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Quantitative and qualitative study on zooplankton in restored southern Iraqi marshes

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Abstract

The Zooplankton assemblages of the restored marshes was dominated by Rotifera, Coprpoda, Cladocera and free nematode respectively. Monthly changes were noticed in densities of these groups.Highest densities were recorded with temperature range 10-20 °C and salinities 1.5-2.0 ppt. dynamic seasonal fluctuations were noticed between zoo. Eighty seven species of zooplankton were identified, including 53 species of Rotifera, 24 of Cladocera, 4 Copepoda, and 6 other belong to Insect, Ostercoda and Nematode.

Rortifera contain more species than other groups in all surveyed stations (plankton and phytoplankton).

1-Introduction

Zooplankton formed an important food web in food chain in aquatic environment they feed greatly on phytoplankton and detritus they converted organic matter in phytoplankton to protein and lipids, they also an important food to fishes, crustaceans .

The oldest studies related to Zooplankton in southern Marshes and neighboring waters were of Gurny (1921) during the British campagian to Iraq, fifty years later Iraqi scientist contributing to the knowledge, Mohamed (1965), Al-Hamad (1966), Khalaf and smirnov (1976), Salman *et al*. (1986), Abdul Hussein *et al*. (1989) and Al-Zubaidi (1998). Few specific articles were dealt with zooplankton of the marshes such as Al-Saboonchi *et al*. (1986) Ajeel (1998) and Al -Garooni (2005).

The aim of the present study to give an idea about the quantity of major groups and seasonal variation of zooplankton and to identified the zooplankton species existed in the restored Iraqi marshes. Zooplankton is important food for fresh water carnivorous fishes in Iraqi southern marshes especially juveniles, beside their importance as a link between different trophic levels.

2-Material and Method

Six stations were selected in three restored marshes distributed in shape of two in each marsh , represented different habitats, these stations are:

1-**Suq Al Shuyuak marsh.**

1-1-Al -Wineas : represent open water with dense vegetations, previously desiccated, GPS reading ((N 30 51 50 ,E 46 40 42)

1-2- Al- Amia : channel marsh station with moderate vegetations, GPS reading(N 30 51 41,E 46 38 13)

2-**Huwayza marsh.**

2-1-Um- Al naaj :The only natural station escape from desiccation, open water with patch vegetations . GPS reading **(**N 31 38 30., E 47 35 21 **),.**

2-2-Taraba :Shallow marsh with very dense vegetations,previously was desiccated. GPS reading(N 31 29 48, E 47 31 48 **),**

3-**East Hammer**:

3-1- Burkha:Open shallow water station , with patch vegetations GPS reading(N 30 40 22 , E 47 33 03)

3-2-Saddah : Natural station escape desiccation,effected by tide from shatt Al Arab, GPS reading (N 30 40 04, E 47 38 06)

Field Measurements Quantitative Sampling:

Hundred liters of water of the in each station were poured through zooplankton net of mesh size of 55 *µm* , then 5% formalin was added to the sample ,for five months(January to May).

Qualitative Measurements:

The plankton net of 55 *µm* mesh size was dragged for about ½ hr. beside the boat and then preserved in bottle with 5% formalin. The samples were taken for nine months (September to May).

Laboratory Analysis

Binocular microscope was used for examination the zooplankton by using different identifications references (Edmondson, 1959; Pontin, 1978 and De Bernardi, 1984).

The numbers of individuals were counted by using the counting cell, and then the average was calculated for 100 liters.

3-Results

The highest numbers of individuals of zooplankton were recorded in Taraba station in January and the lowest in March. Um Al-naaj station in Huwayza marsh, the highest noticed in April and the lowest in May .Al-Amia station,the highest in March, and lowest in April. Al Wineas in Suq Al-Shuyuak the highest in March and lowest in February .Burkha station highest in January and the lowest in April. Saddah highest in March, lowest in January. In general there were no clear rhythm in increase and decrease of number of individuals, but seemed two-three months periodsity, fig (1).

The dominant groups were Rotifera forming 53% , 57% and 70% followed by Copepod consisting 29%, 35% and 15% then Cladocera and followed by free nematode in Huwayza, Suq Al-Shuyukh and East Hammar respectively, figs. (2, 3 and 4).

The highest numbers of Rotifera was in Jan., Copepod in Dec., Cladocera in March and for Free nematode in Sep.as displayed in Fig (5). The monthly variations indicated the dominance of Rotifera,followed by Copepoda ,then Cldocera and free Nematoda were showed in

figures (5,6,7,8,9 and 10), demonstrated the dominance of Rotifera during winter season (December-January), Copepod had different peaks in the studied stations ,Cladocera peaks were mostly in spring season (April-May) and Free nematode peaks in fall in all stations.

The relation between water temperature and total number of individuals were inverse in most of monitored stations except in Taraba and Sadda (Figs. 11, 12, 13).

Fig (14, 15, and 16) represents the relation between number of zooplankton and salinities . The best values were recorded in range of salinity 1.5-2.0 ppt in all stations except Taraba, had lower salinity 0.5 ppt.

Figs (17, 18, and 19) explain the inverse relations between number of zooplankton individuals and phytoplankton cells, in all monitored stations.

