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Occurrence and Seasonal Variations of phytoplankton in the Restored Marshes of Southern Iraq

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Abstract

The phytoplankton community in six stations of three restored marshes in Southern Iraq, was studied (Um Alnaaj, Taraba, Amia, Wineas, Burkah, and Saddah) during the period from summer 2004 to spring 2005.We recognized 85,89 and 64 species in Huwayzah,Suq Shuyukh and East Hammar Marshes respectively.

A total of 130 taxa were identified, and the dominated were diatoms (56%), chlorophyta (23%) and cyanophyta (17%) . The recovery index was 65.89%, 68.99%, 46.51% in Huwayzah, Suq Shuyukh and East Hammar Marshes respectively. The species *Spirogyra ionia* (Chlorophyta) is a new record in Iraq which appeared in Huwayzah Marsh only.

Keywords: phytoplankton, marsh, Iraq

1-Introduction

Phytoplankton are the main primary producers of food chain in many aquatic ecosystems. Phytoplankton provide the aquatic ecosystems with oxygen by photosynthesis process (Jassim, 1999). Phytoplankton cover a vast range of sizes and forms , both as single cells and colonies. Generally, cells or colonies with a maximum linear dimension less than 2 *µm* are considered to be picoplankton. Those which are greater than 30 *µm* in length are considered net plankton or micro plankton. Cells and colonies between these two extremes are nanoplankton. Individual cell and colonies may possess flagella and be motile or tack flagella and be no motile.

Some studies were carried out on phytoplankton in Southern Iraqi Marshes. Pankow *et al*., (1979) studied phytoplankton at Baghdad Burkah, Chibaish Marshes .Maulood *et al*., (1981) reported that diatoms dominated the phytoplankton assemblage stated in Southern Marshes Waters. Islam (1982) studied phytoplankton in Hammar Marsh.

Hinton and Maulood (1982) recorded 101 taxa of phytoplankton belonging to different groups of non-diatoms in some marshes near Tigris River. Al-Saboonchi *et al.*, (1982) recorded 63 genera related to five main groups of phyto-plankton in Garmah Marsh. Al-Zubaidi (1985) identified 196 species of phytoplankton, epipelic and epilethic in Qurna Marshes.

Moreover a number of studies conducted on the phytoplankton in Hammar Marsh (Al-Lami 1986; Al-Araj'y 1988 and Al-Saadi and Al-Lami 1992).

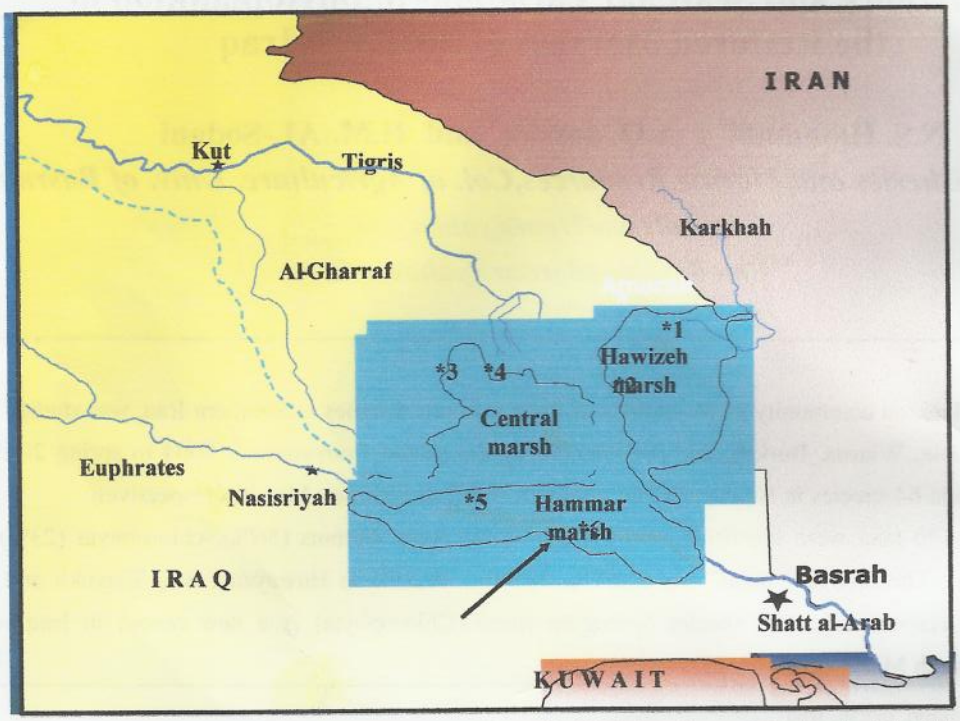


Fig.(1): The study stations (*1=U m Alnaaj, *2=Taraba, *3=Amia,*4=Wineas, *5=Burkah and *6=Saddah)

