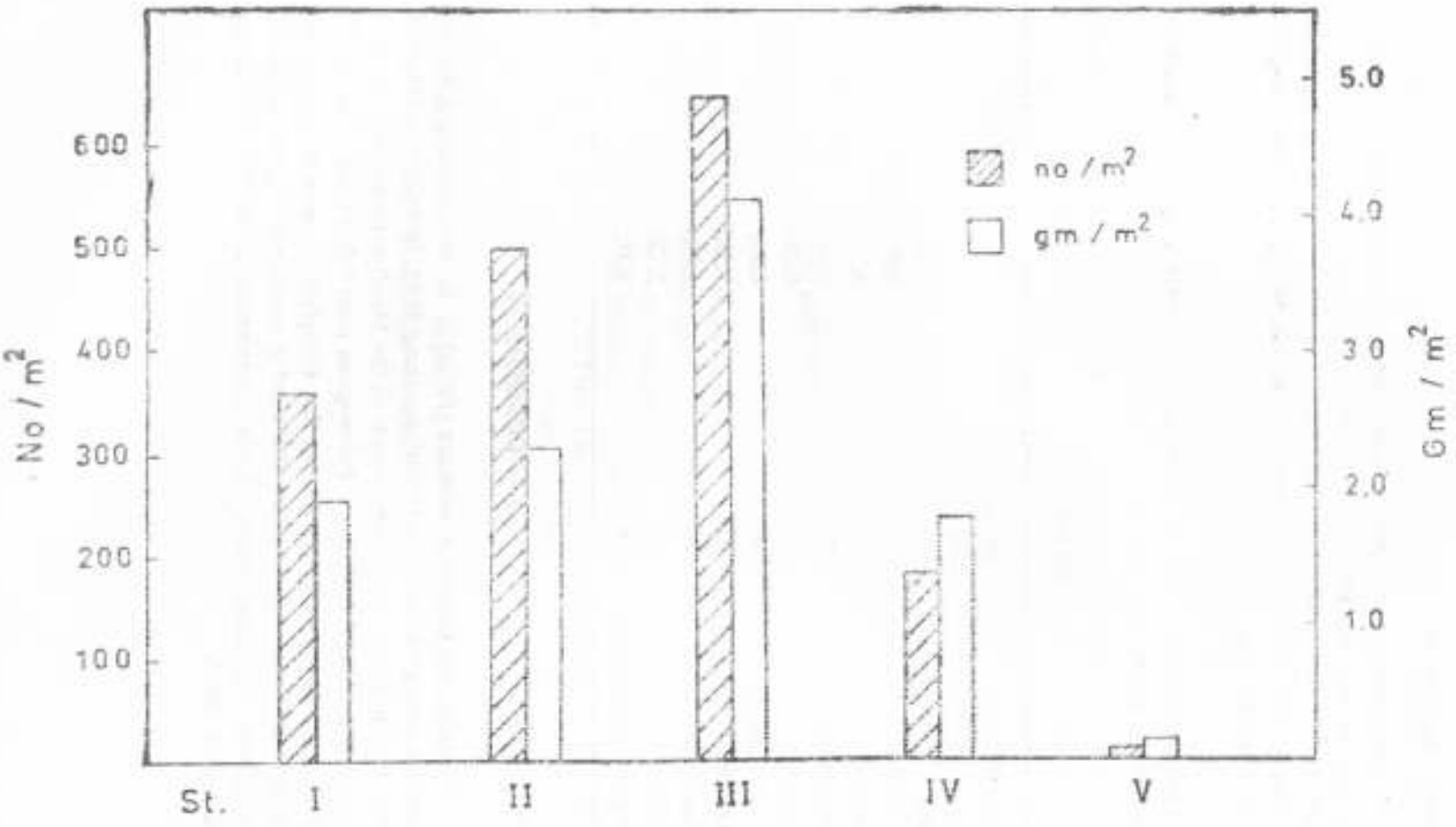

Fig. 5. Average numbers and biomass of *Nereis* recorded at the different stations

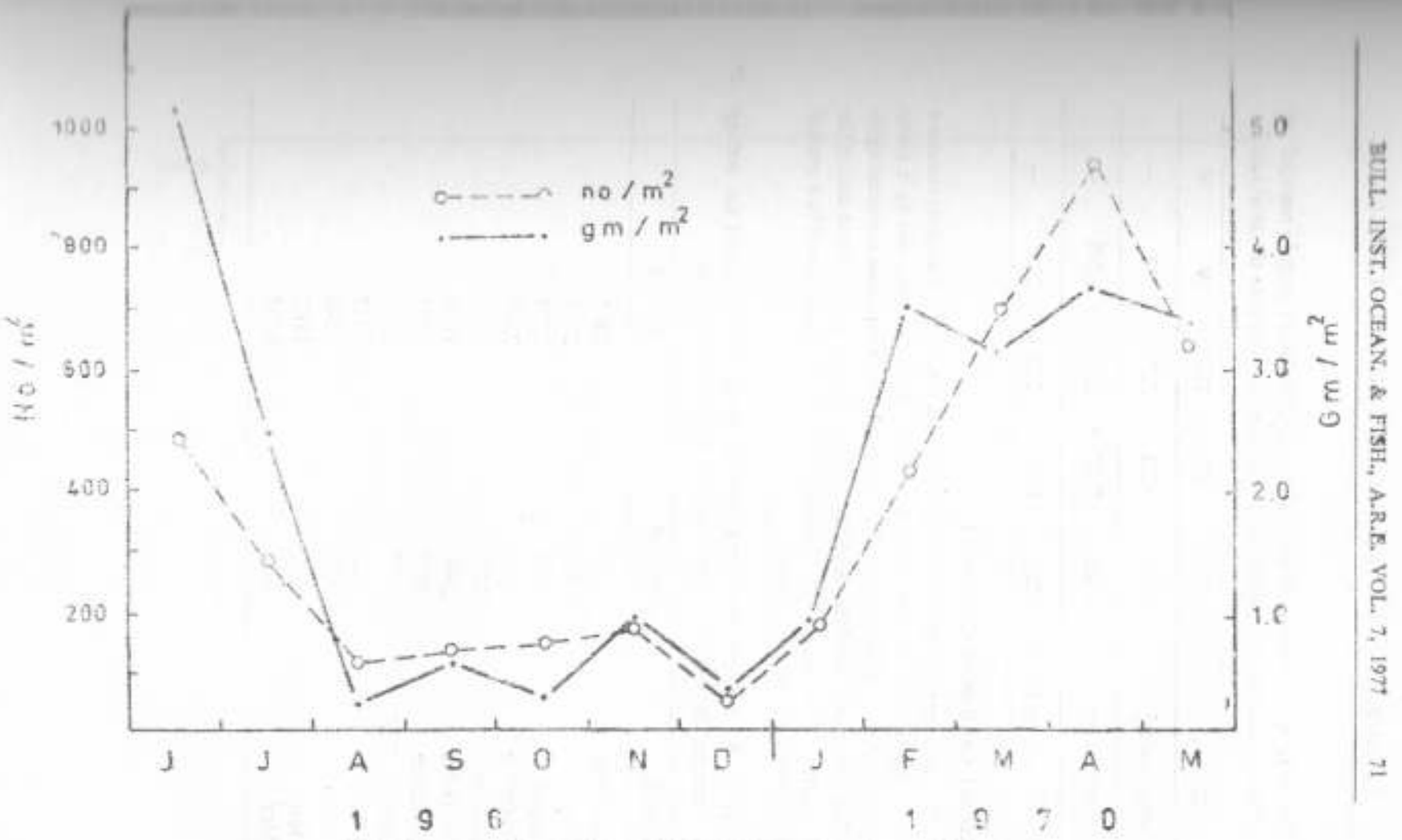

Fig. 6. Seasonal variations of *Nereis*. Data represent average numbers and biomass of the five stations

