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Past and present status of the aquatic plants of the marshlands of Iraq

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Abstract

Inventory and distribution of the aquatic plants historically recorded in the marshlands of Iraq were presented. More than hundred species of aquatic and amphibian plants have originally been recorded in the marshes of Iraq and less than 50% of this were recently recollected in 2004-2005. Several important aquatic plants such as the characteristic water lilies (Goaiba in Arabic) *Nymphoides indica* and *N. peltata* , the insectivorous *Utricularia australis* and the Arrowhead *Sagittaria sagitifolia* are seem to be disappeared. Until know sixteen obligate hydrophytes are not found. Two exotic species, *Tamarix ramosissima* and *T. brachystichas* invaded the area.

Eight main types of aquatic vegetation were been identified and described, of which Hydrilla community was a new type for Iraq. The present status of plant diversity and communities of the Iraqi marshes was compared with that mentioned in the past.

1-Introduction

The marshes of Iraq are considered as the largest ecosystem in the middle East and Western Eurasia (Maltby 1944, UNEP 2001, Nicholson and Clark 2003, Hussain and Ali 2006) ; They lie in the triangle between Amara, Basrah and Thiqar, in the Lower part of the Mesopotamia with a maximum length 210km south-north and 170km east-west (Al-Khatab 1967). Physiographically , they include two districts of the Lower Mesopotamian Region , the southern marsh District (LSM) and the Basrah Estuarine District (LBA) (Guest 1966). However their boundaries can not precisely be defined . The majority of the permanent marshes lie in the LSM through which the lower reaches and distributaries of the Tigris and Euphrates flow. The Iraqi marshlands (often called Alahwar) divided into three major marshes :

1- The Eastern marshes, or Hawaiza marshes situated east of Tigris (S.E. Amara) extending towards the Iraqi-Iranian boarder, received input mainly from Tigris and partially from karon inside Iran.

2- The Central marshes , or Zechri marshes are located between Tigris and Euphrates, approximately between Qurna, Qalat-Salih and Thiqar, it receive water from Tigris .

3- The southern marshes , or Hammar marshes, are situated south of Euphrates stretching west north west from outskirts of Basrah to near Suq ash-Shiyukh, they receive water from Euphrates and connected to the Gulf through Shatt-Arab.

In addition to the above mentioned marshes, there are several other marshes lie outside the LSM and LBA districts such as Al-Ghomoga marsh which is located to the south east of Al-Shatra, and Sanyia and Saeidya marshes in Kumet and Ali-Al-Ggarbi (north Amara) respectively.

Plants are the most important element in the biosphere because , they are the primary source of energy and therefore they are the basis of all life on land, in fresh water and in the oceans. Aquatic plants sustain life by providing food (for human, birds animals, and fish), oxygen, shulter , nursery and spawining grounds and feeding areas for many fishes and invertebrates. They also contain chemical combinations and can be used as important indicators for invironmental changes and in phytoremediation as invironmental sound technologies (Rae and Langram, 1999 ; UNEP, 2004). To destroy such an essential resource and habitat appears to be madness . However, in the past three decades over 90% of the Mesopotamian marshes (Garden of Eden) have been desiccated by Sadam regime (Richardson *et al*., 2005). This tremendous catastrophe caused a great damage to the environment and wetland of Iraq, that is by destroying plants we also begin to damage major life support systems.

The reason for studying , restoring and protecting plants and habitat is that they form part of natural heritage from which new knowledge may be obtained. Aquatic plants have received much less attention from botanists than have land plants (Haslam, 1978).

Few papares have been published on the aquatic macrophytes of the wetlands of Iraq, of these are Al-Hilli, 1977 ; Al-Mayah, 1978 , 1994 and Al-Mayah, 1983 ; Al-Mayah and Al-Hamim, 1991 ; Al-Saadi (unpublished PhD thesis); Al-Rikaby, 1992 (unpublished MSc. Thesis); The work has been aimed, first to provide an inventory and distribution of the aquatic macrophytes originally recorded in the Iraqi marshlands and second to collect, identify and describe the re-established species and communities , in the recently reflooded areas of the marshlands of Iraq.

2- Materials and Methods

Inventory and distribution for the previously recorded plants were presented based on AI-Mayah, 1978 ; 1994 and Al-Saadi and AI-Mayah, 1984 , and on preserved herbarium materials deposited in the Iraqi Herbaria (BSRA). Basrah University Herbarium, (BUH). Baghdad University Herbarium and (BAG) the National Herbarium of Iraq.

Several trips to the recently reflooded marshes of Abo-Zereq, Al-Kirmatia, Hawizeh, Al-Hammar and Central marshes were achieved monthly or sometimes seasonally during the years 2004 and 2005. Plants were collected, identified, mounted and deposited In

Basrah University Herbarium (BSRA), Quadrate samples for biomass and cover determination for some key species of certain areas were taken.