2-Materials and methods

Phytoplankton samples were collected using plankton net of 20 *μm* mesh size; haul behind a boat running at its lowest speed for 15 minutes, the samples were kept in plastic bottles with 4% formalin solution.The six stations of three restored marshes in Southern Iraq, were studied (Um Alnaaj, Taraba, Amia, Wineas, Burkah, and Saddah) during the period from summer 2004 to spring 2005.

The diatoms were cleaned according to Hickman and Klarer, (1974).The following taxonomic references were used to identify the genus and species of phytoplankton (Smith, 1950; Prescott, 1970; Al-Handal *et al.*, 1989; Hadi *et al.*, 1984).

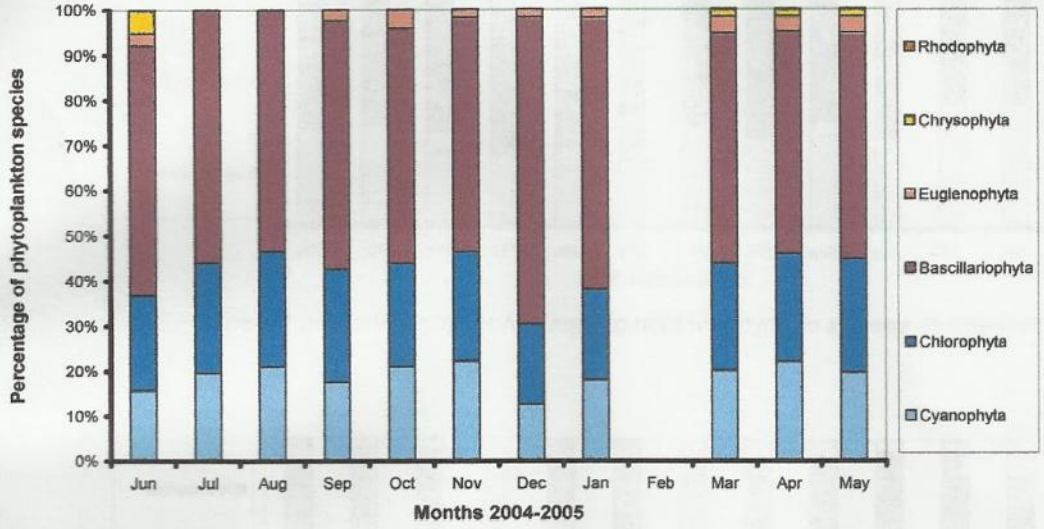
3-Results

A total of 130 taxa of phytoplankton were identified during this study, out of them 85,89 and 64 taxa were identified from Huwayzah,

Suq Shuyukh and East Hammar Marshes respectively.

The assemblage of phytoplankton was dominated by diatoms (Bascillariophyta), Chlorophyta and Cyanophyta. This is applicable for all studied stations with some differences in their compositions (Figs: 2,3,4,5,6,7). Species of diatoms were dominant and represented by52%, 55 % and 61 % respectively (Fig:8).

Spirogyra ionia (Chlorophyta) was newly recorded in Iraq and appeard in Huwayzah Marsh only. The genera were represented by *Nitzschia ,Navicula ,Fragiralira and Cymbella* showed. Some genera were occurred through out the collecting period, while other genera were according to species highest number of species occurred seasonally.