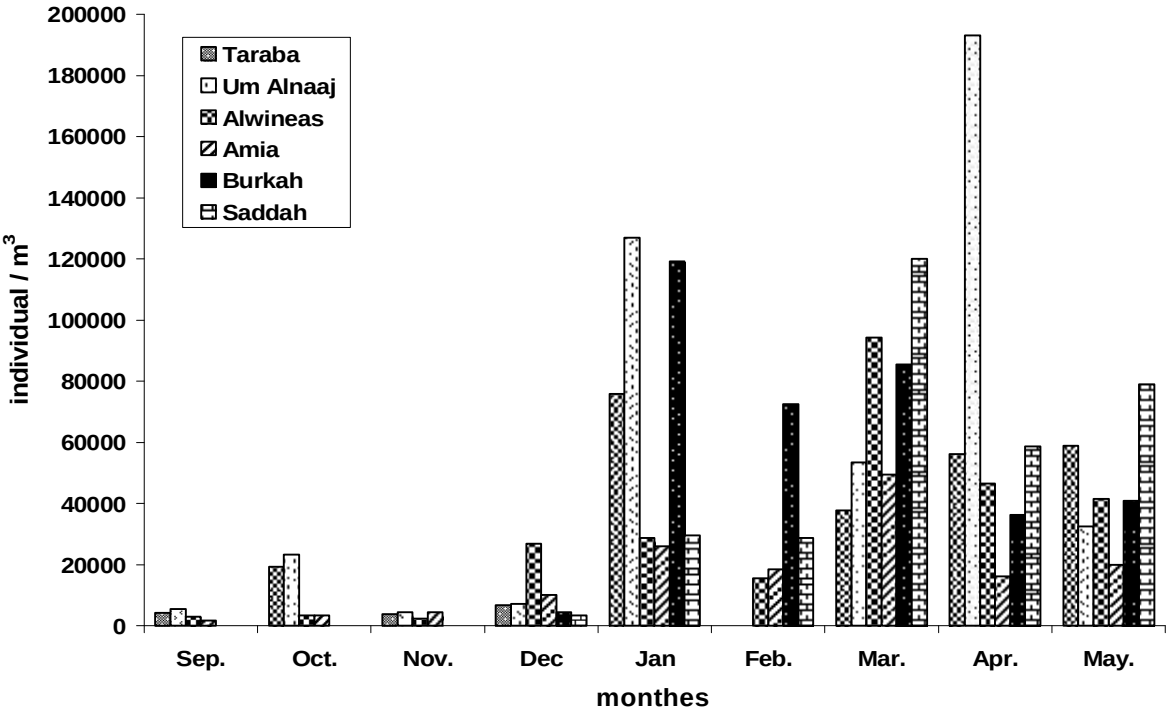

Fig.(1):Total number of zooplankton's individuals in all stations ,Sep.2004-May.2005

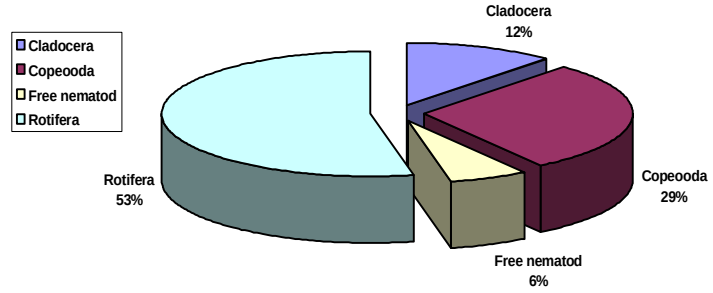

Fig.(2):Mean of individuals for each order of zooplankton at Soq-Alshuwuk Marsh,Sep.2004-May.2005

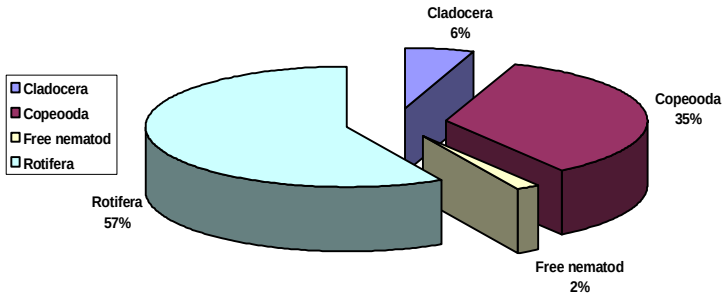

Fig.(3):Mean of individuals for each order of zooplankton at Al-Hawzah Marsh,Sep.2004-May.2005

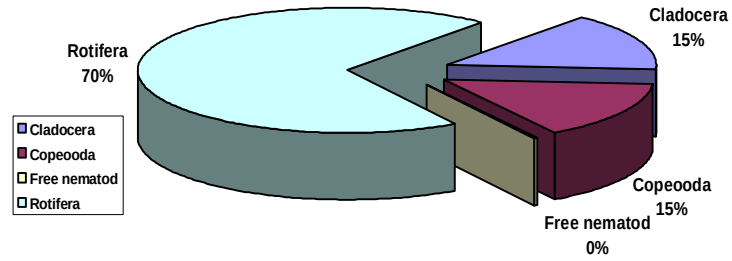

Fig.(4):Mean of individuals for each order of zooplankton at East-Hammar Marsh,Sep.2004-May.2005

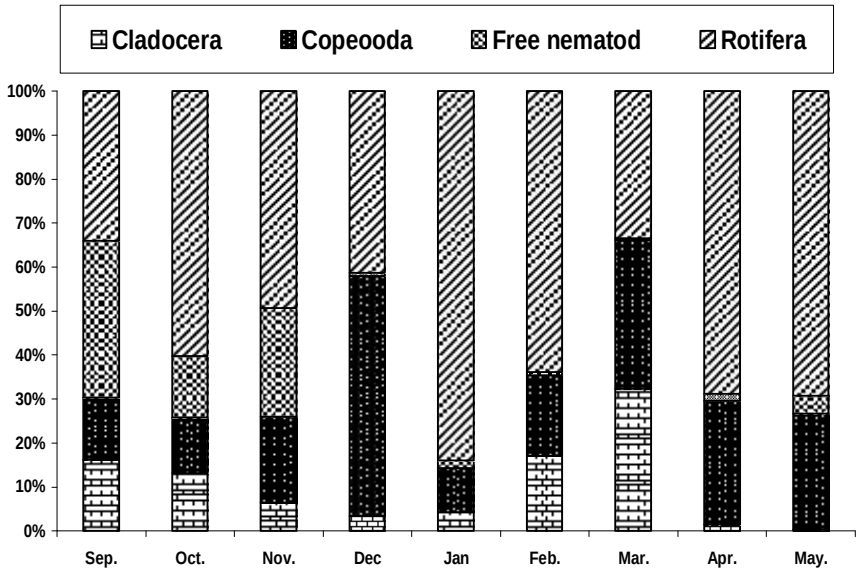

Fig.(5):Total number of indiviuals for each order of zooplankton at Alwineas,Sep.2004-May.2005