Table 5. Average numbers and biomass of **Corophium** (gm/m²) recorded at the different stations and percentage composition by weight to the total fauna.

St. No.	I	II	III	IV	V
Average no/m²	5225	4222	3377	732	—
Average wt. gm/m²	4.451	9.407	5.788	2.488	—
% composition by wt.	49.6	68.1	27.4	27.1	—

Seasonal variations of Corophium :

The average numbers and biomass of **Corophium** at the five stations remained low during the months June and July , 1969. This was succeeded by a sharp increase in August (table 6 and fig. 8). The numbers of **Corophium** decreased again in September and October. Another gradual increase was observed during the period from November, 1969 till January, 1970 and this was followed by a gradual decrease till the month of April.

Table 6 . Seasonal variations of **Corophium**. Data represent the average numbers and biomass in gm/m² recorded for the five stations.

Month	No/m²	Gm/m²
June,1969	1349	2.915
July	1518	2.276
August	6490	6.576
September	2084	2.440
October	1404	1.021
November	2998	1·528
December	3973	8.583
January, 1970	4057	11.361
February	2732	5.125
March	2094	3.568
April	992	1.023
May	1632	0.795

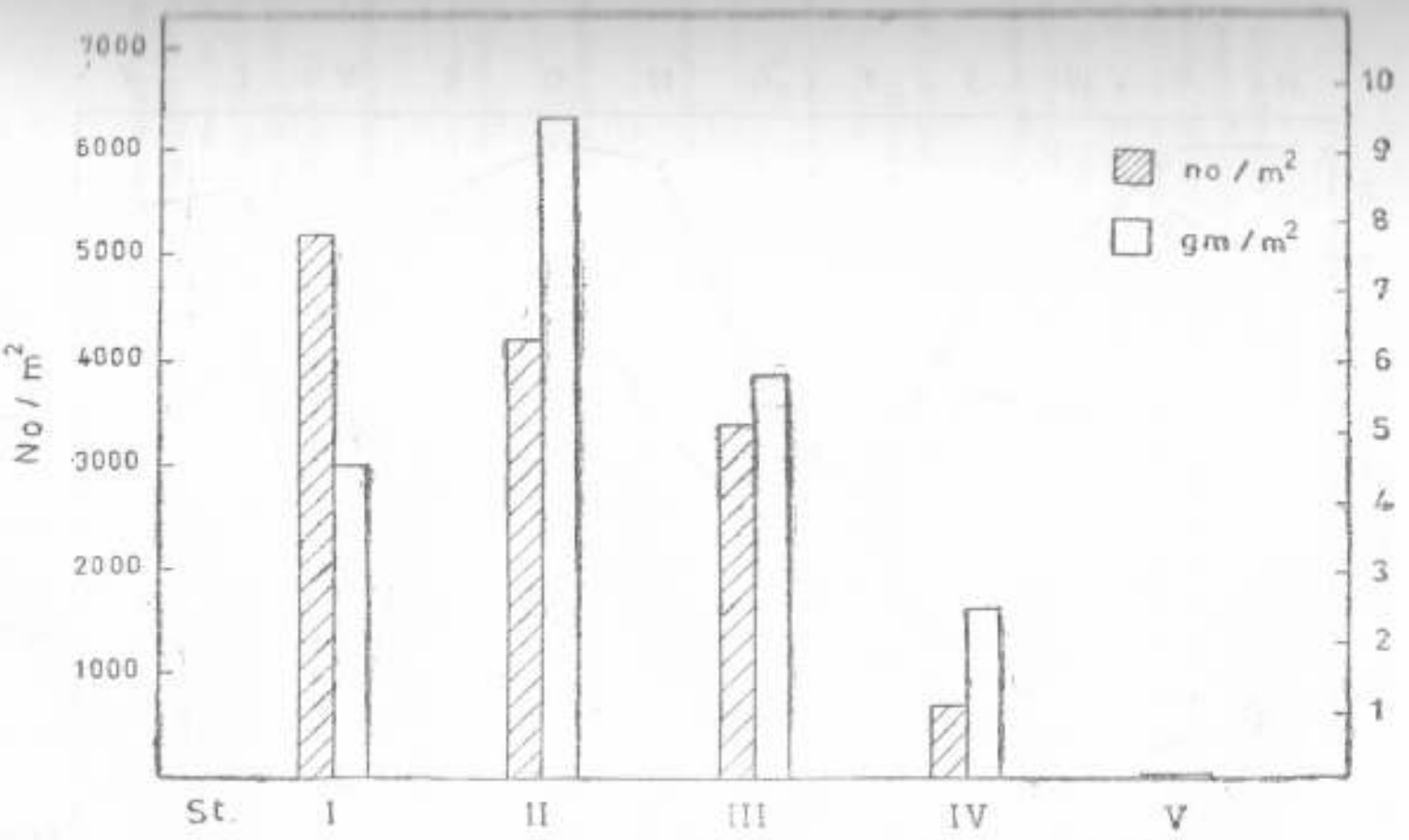

Fig. 7. Average numbers and biomass of *Corophium* recorded at the different stations