Fig(2):Percentage species of phytoplankton groups in Um Alnaaj (Huwayzah Marsh)

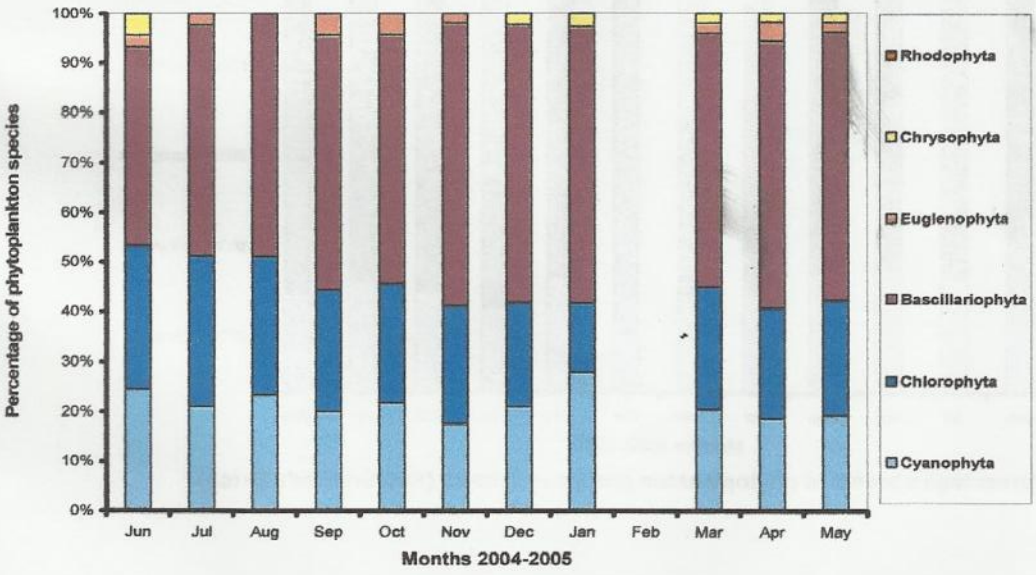
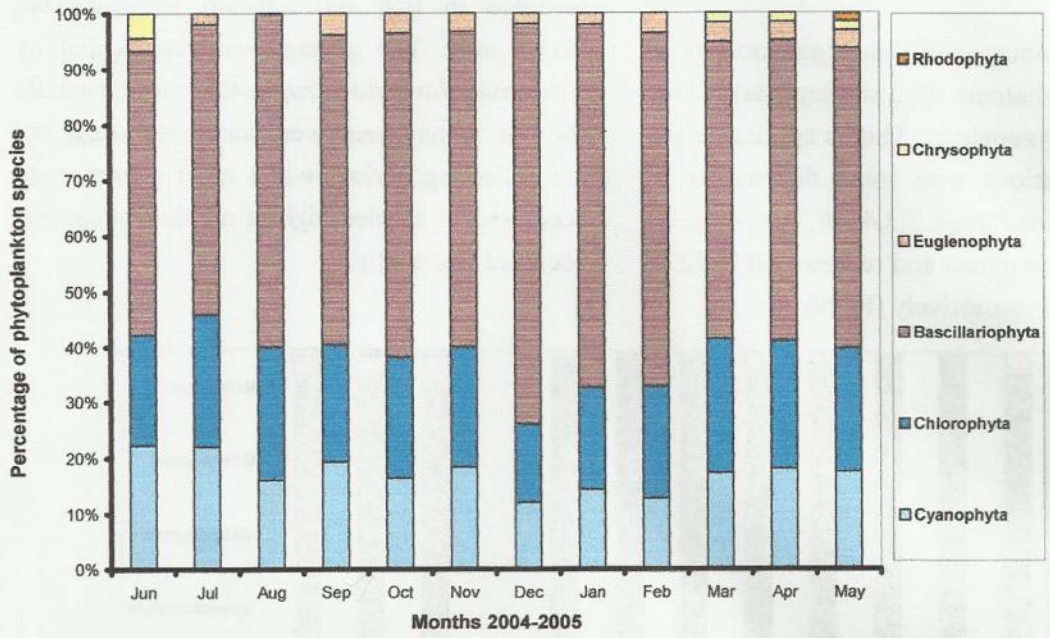
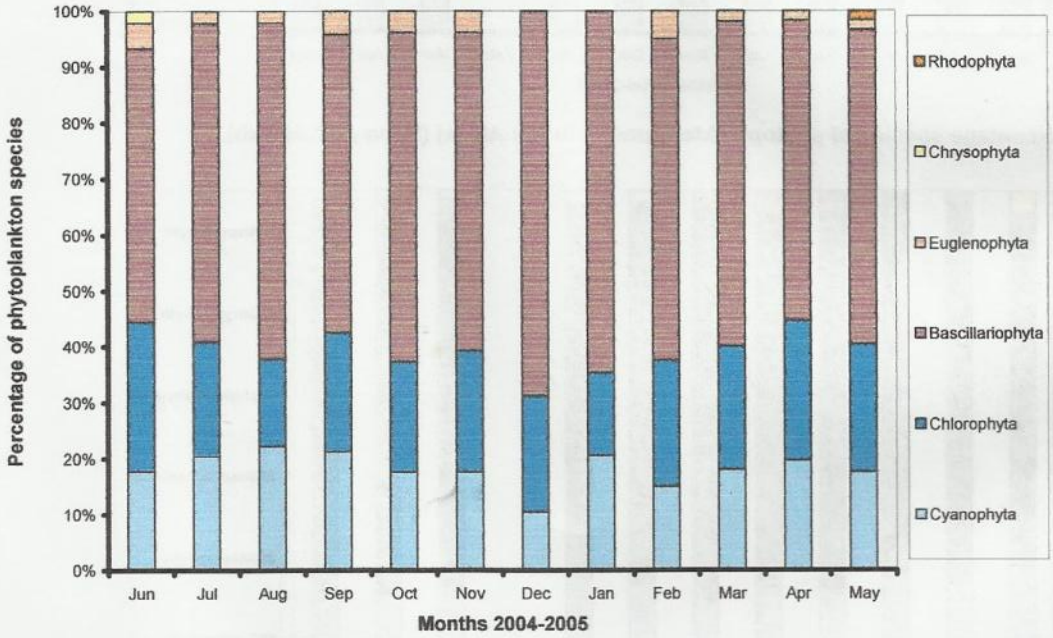