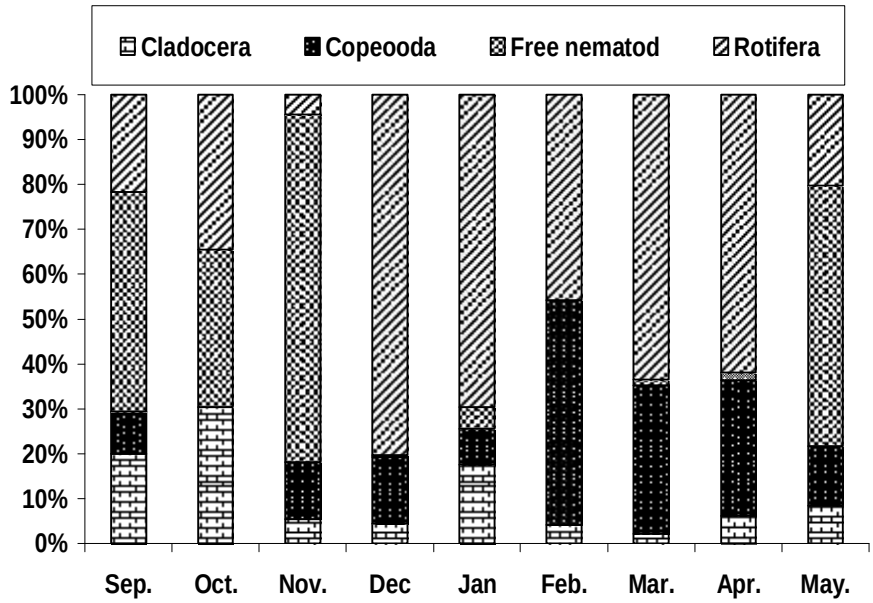

Fig.(6):Total number of indivduals for each order of zooplankton at Alamia,sep.2004-May.2005

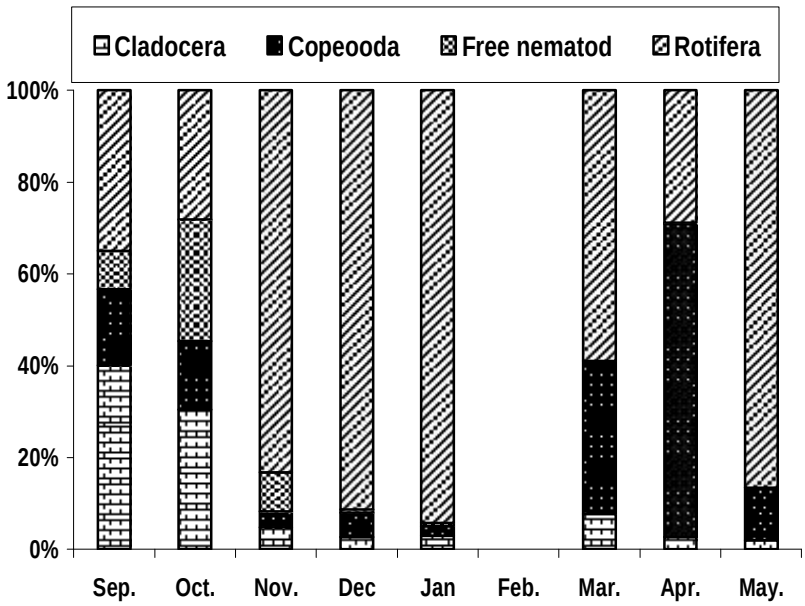

Fig.(7):Total number of individuals for each order of zooplankton at Um Alnaaj,Sep.2004-May.2005

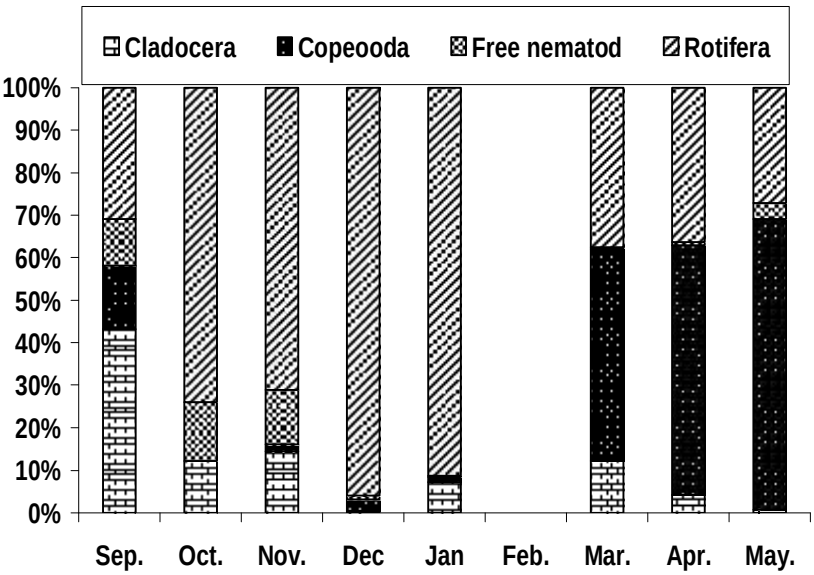

Fig.(8):Total number of individuals for each order of zooplankton at Taraba,Sep.2004-May.2005

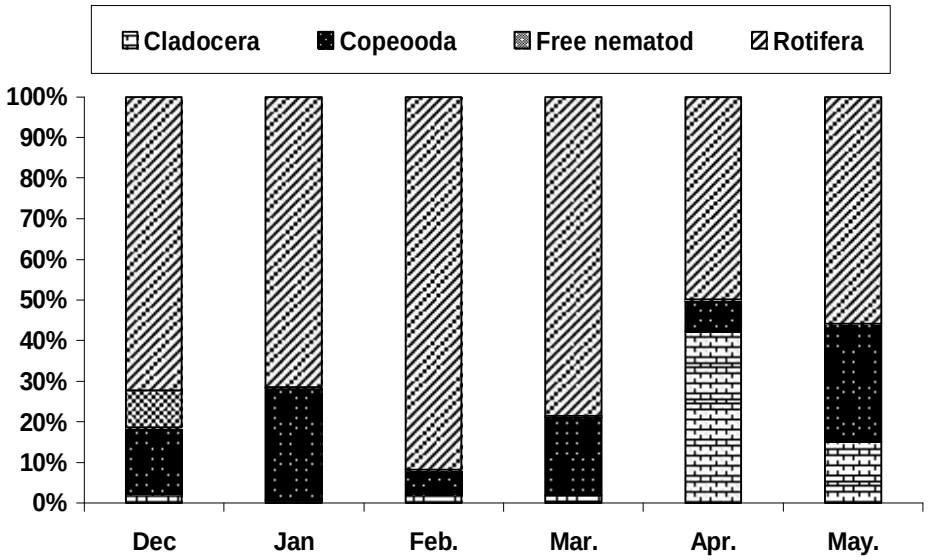

Fig.(9):Total number of individuals for each order of zooplankton at Burkha,Sep.2004-May.2005