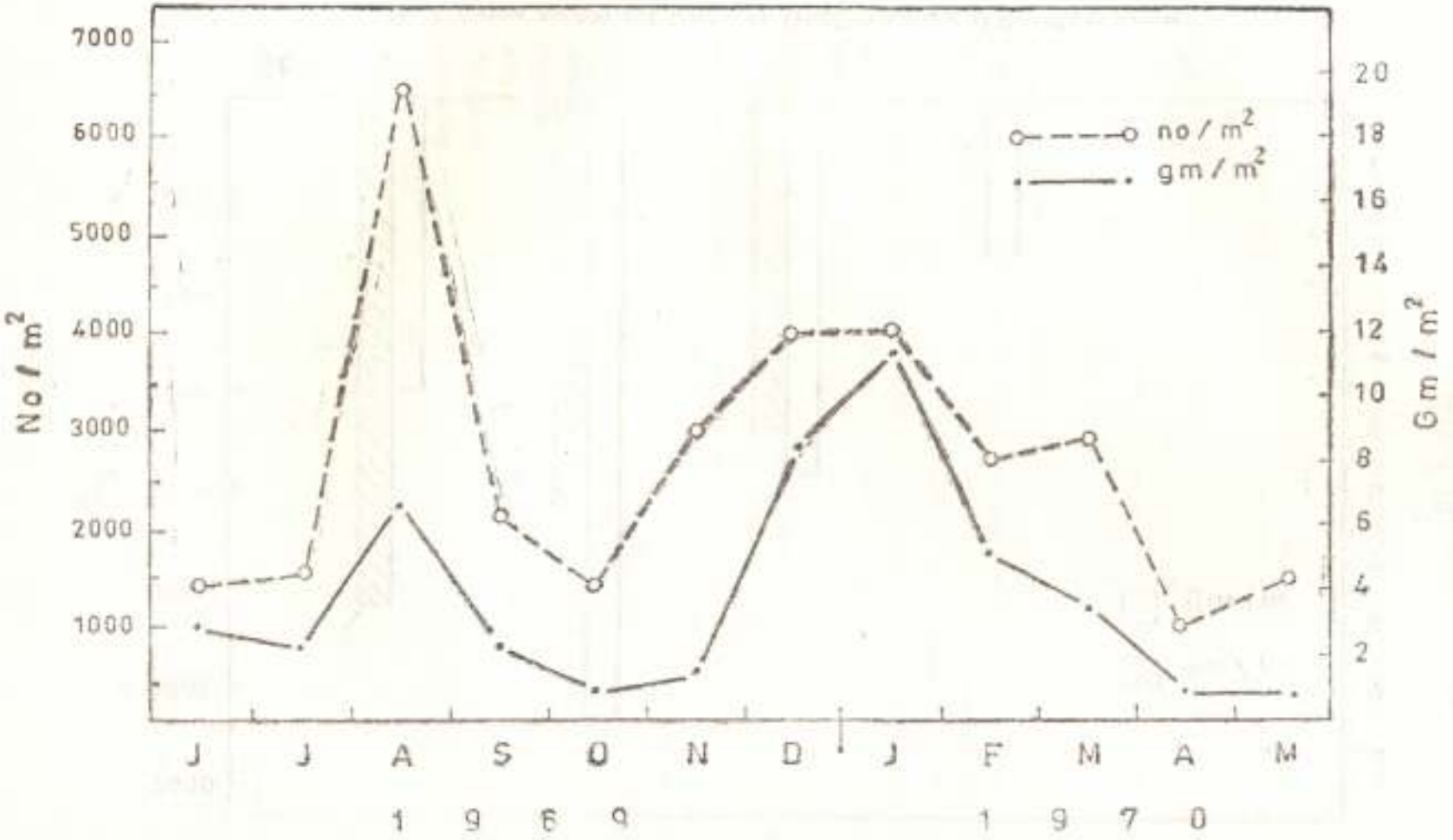

Fig. 8. Seasonal variations of *Corophium*. Date represent average numbers and biomass for the five stations

3 — GAMMARUS

The distribution of the amphipod **Gammarus** in Lake Edku is less than that of **Corophium** since it constitutes about 7.9% by weight of the total biomass of the bottom fauna in the lake. **Gammarus** is represented in the lake by two species, namely; G. **foxi** Schellenberg and G. **aequicauda** (Martynov.) (Schellenberg, 1936). The highest standing crop of Gammarus is recorded at stations I and II while remained low at stations III and IV. On the other hand, the area covered with a dense growth of **Potamogeton** (station V) is devoid of **Gammarus** (table 7 and fig. 9).

Table 7. Average numbers and biomass of **Gammarus** (gm/m²) recorded at the different stations and percentage composition by weight to the total fauna.

St. No.	I	II	III	IV	V
Average no/m²	1164	1243	642	257	—
Average wt. gm/m²	1.347	1.986	0.616	0.450	—
% composition by wt.	15.0	14.3	2.9	4.9	—

Seasonal variations of Gammarus :

The average numbers of **Gammarus** present at the lake bottom dropped rapidly in July, 1969 and it disappeared totally from the bottom samples during August and September. The numbers of **Gammarus** started to increase again gradually from October, 1969 till April , 1970. This was succeeded by a rapid drop in May (table 8 and fig. 10). It is to be noted that **Gammarus** was also recorded in the plankton during most of the year as a few scattered individuals.

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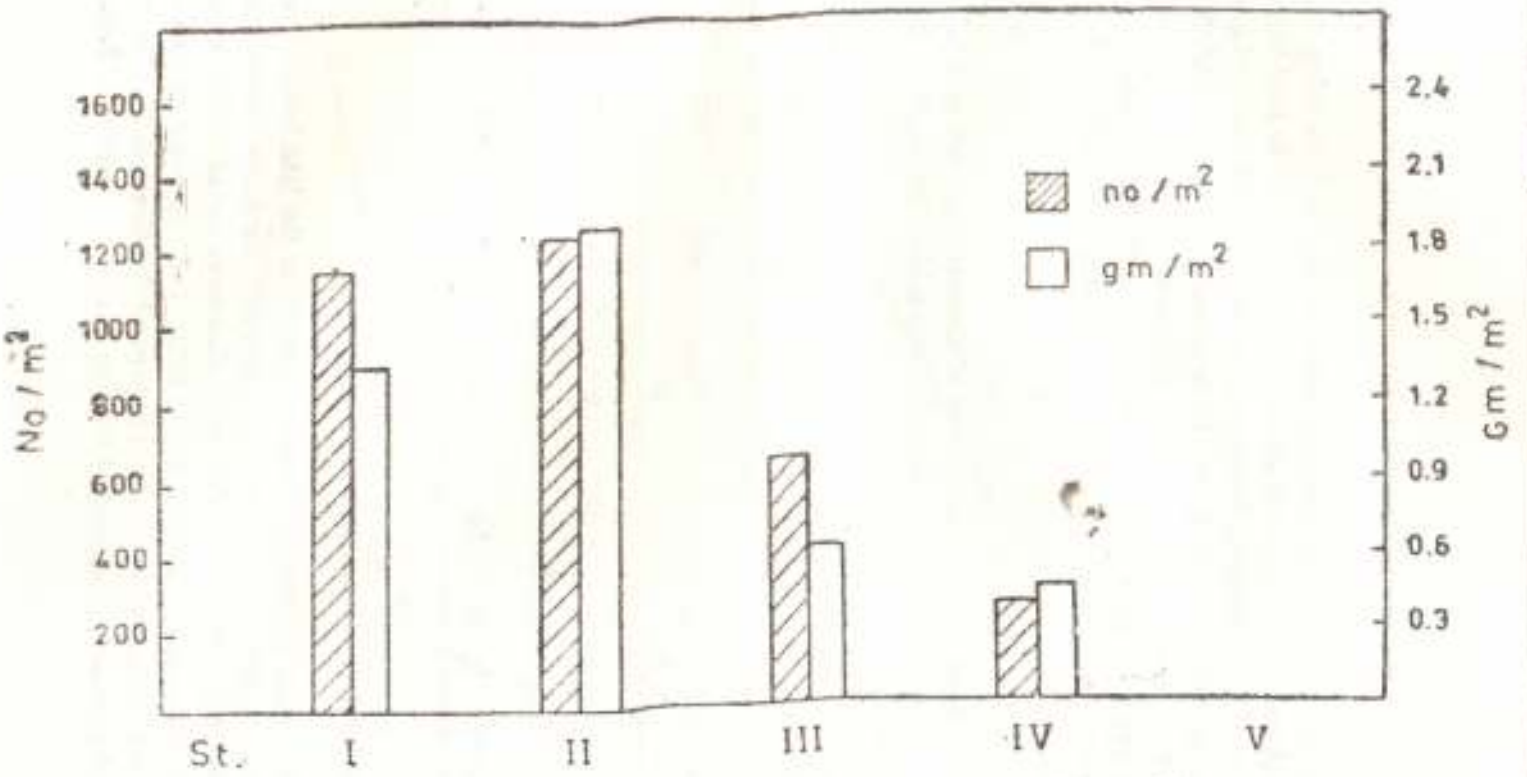