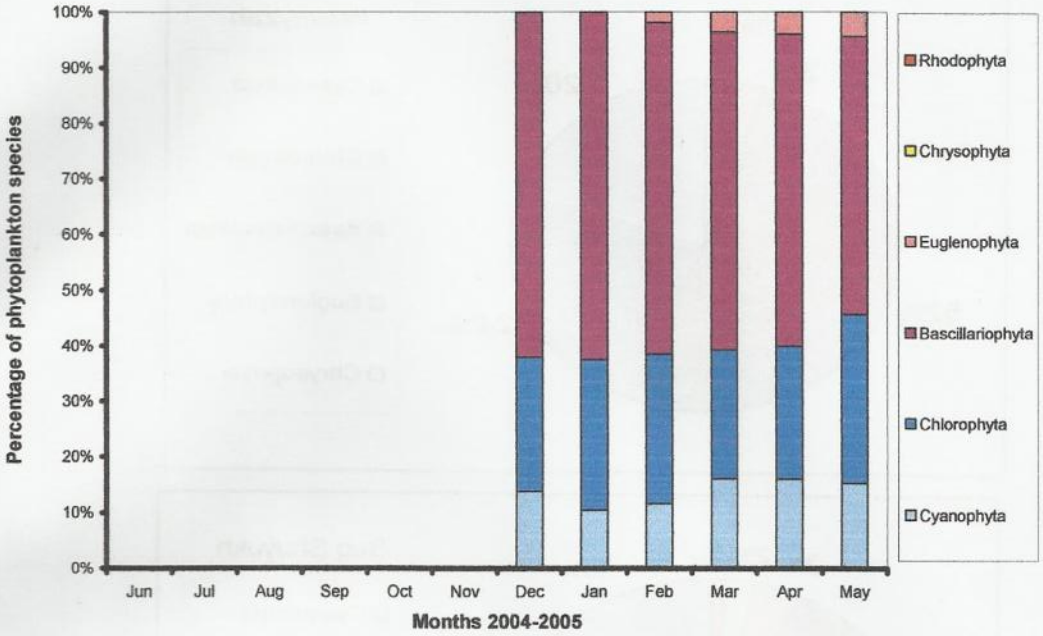
Fig (3):Percentage species of phytoplankton groups in Taraba (Huwayzah Marsh)