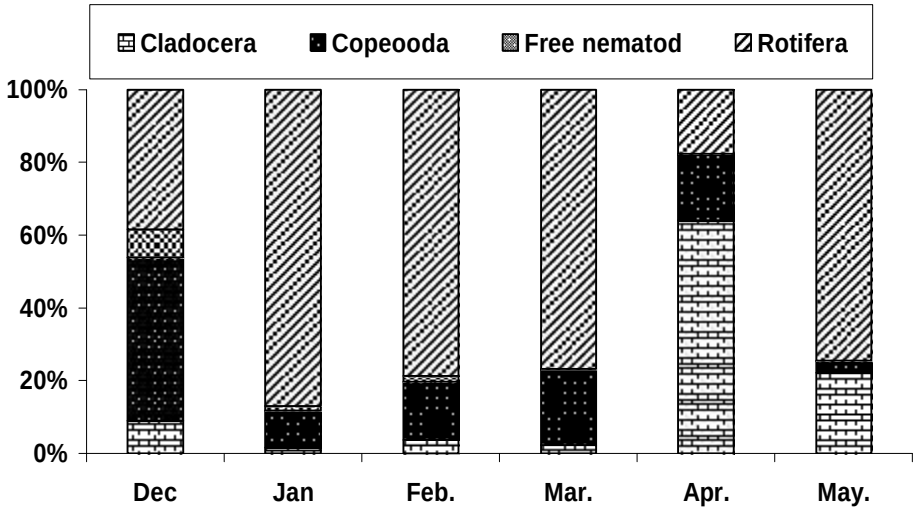

Fig.(10):Total number of individuals for each order of zooplankton at Saddah,Sep.2004-May.2005

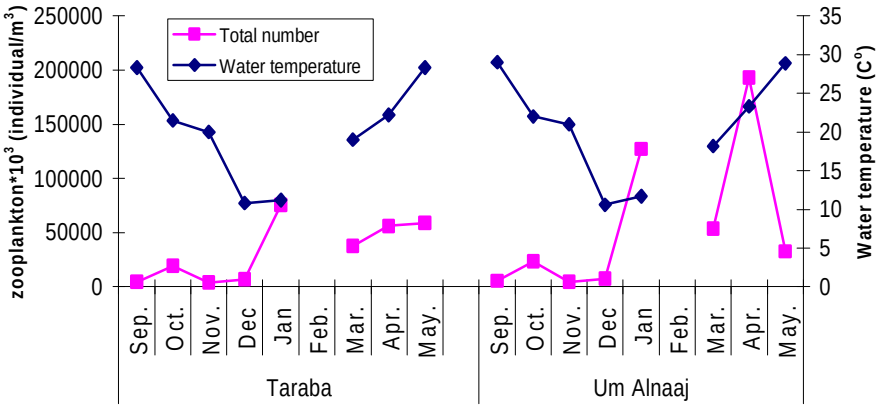

Fig.(11):Relationship between Total number of zooplankton and water temperature at Al-Huwayzah marsh,Sep.2004-May.2005

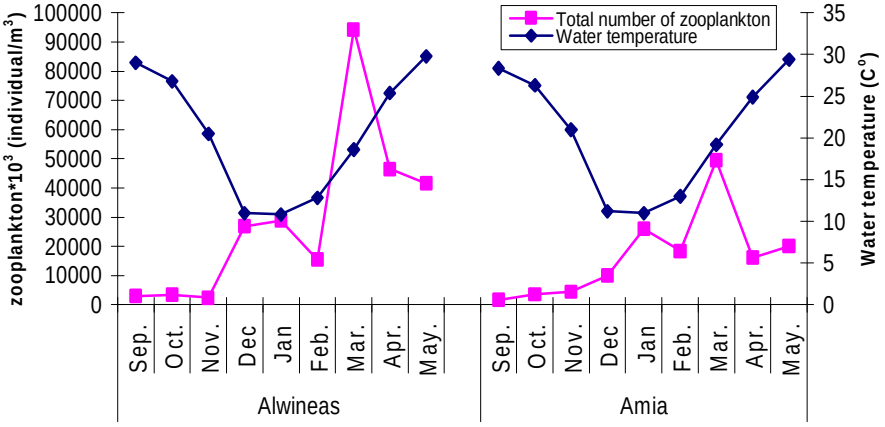

Fig.(12):Relationship between Total number of zooplankton and water temperature at Soq-Alshuyukh marsh,Sep.2004-May.2005

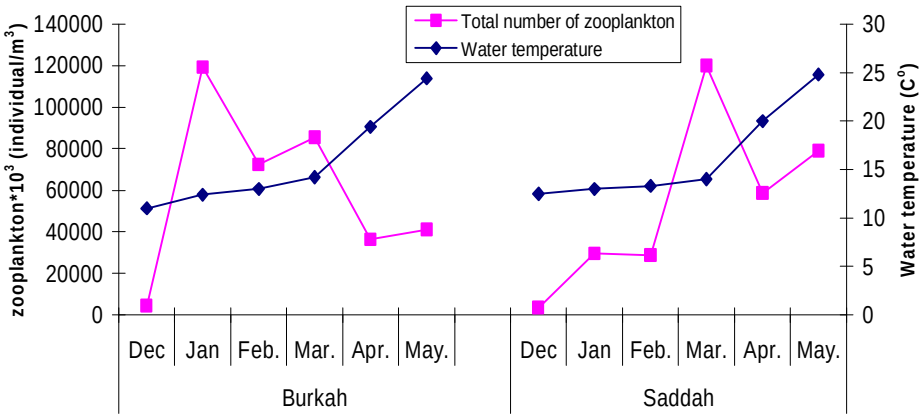

Fig.(13):Relationship between Total number of zooplankton and water temperature at East-Hammar marsh,Sep.2004-May.2005

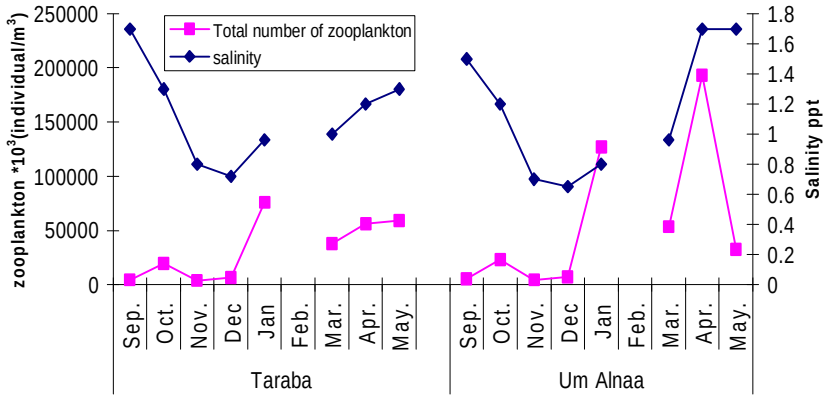

Fig.(14):Relationship between Total number of zooplankton and salinity in Al-Huwazah marsh,Sep.2004-May.2005