Fig. 9. Average numbers and biomass of *Gammarus* recorded at the different stations

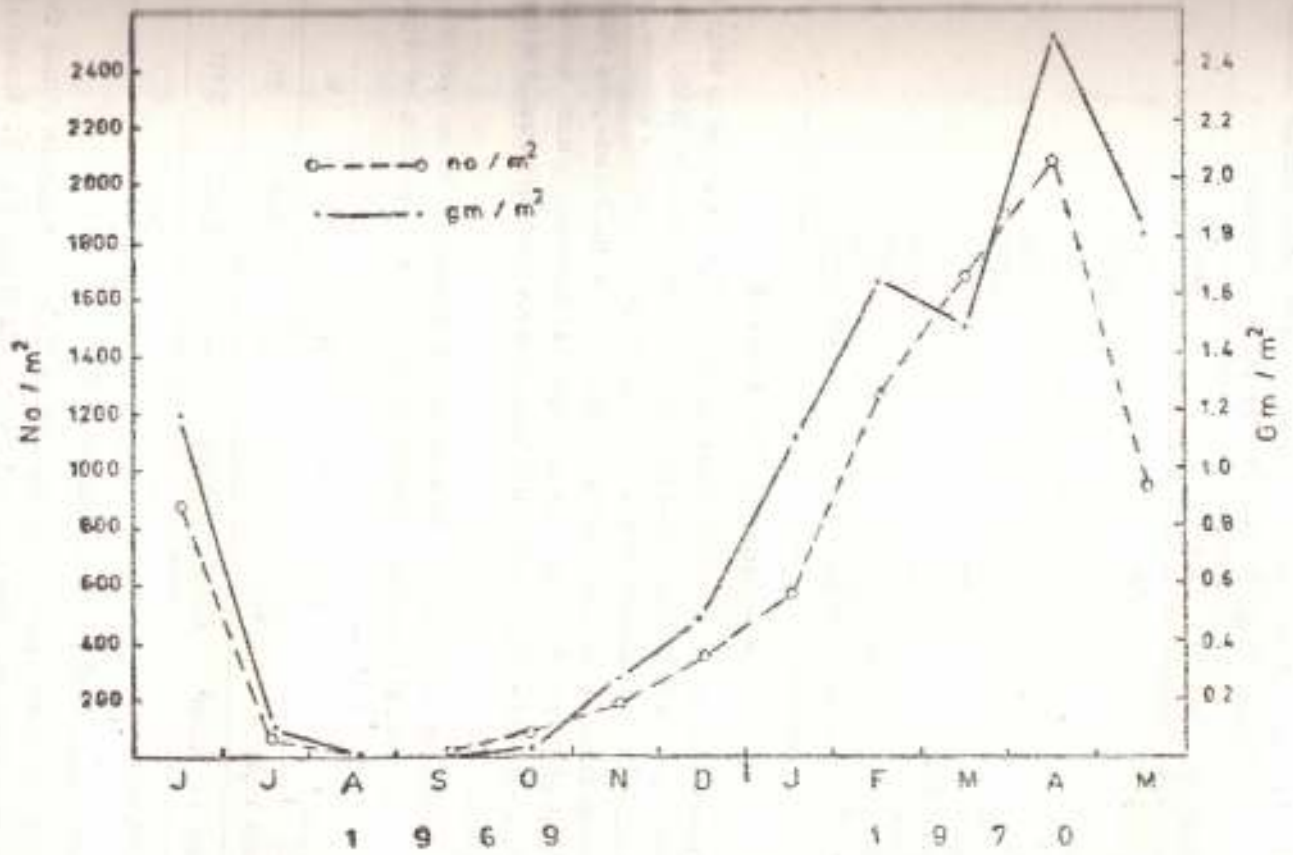

Fig. 10. Seasonal variations of *Gammarus*. Data represent average numbers and biomass for the five stations

Table 8. Seasonal variations of Gammarus. Data represent average numbers and biomass in gm/m² recorded for the five stations.

Month	No/m²	Gm/m²
June, 1969	880	1.203
July	57	0.098
August	—	—
September	—	—
October	79	0.056
November	185	0.275
December	348	0.476
January, 1970	559	1.119
February	1245	1.666
March	1654	1.439
April	3033	2.524
May	920	1.779

4 — CHIRONOMID LARVAE

These are the larvae of aquatic diptera (midges) which are known to inhabit the littoral zone of both oligotrophic and eutrophic lakes (Mundie, 1955). The choronomid larvae constitutes about 10.4% by weight of the total boimass of the bottom fauna in the lake. They are found mainly at the **Potamogeton** plant belt (stations IV and V) where they comprise the dominant bottom animals there (table 9 and fig. 11). On the other hand, they are poorly represented at the other stations.

Table 9. Average numbers and biomass of the chironomid larvae (gm /m²) recorded at the different stations and percentage composition by weight to the total fauna.

St. No.	I	II	III	IV	V
Average no/m²	4	9	—	818	537
Average wt. gm/m²	0.005	0.039	—	3.502	2.411
% composition by wt.	0.05	0.2	—	38.0	85.7

Seasonal variations of the chironomid larvae ;

The choronomid larvae appeared only in the bottom samples during the period from December, 1969 till April, 1970 (table 10 and fig. 12). It showed its maximum distribution in January, 1970 and it decreased gradually till the month of April.