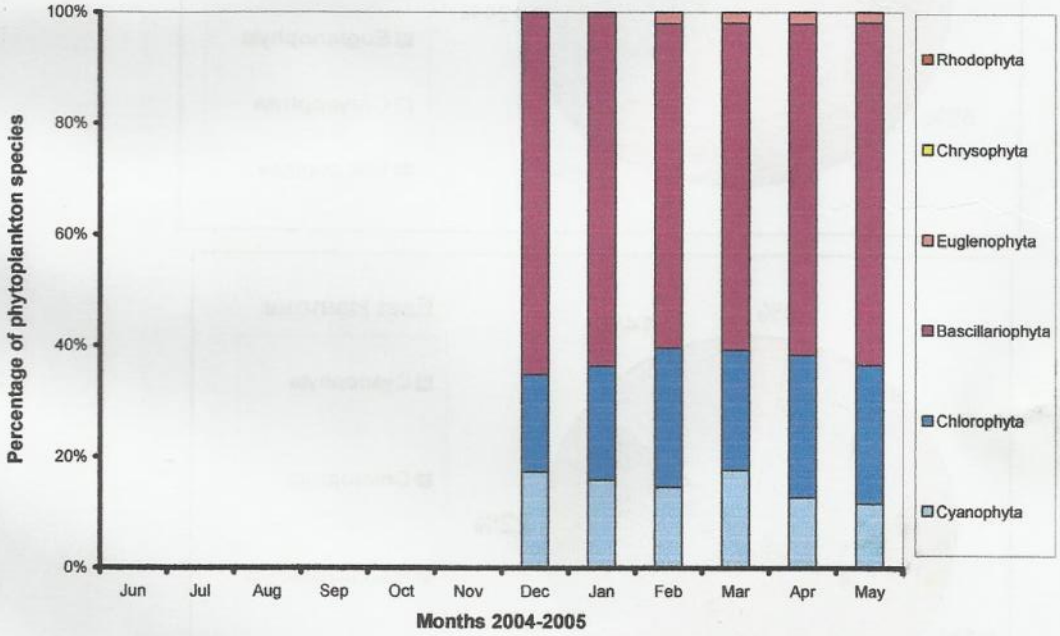
Fig(4):Percentage species of phytoplankton groups in Amia (Suq Shuyukh Marsh)



Fig(5): Percentage species of phytoplankton groups in Wineas (Suq Shuyukh Marsh)



Fig(6): Percentage species of phytoplankton groups in Burkah (East Hammar Marsh)



Fig(7): Percentage species of phytoplankton groups in Saddah (East Hammar Marsh)