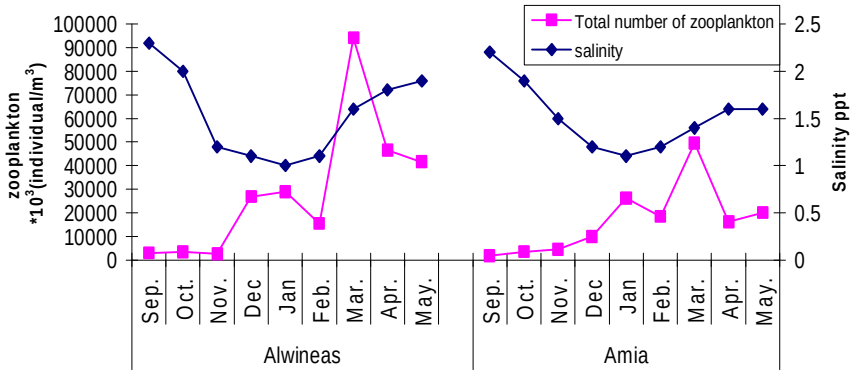

Fig.(15):Relationship between Total number of zooplankton and transparency in Soq-Alshwukuh marsh,Sep.2004-May.2005

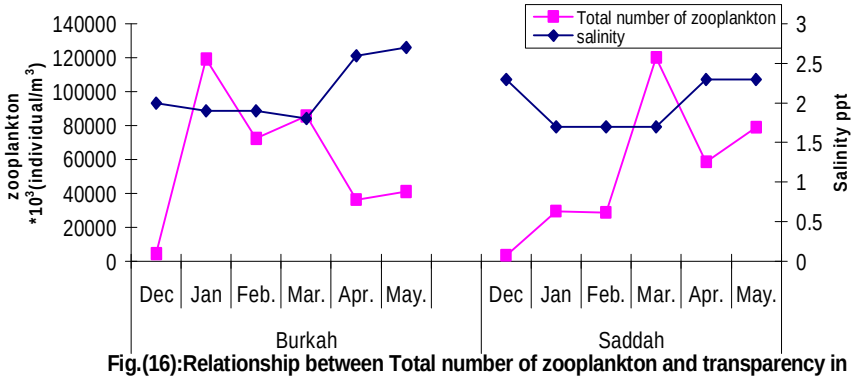

Fig.(16):Relationship between Total number of zooplankton and transparency in East Hammar marsh,Sep.2004-May.2005

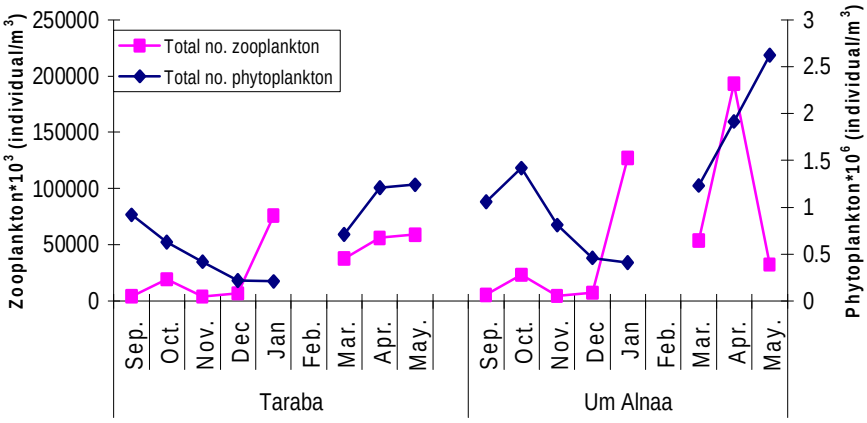

Fig.(17):Relationship between total number of zooplankton and phytoplankton in Al-Hawzah marsh,Sep.2004-May.2005

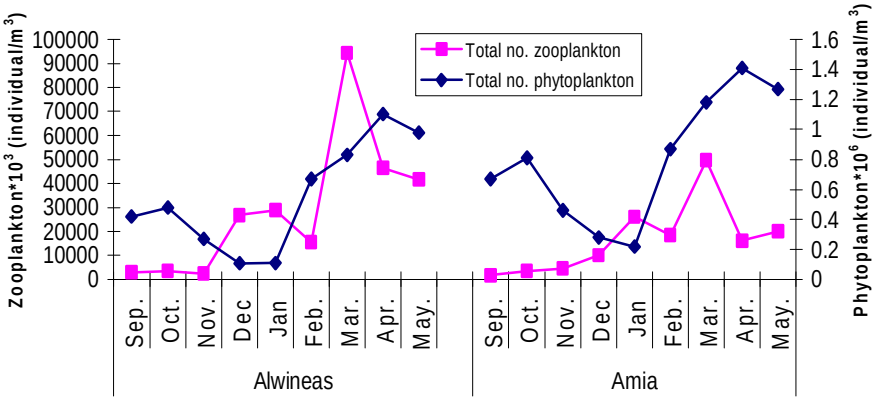

Fig.(18):Relationship between total number of zooplankton and phytoplankton in Soq-Alshuwukh marsh,Sep.2004-May.2005