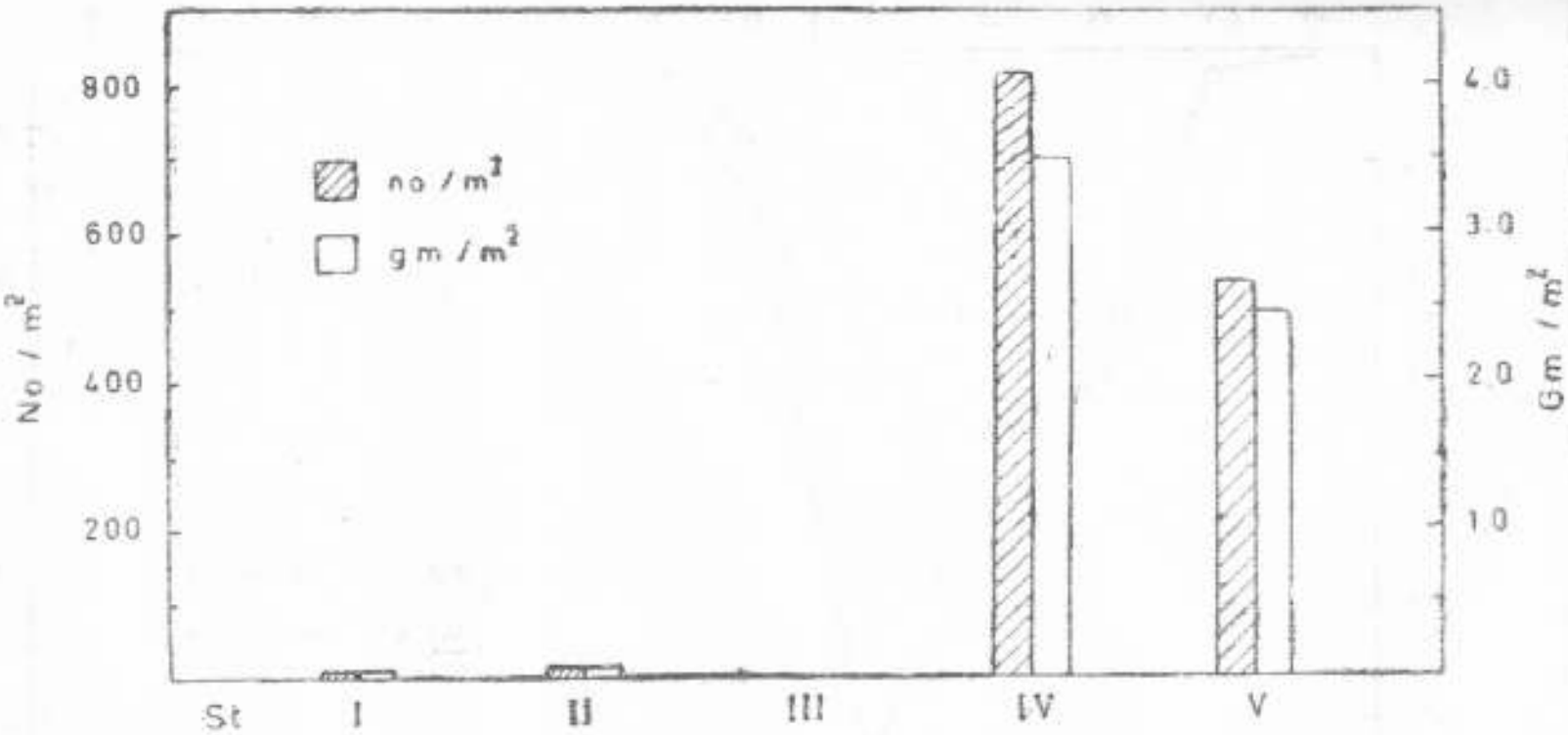

Fig. 11. Average numbers and biomass of chironomid larvae recorded at the different stations

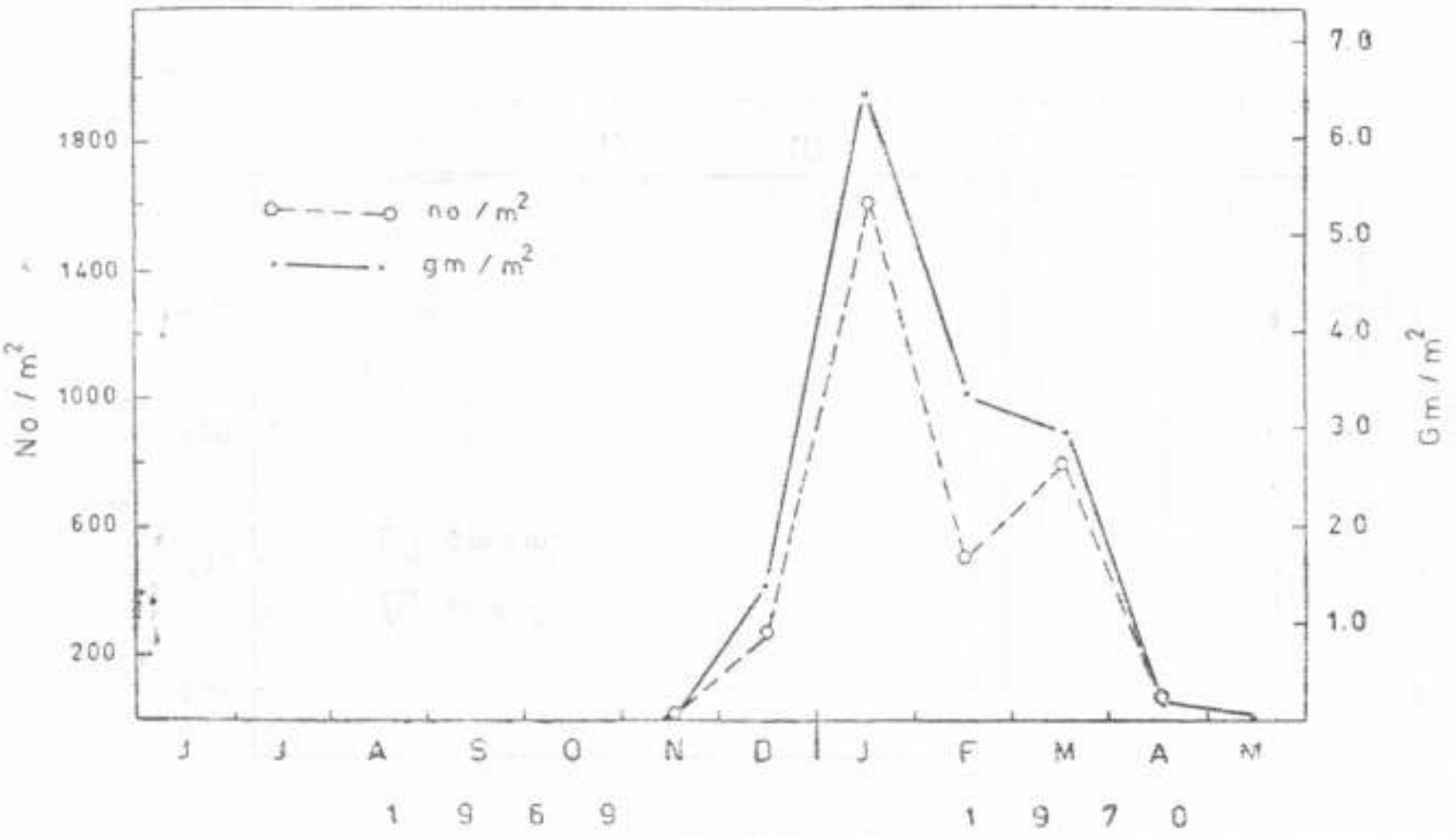

Fig. 12. Seasonal variations of the chironomid larvae. Data represent average numbers and biomass for the five stations