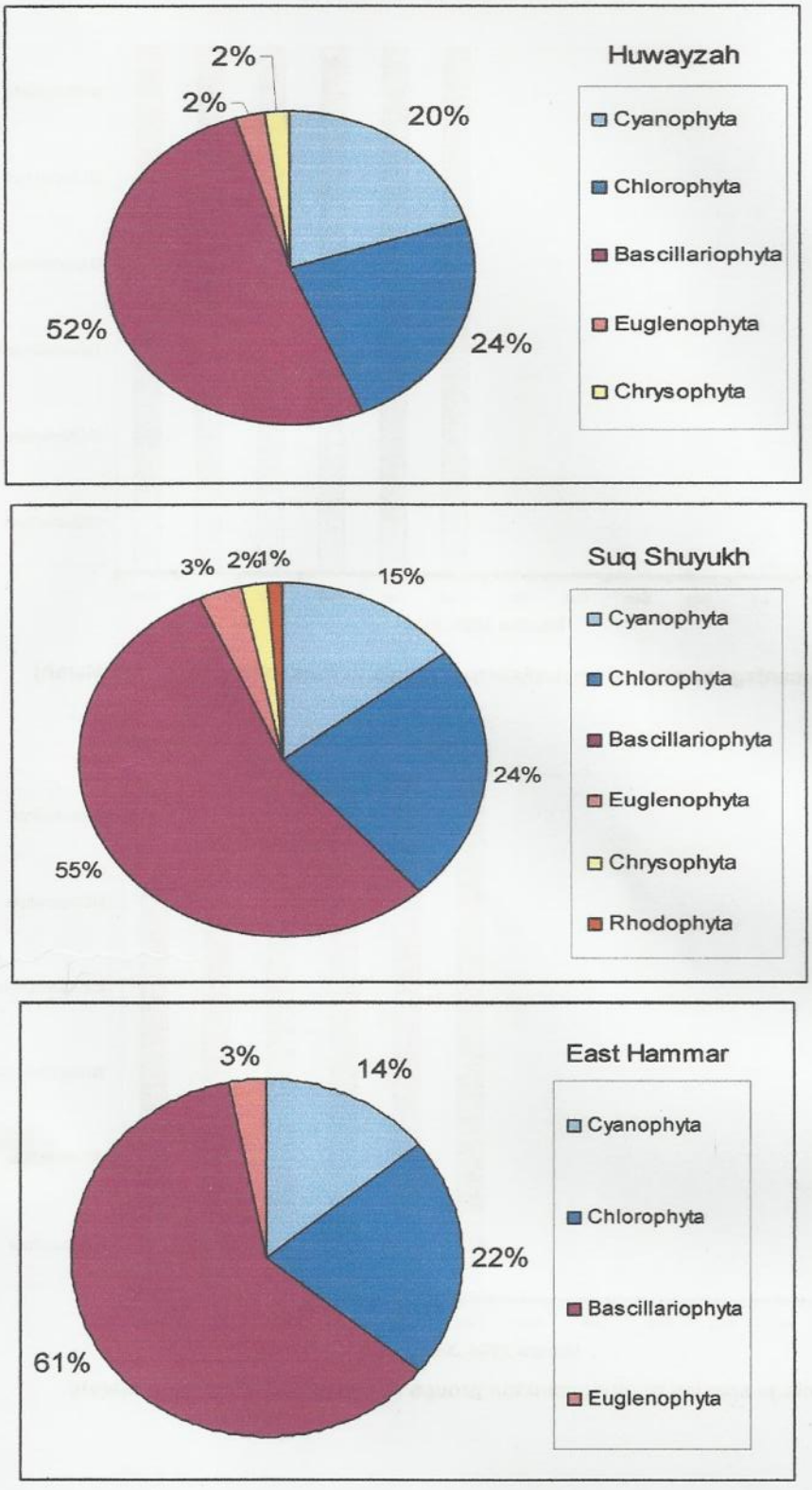


Fig. (8): Percentage of phytoplankton species in studied marshes

Table (1): Comparison of the recorded phytoplankton taxa in the present study and other previous studies.

Taxa	Present study	Maulood *et al.*, (1981)	Al-Saadi *et al.*, (1981)	Al-Lami (1986)	Al-Saadi and Al-Lami (1992)
Cyanophyta					
Anabaena affinis	H,S,E			E	
Aphanizomenon flos-aquae (L.)Ralfs	H				
Chroococcus dispersus	H,S				
Gloeotrichia natans	H				
Gleootrichia echinulata (Smith)Richter	S				
Gomphosphaeria aponina Ktz.	H,S	E			E
Lyngbya aerugineo-coerulea	H,S,E				
Merismopedia glauca	H,S,E		E		E
Microcoleus laustris	S				
Nodularia paludosum	S,E	E			
Nostoc paludosum.	H				
Oscillatoria agardhii	H				
O. angusta	S,E				
O. limosa	H,S,E	E			
O.tenuis	H,S,E				
Phormidium retzii	H,S				
Rivularia globiceps	H				
Spirulina major Ktz.	H,S				E
S.princes (W and W)West	H,E				
S.supsalsa	S,E				
Chlorophyta					
Actinastrum angustus	S				
A. grasillinum	H				
Chlorella vulgaris	H,S,E				
Cladophora fracta	H,S	E			
Closterium depressum	S				
C.lunula	E				
C.parvulum	H				
Coelastrum microsporum	H,S,E	E			
Cosmarium cucumis	H,E				
Cylindrocapsa geminella Wolle	H				
Micractinum pusillum	E				
Microspora floccosa	H,S,E				
Mougoetia viridis.	H				
Oedogonium cripsum	H,S,E				
Pandorina morum	S			E	E
Pediastrum duplix	H		E		
Rhizoclonium crassipellitum	H,S,E				
Scenedesmus armatus	H,S		E	E	E
S. bijuga	H,S,E		E	E	E
S. dimorphus var. longspina	H,S			E	E
S. quadricauda	H,E	E		E	E
Sphaerocystis plactonica	S				