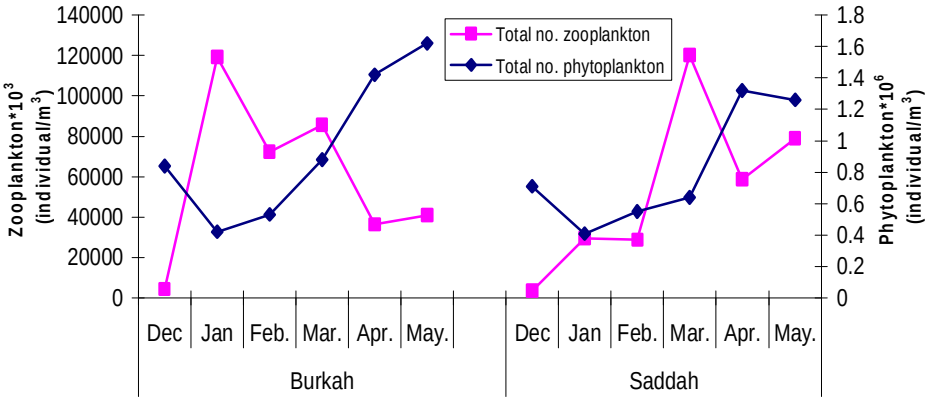

Fig.(19):Relationship between total number of zooplankton and phytoplankton in East Hammar marsh,Sep.2004-May.2005

Tab.(1) showed list of species of zooplankton recorded in the monitored marshes, Fifty three species of Rotferia belong to 27 genera, some genera contain more than three species like *Keratella, Lecona, Brachionus* and *Monostyla.*Species *Lecone luna* occurred in all monthes in Suq Shuyuak.

In Huwayza, the dominant species were *Colurella adriatca, Lecane luna, Lepadella ovalis, Monostyla bulla* and *Monostyla clostercoa,* In East Hammer the mostly occurred species *Brachionus urcedaris, Brachionus angulars, Keratella quadrata, Monostyla clostroceca* and *Trichtaria tetractis* in six months of survey period.

For Cladocera twenty four species were identified belong to eleven genera. The most occurred genus were *Daphnia* and *Alona.*Low occurrence was observed for genus Ceriodaphnia and Macrothrix in the three monitored marshes.Four species of Copepoda were recognized belong to three genera, the most occurred once were(*Cyclops* and *eucyclops*), these were occurred in all monitored marshes.

Nematoda and Diptera occurred in several months in all stations.

Table (1) Occurrence of main groups of Zooplankton in Huwayzah (H), Suq-Shuyukh (S), and East Hammar (E) during the monitoring period.

Species	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.
Roteera									
Asplonchnopus myrmeleo						E	S	S	
Brachionus angulars	H	H	H,S	S,E	H,S,E	S,E	H,S,E	H,S,E	H,S,E
Brachionus calyciflorus				S	H,S				H,E
Brachionus quadridentatus	S	H	S	H,S	E		E	E	E
Brachionus urceolaris	S	S		S,E	H,S,E	E	E	E	E
Cephalodella auriculata			H,	H,S	H,E	S,E	H,S,E	H,S,E	H,E
Cephalodella exigua					E				
Cephalodella mucronata				S					
Colurella adriatica	H,S	H,S	H,S	H,S,E	H,S	S,E	H,S,E	H,S,E	H,S,E
Colurella bicuspidata		S	H	H	H,S	S	H,S	H,S	H,S
Colurella obtusa	S		H,S	H,S	S,E	S	H,S		S
Diplois sp.			H	H,E					
Dipleuchlanis propatula	H	H					H	H,E	
Epiphans sp.					H,E				
Epiphans senta					E				
Euchlanis dilatata					E	S			H
Philodinavus paradoxus				S	H,S	H			
Platuias quadricornis	H				H.S			H	

Ploesoma sp.			H	S	E	E			
Polyarthra ramata									H
Gastropus stylifer				S	E	E	S		
Keratella cochleeris						S	E		E
Keratella sp.					H,S	E		E	E
Keratella hiemalis	S	S	H,S	H	E	S	E	E	
Keratella valga				S					
Keratella quadrata	H	H		S,E	H,S,E	S,E	H,E	H,S,E	E
Keratella tropica	H	H	H		H,S,E	E	E	E	E
Lecane sp.				E					H,S
Lecane elasme		H,S							
Lecane depressa	H,S	H,S	H,S	H,S,E					
Lecane luna	H,S	H,S	H,S	H,S	H,S,E	S,E	H,S,E	H,S,E	H,S,E
Lecane ohioensis	H,S	H	H,S	H,S,E	E	E	H,S,E	H,S,E	H,S
Lepadella ovalis	H,S	H,S	H,S	H,S,E	H,S,E	S,E	H,S,E	H,S	H,S,E
Lepadella patella	H,S	H,S	H,S	H,S	H	E	E	S	
Macrochaetus subquadratus				E	E				
Manfredium eudactylotum	H		H	H	H		H		H
Monostyla bulla	H,S	H,S	H	H,S,E	H,S,E	S,E	H,S	H,S	H,S,E
Monostyla closterocerca	H,S	H,S	H,S	H,S,E	H,S,E	S,E	H,S,E	H,S,E	H,S,E
Monostyla lunaris	H,S	H,S	H,S	H,S,E			S	H,S,E	H,S
Monostyla quadridentata		H,S	H	S			H,S	S	H,S
Mytilina mucronata				H,S	E		H		H,S
Mytilina ventralis							S,	H,S	H,S,E
Notholca acuminata				H	E	E	H,E	E	H
Notholca squamula				H,S,E	H,S,E	S,E	S,E	S,E	
Scaridium longicaudum			H	S	E				H
Squatinella mutica			H	H,S,E	H,S	S	S	S	H,E
Testudinella patina			H	H,S		S	H,S,	H,S,E	H,E
Trichocerca longiseta				H	H	E			
Trichocerca porcellus				H					
Trichocerca cylindrica				H,S	H,S		H,S	H,S,E	H,S,E
Trichtaria tetractis	H	H		H,S,E	H,S,E	S,E	H,S,E	H,S,E	H,S,E
Trichtaria pocillum	H	H		H,S,E	H,S,E				
Vanoyella globosa	S		H	H	E,S			H	H
CLADOCERA									