Table 10. Seasonal variations of the chironomid larvae. Data represent the average numbers and biomass in gm/m² recorded for the five stations

Month	No/m²	Gm/m²
June, 1969	—	—
July	—	—
August	—	—
September	—	—
October	—	—
November	—	—
December	281	1.413
January, 1970	1632	6.426
February	517	3.345
March	792	2.986
April	61	0.126
May	—	—

5 — ANCYLUS

Ancylus sp is the only living pelecypoda recorded at the lake bottom. It is an important bottom animal inhabiting the lake since it constitutes about 23.5% by weight of the total biomass of the bottom fauna (flesh weight). However, it is found mainly at station III and it remains low at the other stations (table 111 and fig. 13).

Table 11. Average numbers and biomass of **Ancylus** sp (flesh weight in gm/m²) recorded at the different stations and percentage composition by weight to the total fauna.

St. No.	I	II	III	IV	V
Average no/m²	11	2	177	11	2
Average wt. gm/m²	1.263	0.105	10.610	0.982	0.200
% composition by wt.	14.1	0.7	50.2	10.7	7.1

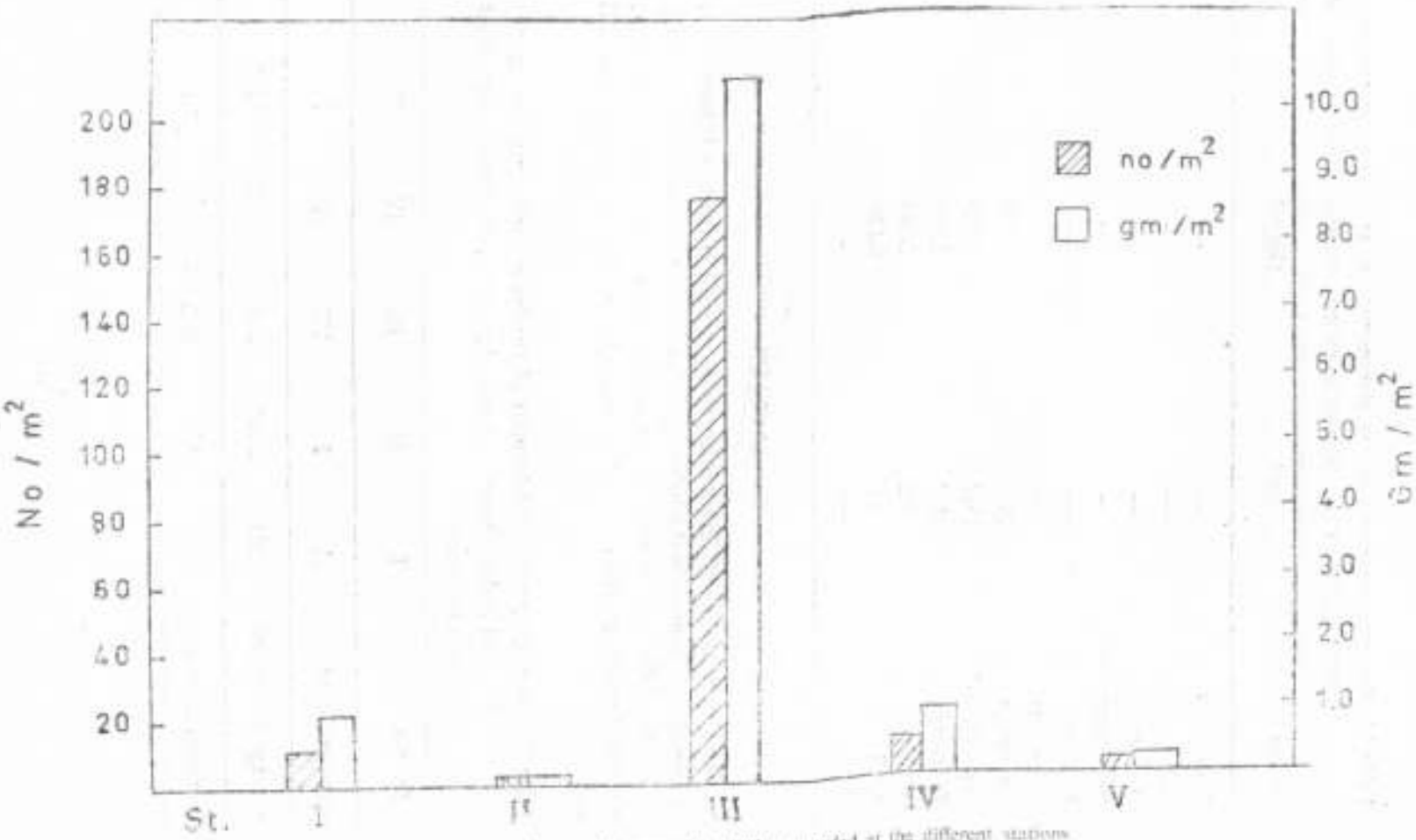

Fig. 13. Average numbers and biomass of *Amerlus* recorded at the different stations