Taxa	Present study	Maulood *et al.*, (1981)	Al-Saadi *et al.*, (1981)	Al-Lami (1986)	Al-Saadi and Al-Lami (1992)
Spirogyra affinis	H,S,E				
S.subsalina	S				
*S. ionia**	H				
Volvox africanus	S				E
Ulothrix tenerrima	S,E				
U. variabilis.	H,S,E				
Euglenophyta					
Euglena acus	S,E			E	
E. elasica	H				
Phacus pleuronectus	H,S,E				
Trachelomonas crebea	S				
Chrysophyta					
Dinobryon sertularia Ehr	H	E	E		
D.stipitatum	H				
Synura urella Ehr	S				
Vaucheria geminata	S				
Rhodophyta					
Compsopogon coeruleus (Balb.)Mont.	S	E			
Bacillariophyta					
Achnanthes inflata	H,E				
Achnanthes lanceolata	S			E	E
Amphiprora alata	H,S,E			E	
Amphiprora plndosa	S,E				
Amphora ovalis	S,E				
Bacillaria paradoxa	H,S,E	E		E	
B. paxillifer	H,E				E
Campylodiscus noricus	S				
Cocconeis placentula Ehr	H,E				
C. placentula var.euglypta	H,S,E	E		E	E
C.Pediculus Ehr	H				
Cyclotella meneghiniana Ktz.	H,S,E	E		E	E
C. pseudostelligera	H				
Cylindrotneca gracilis	S				
Cymbella affinis	H,S,E				
C. cistula	H,S,E				
C. prostrata	E				
C.turgida	H				
C. ventricosa	S				
Diatoma vulgare	H,S,E				
Epithema Argus (Ehr) Ktz.	E				
E. sorex Ktz.	H,S			E	E
E. Zebra (Ehr)Ktz.	S			E	E
Fragilaria argus	S				
Fragilaria capucina	H,E			E	E

Taxa	Present study	Maulood *et al.*, (1981)	Al-Saadi *et al.*, (1981)	Al-Lami (1986)	Al-Saadi and Al-Lami (1992)
F. crotonensis	H,S,E				
F. pinnata	S			S	E
F. pirescens var. capitata	H				
F. vaucheriae	H				
Gomphonema acuminatum	E				
G. constrictum	H,S,E				
G. olivaceum (Lyng.)Ktz.	H,S,E				
G. Vibrio Ehr	S				
Gyrosigma fasciola	H,S				
G. attenuatum	S				
Mastogloia braunii	S			E	E
Mastogloia grevillei	S				
Melosira varians	H,S,E				
Navicula cryptocephala	H,S,E			E	E
N.cuspidata	H,S,E				
N. mutica	H,S,E				
N. parva	H,S,E			E	E
N. placetula	H,S,E				
N.pygmaea	S				
N. spicula	H			E	E
Nitzschia aciclaris	S,E			E	E
N. (Nitzschiellae) aciclaris	S				
N. amphibia	H	E		E	E
N.fasciolata	S,E				
N. longissima	H,E			E	E
N.obtusa	H,S,E				
N. palea	H,S,E			E	E
N. philipinarum	H				
N. punctata var.coarctata	S			E	
N.sigma	S			E	E
Pinnularia viridis	H,S				
Pleursigma delicatulum	H,S,E			E	E
Rhoicosphenia curvata	H,S,E			E	E
Rhopalodia gibba	H,S,E	E			E
R. gibba var.ventricosa	H,E			E	
R. rhopala	E				
Surirella biseriata	H				
Surirella robusta	S				
S. ovata	H				
Synedra capitata	H,S,E	E			
S. fasciolculata	S,E			E	E
S. ulna	H,S,E	E		E	E
Tabellaria fenestrate (Lyng.)Ktz.	H,S,E				

Note: H=Huwayzah Marsh S=Suq shuyukh Marsh E= East Hammar Marsh * = New record

Table (2): Comparison between the number of species reported in the present study and the historical data by other studies

Number of species	Location of study	References
68	Hammar marsh:Abu Suban; Burkat Baghdad;Ashar; Um Al-Schwaich;Um Al-jary and Hor Soraifa.	Maulood *et al.*, (1981)
-	Some marshes near Qurna.	Al-Zubaidi (1985)
113	Southern part of Hammar marsh: Hor Al-Barka; Hareer and Um Al-Houali.	Al-Lami (1986)
-	Southern part of Hammar marsh: Hor Al-Barka; East of Chibaish and others.	Al-A'argy (1988)
129	Marshes near Qurna	Pankow *et al.*,(1979)
178	Brakish water of southern Iraq	Hinton and Maulood(1982)
149	Samarra Reservoir	Al-Lami *et al.*,(1996)
126	Al-Qadisia	Kassim *etal.*,(1999)
169	Overes of Tigris and Euphrates rivers	AL-Saadi *et al* ., (1999)
103	Southern part of Hammar marsh	Al-Saadi and Al-Lami (1992)
85	AlHuwayzah marsh: Um Alnaaj and Taraba	Present study
89	Suq Al-Shuyukh marsh: Alamia and Alwineas	Present study
64	East Hammar: Burkah and Saddah	Present study