Alona sp.	H,S	H	H,S	H	S,E	E	H,S,E	H,S,E	H
Alona affinis	H	H				S			H
Alona karua	S	H	H	H,S	H			E	
Alonella sp.						S,E	S	S,E	
Camptocercus oklahomensis				S	S			H	
Camptocercus rectirostris	H	H	H		E				
Ceriodaphnia sp.									E
Ceriodaphnia lacustris									S
Ceriodaphnia laticaudata						E		H	
Ceriodaphnia reticulata								H	E
Chydorus sp.	H				E				
Chydorus piger									E
Chydorus sphaericus	H					S		H,S,E	H,E
Chydorus gibbus								S	
Chydorus ovalis			S		H	E		E	
Daphnia sp.	H,S	H,S	S			S,E	H,S,E	H,S,E	H,S,E
Daphnia pulex	H		S		H				
Macrothrix sp.							H		
Bosmina caregoni					H				
Bosmina longirostris				S	H,S	S	S	S	
Pleuroxus sp.								H	H
Scapholeberis kingi	H						H,S	H	
Simocephalus vetulus			S	E			S	H	
Simocephalus exspinosus			H	E			S		E
COPEPODA									
Cyclops sp.	H,S	H	H,S	H,S,E	H,S,E	S,E	H,S,E	H,S,E	H,S,E
Eucyclops agilis			S	E	E				
Eucyclops sp.	H	H	H,S	H,S,E	H,S,E	S,E	H,S,E	H,S,E	H,S,E
Paracyclops funpriatus	S		S						
FREE NEMATODS	H,S	H,S	H,S	H,S,E	H,S,E	S,E	H,S,E	H,S,E	H,S,E
OSTRACODA	H,S	H,S	S					H,S	E
DIPTERA	H,S	H	H,S	H,S,E	H,S,E	S,E	H,S,E	H,S,E	H
HARPACTICOIDA	S		S	E	H,E		H	E	
ACARI				S,E					H,S,E
CALANOIDA	S	S	S						

(H) Huwayzah, (S) Suq – Shuyukh, (E) East - Hammar

Eighty seven species of zooplankton were recognized, fifty three belong to Rotifera, followed by Cladocera contain twenty four species. Four Copepoda species .six other species belong to Insect, Ostercoda and Nematoda, table (2).

The genus *Keratella* belong Rotifera, this genus was recorded by most previous authors. Genera like *polyarthra, Mytilina, Scaridium* and *Vanoyella* were recorded before in southern marshes.

Genera *Bosmina* and *Chydorus* belong to Copepoda were recorded by most previous studies, whil genus *Alona* was not recorded previously in the inland waters of Iraq. Genus *Cyclops* was recorded by most previous authore, while *Eucyclops* was recorded by one author only, table (3).

Table (2) Comparison of number of Zooplankton species recorded in the restored Southern marshes and other pervious studies in Iraqi in land water bodies.

	Number of Species				
	Rotifera	**Cladocera**	**Copepoda**	**Others**	**Total**
Al-Saboonchi, *et al.* (1986)	13	-	-	-	13
Al-Laami, *et al*.(1996)	62	-	-	-	62
Al-Laami, *et al*. (1998)	70	16	13	-	99
Ali, *et al.* (2000)	60	20	-	-	80
Nashaat (2001)	50	13	7	4	74
Ali, *et al.* (2001)	-	25	-	-	25
Muften (2002)	42	12	13	2	69
Present study (2004-2005)	53	24	4	6	87

Table (3) Zooplankton species recorded in the restored southern marshes (Huwayzah Suq-Shuyukh and East – Hammar) and other Iraqi in land water bodies

Species							
Rotefra							
Asplonchnopus myrmeleo			**L.E**				**Z.E**
Brachionus angulars	**N**	**L**	**L.E**	**S**		**F**	**Z.E**
Brachionus calyciflorus	**N**	**L**	**L.E**	**S**		**F**	**Z.E**
Brachionus quadridentatus	**N**	**L**	**L.E**	**S**		**F**	**Z.E**
Brachionus urceolaris	**N**	**L**	**L.E**	**S**		**F**	
Cephalodella auriculata		**L**	**L.E**			**F**	
Cephalodella exigua							
Cephalodella mucronata						**F**	
Colurella adriatica	**N**	**L**	**L.E**			**F**	
Colurella bicuspidata		**L**					**Z.E**
Colurella obtusa	**N**	**L**					**Z.E**
Diplois sp.							**Z.E**
Dipleuchlanis propatula			**L.E**				
Epiphans sp.		**L**	**L.E**				**Z.E**
Epiphans senta							**Z.E**
Euchlanis dilatata	**N**	**L**	**L.E**			**F**	**Z.E**
Philodinavus paradoxus		**L**	**L.E**				
Platuias quadricornis				**S**			
Ploesoma sp.		**L**					
Polyarthra ramata							
Gastropus stylifer							**Z.E**
Keratella cochleeris	**N**	**L**	**L.E**	**S**		**F**	**Z.E**
Keratella sp.						**F**	**Z.E**
Keratella hiemalis	**N**	**L**				**F**	**Z.E**
Keratella valga	**N**	**L**	**L.E**			**F**	**Z.E**
Keratella quadrata	**N**	**L**	**L.E**	**S**	**Z**	**F**	**Z.E**
Keratella tropica	**N**			**S**			
Lecane sp.	**N**	**L**			**Z**		**Z.E**
Lecane elasme	**N**	**L**	**L.E**			**F**	
Lecane depressa		**L**					
Lecane luna	**N**	**L**	**L.E**		**Z**	**F**	**Z.E**
Lecane ohioensis		**L**	**L.E**			**F**	**Z.E**

Lepadella ovalis	**N**	**L**	**L.E**		**Z**	**F**	
Lepadella patella		**L**	**L.E**		**Z**		**Z.E**
Macrochaetus subquadratus	**N**		**L.E**				
Manfredium eudactylotum		**L**	**L.E**				
Monostyla bulla	**N**	**L**	**L.E**			**F**	**Z.E**
Monostyla closterocerca	**N**	**L**	**L.E**			**F**	**Z.E**
Monostyla lunaris	**N**	**L**	**L.E**				**Z.E**
Monostyla quadridentata	**N**		**L.E**				
Mytilina mucronata							
Mytilina ventralis							
Notholca acuminata	**N**	**L**	**L.E**	**S**	**Z**		**Z.E**
Notholca squamula	**N**	**L**	**L.E**	**S**		**F**	**Z.E**
Scaridium longicaudum							
Squatinella mutica			**L.E**				
Testudinella patina		**L**	**L.E**				**Z.E**
Trichocerca longiseta	**N**	**L**					
Trichocerca porcellus		**L**	**L.E**				
Trichocerca cylindrica		**L**	**L.E**			**F**	
Trichtaria tetractis	**N**	**L**	**L.E**			**F**	**Z.E**
Trichtaria pocillum	**N**			**S**			
Vanoyella globosa							
CLADOCERA							
Alona sp.							**Z.E**
Alona affinis							
Alona karua							
Alonella sp.							
Camptocercus oklahomensis							
Camptocercus rectirostris					**Z**		
Ceriodaphnia sp.					**Z**		**Z.E**
Ceriodaphnia lacustris							
Ceriodaphnia laticaudata							
Ceriodaphnia reticulata	**N**	**L**			**Z**		**Z.E**
Chydorus sp.					**Z**		**Z.E**
Chydorus piger							
Chydorus sphaericus	**N**	**L**			**Z**	**F**	**Z.E**
Chydorus gibbus							