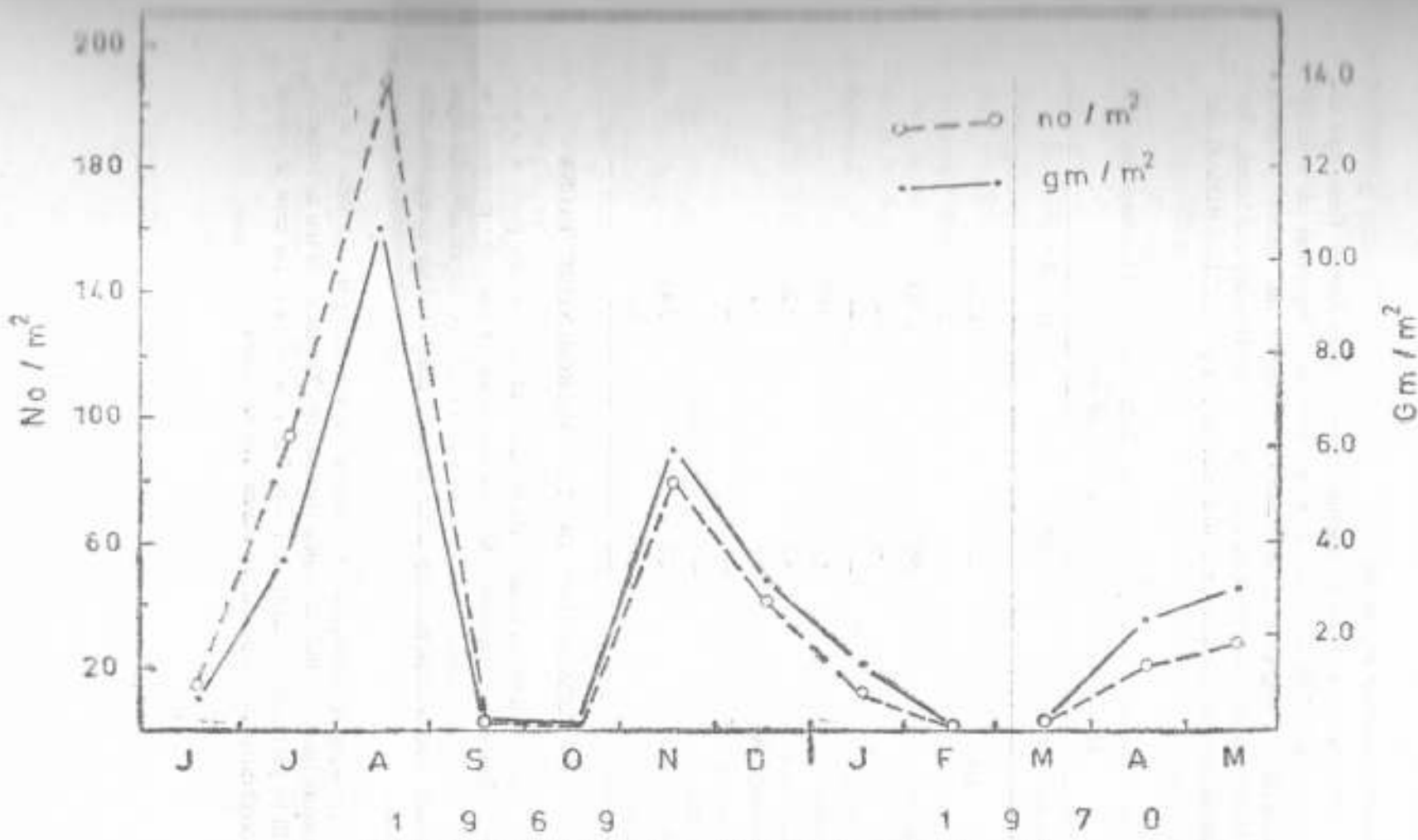

Fig. 14. Seasonal variations of *Amylus*. Data represent average numbers and biomass of the five stations

Seasonal variations of Ancylus ;

The average numbers of **Ancylus** showed a rapid increase From June till August, 1969. This was succeeded by a sharp drop in September and it disappeared totally during October. A second increase was recorded again in November which decreased gradually and it disappeared during February and March, 1970. **Ancylus** appeared again in the bottom samples in April and May (table 12 and fig. 14).

Table 12. Seasonal variations of Ancylus. Data represent the average numbers and biomass in gm flesh/m^2 for the five stations.

Month	No/m^2	Gm/m^2
June, 1969	13	0.88
July	95	3.51
August	195	10.83
September	4	0.53
October	—	—
November	81	5.90
December	42	3.20
January, 1970	13	1.29
February	—	—
March	—	—
April	21	2.41
May	26	3.03

V - DISTRIBUTION OF THE MICROBENTHIC FAUNA

Microscopic examination of the bottom muds indicates the presence of several microbenthic organisms. Such organisms are of particular importance in the food cycle involved in the lake. They feed mostly on the microbenthic algae bacteria and detritus, and they inturn furnish a direct food for the macrobenthic fauna.

A separate investigation was carried out concerning the distribution of the microbenthos and their ecological relationships. The results of this investigation will be published separately in future. The distribution of the most important microbenthic organisms can be summerized as follows :

a. **Foraminifera** ; The foraminifera present at the lake bottom is represented mainly by the genus **Ammonia** . It shows its maximum distribution at the Maadiya District and the middle lake. Its maximum frequency was observed in autumn and early spring.

b. **Centropyxis** : It is the only genus of the order Testacea lobosa recorded at the lake bottom. It is widely distributed at the different parts of the lake particularly at the **Potamogeton** plant belt where it reached two peaks during the spring and the summer months.

c. **Ciliophora** ; The class ciliophora is mainly represented at the lake bottom by the genera : **Platyophrya, Paramecium, Stylonychia Holophrya, Glaucoma** and **Spasmostoma**. Members of ciliophora were mainly recorded at the **Potamogeton** plant belt. They were observed during most of the year but their numbers tend to increase during the winter months.

d. **Free living nematodes** :The free living nematodes are tychoplanktonic forms. They are rather frequent at the **Potamogeton** plant belt. They attain their maximum distribution during the spring.

e. **Ostracoda** : The genus **Cyprideis littoralis** (Brady) is a tychoplanktonic form. It is recorded mainly at the bare area and it shows its maximum frequency during the summer.

VI DISCUSSION

The importance of the macrobenthic fauna in the general productivity of lakes has been discussed by many investigatigators (cf. Welch, 1952). They feed mostly on detritus and microbenthos, converting them into flesh of their own bodies. They, in turn, furnish a direct food for bigger aquatic animals including fish. Since the lake is very shallow (about one meter depth), its entire area belong to the littoral zone. Such shallow lakes were found to support the most productive benthic fauna (Muttkowski, 1918; Baker, 1918; Eggleton, 1935; Samaan and Aleem, 1972).

The distribution of the bottom fauna in lake Edku is affected by the physicochemical as well as the biological conditions prevailing at the different localities. Thus, the bare area which is devoid of hydrophytes (stations I, II and III) sustains a relatively high standing stock of bottom animals when compared with that recorded at the **Potamogeton** plant belt. Station III is the most productive area in the bottom fauna. The average biomass of the bottom fauna at that station is 21.12 gm/m^2 and this comprise mainly the bivalve **Ancylus** and to a less

extent of the polychaete **Nereis** and the amphipod **Corophium**. The standing stock of the bottom fauna decreases gradually from station III to station I, attaang 13.84 and 8.98 gm/m² at stations II and I respectively. The most important bottom animals inhabiting these two stations include **Nereis**, **Corophium** and **Gammarus**. The standing stock of the bottom fauna at the **Potamogeton** plant belt (stations IV and V) is rather poor due to the reduced conditions prevailing at the lake bottom there. Thus, the average biomass of the bottom fauna at stations IV and V is 9.2 and 7.81 gm/m². The chironomid larvae which can thrive in water poor in dissolved oxygen is the most dominant bottom animal in the plant belt, particularly at station V. Station IV, being located at the margin of the plant belt and sustains a lower density of hydrophytes harbours also a fauna similar to that recorded at the adjacent station III.