Discussion

Number of species of phytoplankton in Suq Al- Shuyukh was higher than in Huwayzah and East Hammar, which indicated that it was not stagnant population, but diverse one, this was a vital step in restoration process. Wetzel (1983) and Al-Lami *et al.*, (1998) postulated that the water had less nutrient content and relatively deeper which may introduce better environment to the algal diversity, but disturbance in Suq Al-Shuyukh has led to increase in number of species in Suq Al- Shuyukh more than other monitored marshes (Table 2).

Diatoms were dominat in species group constituted formally 52%, 55 % and 61 % in Huwayzah, Suq Al-Shuyukh and East Hammar marshes respectively. The dominance of the diatoms in the present monitor program is well know for Iraqi inland waters (Al-Zubaidi , 1985 ; Al-Mousawi *et al.* , 1990 ; Al-Mousawi , 1992 ; Maulood *et al.* , 1993 ; Kassim *et al.* , 1999 ; Al-Saadi *et al.* , 1996 , 2000 ; Al-Lami *et al.* , 1996 , 1998 , 2000 ; Al-Zubaidi *et al.*,2006).

Dominance of diatoms was clear indication that restored marshes were similar to the previous one. Comparison with historical data of

previous studies revealed that the current number of species is lower (Table2).

More than 21.69% of species identified totally in the study area belong to the genera *Nitzschia* (10species), *Navicula* (7species), *Cymbella* (5species), *Oscillatoria* (4species), *Fragilaria* (6species) and *Scenedesmus* (3species). The importance of these genera in Iraqi Waters was illustrated (Al-Saadi *et al.* , 1996, 2000;Kassim *et al.*,2006).

Depending on Maulood *et al.*,(1993). The species *Spirogyra ionia* (Chlorophyta) is a new record in Iraq ,appeard in Huwayzah Marsh only.The present of *Amphora ovalis* and *Cocconeis placentola* Var. *euglypta* in the present study may indicate that water is not organically polluted, depending on Palmer tables (Al-Saboonchi, 1998). Also the presence of some species in studied stations in very low densities which are given as bioindicator for organically enriched area by (Palmar tables) may support the previous conclusion that the studied area is almost clean (not organically polluted). These species are *Scenedesmus quadricauda, Diatoma vulgare and Surirella ovata* (*Al*-Saadi *et al.*, 2001).

Cyclotella Meneghiana was found in low densities in the present study, which may indicate that the studied area is not organically polluted (Al-Saadi *et al.*, 1979).

The relative scarcity of Rhodophyta algae in the plankton of the marshes commented on by last historical studies, can also be considered a feature of the Iraqi Marshes.

Acknowledgement

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التواجد والتغيرات الفصلية للهائمات النباتية في الاهوار المعادة جنوب العراق

نعيم شند حمادي ، عادل قاسم جاسم ، حبيب محسن السوداني
قسم الأسماك والثروة البحرية- كلية الزراعة- جامعة البصرة

الخلاصة

درست تجمعات الهائمات النباتية في ثلاثة اهوار معاد تأهيلها جنوب العراق(الحويزة ، سوق الشيوخ ، شرق الحمّار) ، إذ حددت ستة محطات (أم النعاج ، الترابة ، العمية ، آل ونيس ، البركة ، السدة) . وجمعت العينات شهريا للفترة من حزيران 2004 ولغاية مايس 2005 .تم تسجيل 130 نوع من الهائمات النباتية ومن ضمنها النوع *Spirogyra ionia* والذي سجل لأول مرة في العراق في (هور الحويزة).وبلغ عدد الأنواع المسجلة 64،89،85 في اهوار الحويزة ، سوق الشيوخ و شرق الحمّار على التوالي.سادت مجموعة الدايتومات بنسبة 56% على بقية المجاميع ، تلتها الطحالب الخضر بنسبة 23% وثم الخضر المزرقة 17%. بلغت قيمة دليل الاسترجاع 65.89% ، 68.19% ، 46.51% في الحويزة وسوق الشيوخ ، شرق الحمّار على التوالي.