Chydorus ovalis			**Z**		
Daphnia sp.	**N**	**L**		**F**	
Daphnia pulex					
Macrothrix sp.		**L**	**Z**	**F**	
Bosmina caregoni			**Z**		**Z.E**
Bosmina longirostris	**N**	**L**	**Z**	**F**	**Z.E**
Pleuroxus sp.			**Z**		
Scapholeberis kingi	**N**	**L**			
Simocephalus vetulus	**N**				
Simocephalus exspinosus			**Z**		**Z.E**
COPEPODA					
Cyclops sp.	**N**	**L**		**F**	
Eucyclops agilis		**L**		**F**	
Eucyclops sp.		**L**			
Paracyclops funpriatus		**L**		**F**	
FREE NEMATODS		**L**			
OSTRACODA					
DIPTERA					
HARPACTICOIDA					
ACARI					
CALANOIDA		**L**	**Z**	**F**	

(S) Al-Saboonchi, *et al*. (1986) **(L.E) Al-Laami, *et al*. (1996)**

(L) Al-Laami, *et al*. (1998) **(Z.E) Ali, *et al*. (2000)**

(N) Nashaat, (2001) **(Z) Ali, (2001)** **(F) Muften, (2002)**

4-Discussion

There were a big deference's in total numbers of Zooplankton individuals at the monitor stations especially those of open water stations (Um Alnnaj and Burkah) .

Rotifera was the dominant group in all studied stations followed by Copepoda and then Cladocera, the same was recorded in previous studies In Iraq inland water including the marshes, like Al-Saboonchi *et al*., (1986); Sabri, (1988); Alami *et al.*, (1996) and (1998) and Nasha't (2001).

There was a seasonal changes in the density of zooplankton (Ind./m3) during Spring with peak in April 2005 (Um Alnaaj) while the lowest in September in Alamia station this could be due to the Phytoplankton increase in Spring and Autumn and decrease in Summer and winter as showed previously by Al-Zubaidy (1988) and in agreement with Ajeel (1998), found the peaks in

March and April and also in agreement with Mangol and Akbar (1986a, b, c).

The present survey indicated that more Rotifera species existed in the restored marshes than previously reported by Al-Saboonchi, *et al.* (1986) in Garma marshes. The number of species recorded in historical studies, Sabri *et al*. 1988 recorded sixty species of Rotifera and in second study (Sabri *et al*.1993) identified fifty seven Rotifera and twenty five Cladocera, while Al-Laami (1998) recorded 70 species of Rotifera and Ali *et al*. (2000) revealed occurrence 60 species of Rotifera, and in the present study the number was 53 species.

Present study revealed higher number of Cladocera (24 species) than previously recorded (Al-Laami *et al*. 1998; Ali *et al*. 2000; Nashaat, 2001; & Muften, 2002, while Ali *et al*. (2001) recorded 25 species of Cladocera.

In general the total number of zooplankton recorded in this study was 87 species and came in the second rank after Al-Laami *et al*. (1998), Ali *et al*. (2000) recorded total number nearest to our study (80) species, while Al-Saboonchi, *et al.* (1986) was recorded the lowest number of zooplankton.

The percentage of Rotifera species to other species groups of zooplankton in this study was 60.9 %, it was similar to Muften (2002) and agreed whit Al-Laami *et al*. (1996) while Al-Saboonchi, *et al.* (1986) was recorded 100 %, and Ali (2001) neither recorded any species belonged to Rotifera.

Genera like *Keratella, Lecane, Brachions* and *Monostyla* were recorded in previous studies in Tigris river and other Iraqi inland waters (Al-Sabonachi *et al*. 1986; Mongalo and Akbar, 1986a,b,c; Monogalo and Akber, 1988; Sabri, 1988; Sabri *et al*. 1988 and 1993; Abdual – Hussein, *et al*. 1989; Al–Lami, *et al*. 1996 and 1998).

Comparing the density (ind./m3) of Zooplankton obtained in this study and previous record table(4), they came within the range of previous study. (Ajeel ,1998 ; Mangalo & Akber , 1998 ; Al-Zubaidy,1998).

We could conclude that restoration is taking place through the seasonal changes in Zooplankton density, interaction with phytoplankton, temperature. Groups of Zooplankton were the same as recorded previously, even the number of individual recorded were with in the range of monitored program.

Table(4):comparison of Total number ind/m3 between present study and historical data about the southern marshes.

Total Number ind./m3	Location of study	References
45291	Qarmat Ali(hm*)	Ajeel (1998)
65320	Al-maqal(sar**)	
27670	Al-Fao (sar**)	Al-Zubaidy(1998)
13438	Al-seeba (sar **)	
38890	Hammar marsh	Al-Garooni (2005)
184890	Fahood marsh	
139670	Chebiesh marsh	
94310	Suq Al-Shuyukh	Present study 2004-2005
193160	Al-Huwayzah	
120060	East Hammar	

*lower reach of Hammer marsh, **Shatt Al Arab river

5-References

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دراسة كمية ونوعية للهائمات الحيوانية في الأهوار المعادة في جنوب العراق

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الخلاصة

تركيب الهائمات الحيوانية في الأهوار المعادة إليها المياه يعود إلى الدولابيات ومجذافية الأقدام ومتفرعة اللوامس والديدان الخيطية حرة المعيشة.لوحظت التغيرات الشهرية في كثافات هذه المجاميع، سجلت أعلى كثافة عند درجات حرارة تراوحت بين 10- 20 درجة مئوية وملوحة بين 1.5 – 2 جزء بالألف. لوحظت التغيرات الفصلية بين مجتمع الهائمات الحيوانية الهائمات النباتية.

ظهر تواجد 87 نوعاً من الهائمات الحيوانية وهي تتضمن 53 نوعاً من الدولابيات و24 نوعاً من متفرعة اللوامس وأربعة أنواع من مجذافية الأقدام وستة أنواع أخرى تعود لكل من الحشرات والدرعيات والديدان الخيطية الحرة المعيشة. احتوت الدولابيات على أنواع أكثر من المجاميع الأخرى وفي كل المحطات التي مسحت.