The water temperature in the lake ranges between 28.5 and 12.2°C. Lowest values are recorded during January while the highest are reached in July. Between these two extremes, the water temperature increases gradually during the spring and the summer but decreases again during the autumn and the winter. The effect of the seasonal variations of the water temperature on the succession of the bottom animals varies with the different genera. Thus, the chironomid larvae flourished mainly during the winter months. The polychaete **Nereis** and the amphipod **Gammarus** were more abundant in late winter and during the spring. On the other hand, **Corophium** and **Ancylus** showed their maximum distribution in August.

The chlorosity of the lake water usually ranges between 0.48 and 2.0 gm Cl/l. On rare occasions, it may reach 17.7 gm Cl/l at the Maadiya District during periods when the sea water invades the lake. However, the dominant bottom animals inhabiting the lake are considered as brackish water forms which can tolerate a wide range of salinity.

As regards to the fertility of Lake Edku, it is considered as a mesotrophic lake in phytoplankton production which amounts an average value of 0.604 gm C/m² /day. On the other hand, the growth of the hydrophytes with their assosiated epiphytes in the lake is more effecient as they yield an average value of 1.32 gm C/m² /day and they cover about 50% of the total area of the lake. A linear relationship appears to exist between the phytoplankton production and the distribution of the bottom fauna (table 13). Thus, both of the phytoplankton production and the biomass of the bottom fauna increase gradually from station I to

station III. On the other hand, the bottom at the **Potamogeton** plant belt, being subjected to reduced conditions, harbours but a little amount of bottom animals particularly at station V.

Table 13. Average biomass of the bottom fauna (gm fresh wt./m²) and primary production (gm C/m²/day) recorded at the different stations during the period from June, 1969 till May, 1970.

Habitat	Bare area				Potamogeton belt
St. No.	I	II	III	IV	V
Gross primary prod. gm C/m²/day	0.322	0.697	0.789	0.776	0.435
Biomass of the bottom fauna gm/m²	8.98	13.84	21.12	9.2	2.81

Comparing the results obtained for both the phytoplankton production and the biomass of the bottom fauna at the bare areas of the adjacent lake Mariut and the Nouzha Hydrodrome, we find also a linear relationship that exists between these two successive trophic levels (table 14). Thus, it can be concluded that, under favourable conditions, the increase of the primary production in such shallow lakes will also increase the amount of the bottom fauna and consequently will increase the annual fish yield. This can be explained according to the fact that the phytoplakton sedimented on the lake bottom, beside the microbenthos present there, furnish the main food supply for the bottom fauna particularly in the form of detritus.

Table 14. Average values of phytoplankton production (gm C/m² day) and biomasses of the bottom fauna (gm fresh wt./m²) recorded at the bare areas of some Egyptian Lakes.

Locality	L. Mariut	L. Edku	Nouzha Hydrodrome
Period of investigation	1960	1969-70	1956
Primary production gm C/m²/day	4.804	0.743	0.30
Biomass of bottom fauna gm/m²	76.5	17.5	6.3

In conclusion, Lake Edku sustains a moderate quantity of macrobenthic fauna when compared with the other Egyptian Delta Lakes. Thus, the highest standing stock of the bottom animals was recorded in Lake Mariut due to the high fertility of the lake water. On the other hand, the standing stock of the bottom fauna at the bare area in Lake Edku (17.5 gm/m²) is comparable with that recorded in Lake Burollus which amounts to about 19 gm/m² (unpublished data by the author),while the average biomass of the bottom fauna in the Nouzha Hydrodrome remained as low as 6.3 gm/m² . It is found also that the areas devoid of hydrophytes in these lakes are more favourable habitats for the growth and survival of the marcobenthic fauna than the areas covered with a dense growth of submerged plants.

VII - SUMMARY

1 — Lake Edku is a shallow brackish water lake adjoining the Mediterranean Coast at a latitude 31° 15' N and longitude 30° 15' E. Its total area amounts to about 12,600 hectare and it has an average depth of about one meter. The lake receives its water from the Edku and Berzik Drains situated at the eastern margin and it discharges the surplus water into the sea through a small channel located at the north western side (Maadiya District). The lake bottom is composed mainly of clay and to a less extent of sand .

2 — The distribution of the bottom fauna in the lake varies greatly according to the different habitats. Thus, the area of the lake-sea connection (station I) sustains a moderate quantity of bottom fauna (8.98 gm/m²) . The biomass of the bottom fauna at the bare area increases gradually as we go towards the middle lake, reaching 13.84 and 21.12 gm/m² at stations II and III respres-pectively. On the other hand, the area covered with a heavy growth of **Potamogeton** (station V) is the poorest in bottom fauna (2.81 gm/m²), while the margin of the **Potamogeton** plant belt (station IV) sustains a moderate quantity of bottom animals (9.2 gm/m²).

3 — The seasonal variations of the average biomass of the bottom fauna recotded at the five stations showed a small peak in August, 1969 and a big one in January, 1970, while it remained at a more or less lower values during the rest of the year.

4 — The polychaete **Nereis diversicolor** constitutes about 18.6% of the total biomass of the bottom fauna. It is more frequent at the bare area and less

so at the Maadiya District. It was poorly represented at the **Potamogeton** plant belt. **Nereis** appears all the year round, showing a peak in late winter and during the spring.

5 — The amphipod **Corophium** is the most important bottom animal inhabiting the lake since it constitutes about 39.6% of the total biomass of the bottom animals. It is more frequent at station I and it decreases gradually till station IV. It is not recorded at station. V. **Corophium** survives at the lake bottom during the whole year, showing a high peak in August and a smaller one during the winter.

6 — The amphipod **Gammarus** is of less frequency than **Corophium** and it constitutes about 7.9% of the total biomass of the bottom fauna. The highest standing stock of **Gammarus** is observed at stations I and II and it decreases steadily at stations III and IV. It was not recorded at station V. The numbers of **Gammarus** showed a gradual increase from October, 1969 till April, 1970. This was succeeded by a rapid drop in May.

7 — The chironomid larvae constitutes about 10.4% of the total biomass of the bottom fauna. However, they form the main benthos at the **Potamogeton** plant belt. The distribution of the chironomid larvae is confined to the winter and early spring.

8 — The pelecypoda **Ancylus** represents the only living bivalve recorded at the lake bottom. It constitutes about 23.5% of the total biomass of the bottom fauna (flesh weight). Its maximum distribution is observed at station III

9 — A linear relationship was found to exist between the phytoplankton preoduction and the distribution of the bottom fauna in areas devoid of the hydrophytes. On the other had, the bottom fauna at the **Potamogeton** plant belt was rather poor due to the reduced conditions present at the bottom there.

10— It is concluded that Lake Edku sustains a moderate quantity of macrobenthic fauna (average biomass of the five stations is 11.19 gm/m^2) when compared with the other Egyptian Lakes and this is attributed to the mesotrophic properties of the lake water.

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