3- Results

Inventory and distribution

A total of 104 aquatic and semi aquatic plants have historically been recorded in Iraq. Table (1) shows the diversity and habitat of these taxa it shows 96 vascular plants, of which 92 are flowering plants and 4 pteredophytes (Ferns). Details of distribution of these species are shown in Table 2 .

Table (3) shows a comparison in species richness between the main marshes before the catastrophe of drying and recently after partially reflooded in 2004-2005. The highest number of aquatic plant species historically recorded in the southern marshes was 44 species in central marshes and the lowest number of species was 23 in Al-Kirmatia. However the highest percent of recovery are 56.5% in kirmatia and 50% in central marshes while the lowest percent is 19 in Hewaizah. Table 4, shows detail of the aquatic plants collated in 2004-2005 from the marshlands of Iraq with their habitat and distribution, it indicate that only 27 species of typical aquatic plants were collected this represents only 29% of the total number of the previously recorded species in Iraq. Table (5) shows names of aquatic plants that have not appeared until now with their historical distribution. The table indicates that there are 23 aquatic species either lost or not appeared until now. Table 6 shows plant groups, number of species and habitats of the disappeared species. It indicates that (75%) (3 of 4 species) of the pteridophytes (ferns) and 31% of the floating plants were not yet found. The results indicate that Hor Al-Hewaizah has the less diversity of species while the central marsh and Abuzeriq have the highest. Biomass estimation for most species studied were nearly equal to that recorded in the past. (Table 7).

Table (l): Aquatic plants diversity before the desication of the Iraqi marshes.

Habitat and Habit	Plant groups				Total
	Macroalgae	Pteridophytes (ferns)	Flowering plant		
			Dicots	Monocots	
Submergent	2	0	9	13	24
Flonting	6	4	4	05	19
Emergent	0	0	25	34	59
Shrubs or Trees	0	0	2	0	02
Total	8	4	40	52	104

Table (2): List of aquatic and semi aquatic vascular plants historically recorded in Iraq.

Botanical name		H	C	He	O	S
Alisma laniceolatum		+			+	
Alisma plantago-aquatica	اذن العنز	+			+	
Alternanthera sessilis	عنطران		+	+	+	+
Arundo donax	قصب فارسي				+	+
Aster tripolium	بربين سواقي					+
Baccapa monniera	بربين بري (شحيمة)	+	+	+	+	+
Bergia ammannioides	برجي				+	
Bergia capensis	برجي				+	
Bolboschoenus maritimus	سميل،سجل			+	+	
Butomus umbelllatus			+		+	
Ceratophyllum demersum	شمبلان	+	+	+	+	+
Ceratopteris thalicroides	بربخ هور		+	+		
Cladium mariscus	جريح		+	+		
Cynancum acutum	حلبلاب			+	+	+
Cyperus difformis				+	+	+
Cyperus lavegatus		+				
Cyperus longus	جولان				+	
Cyperus malaccensis	جولان					+
Cyperus iria				+		
Cyperus corymbosus						+
Cyperus michelians			+	+		
Cyperus rotundus	سعد	+	+	+	+	+
Damasonium alisma					+	
Diplachne fusca	سبط	+	+	+	+	+
Echinoeloa crass-zalli	دنان			+	+	
Eclipta alba	شواصر	+	+		+	
Fimbristylis bisumbillata				+	+	+
Fimbristylis littoralis				+		
Fimbristylis sieberiana	فليفلة		+	+		
Juncus acutus	اسيل					+
Juncus articulatus	اسيل					+
Juncus rigidus	اسيل	+				+
Lemna gibba	عدس الماء	+	+	+	+	+
Lemna minor	عدس الماء	+	+			
Lemna perpusilla	عدس الماء			+		
Lemna trisulca	عدس الماء				+	
Limnophiia indica		+				
Ludwigia repens	عرمط	+	+	+		+
Lycopus europaeus				+		
Marsilea capensis	جرفت، زامرة	+	+			

Mentha aquatica	نعناع الماء		+			
Myriophyllum spicatum	ذيل العتوي	+	+			
Myriophyllum verticillatum	ذيل العتوي		+			
Najas graminea						
Najas marina	شويجة، زجري		+			
Najas minor	شويجة		+			
Nastutium officenale	حب الرشاد				+	
Nymphaea alba	كعيبة كبيرة كيك الله	+	+			
Nymphoides indica	كعيبة	+	+	+		
Nymphoides petata	كعيبة	+	+			
Ottelia alismoides		+	+			
Oxystelma esculentum		+				
Paniam repens	مران		+		+	+
Paspalum paspaloides	سلهو	+				
Peplidium maritimum		+				
Phragmites australis	قصب	+	+	+	+	+
Phyla nodiflora	بربين جداوة	+	+			+
Polygonum amphibium	كاط				+	
Polygonum lapathifolium	كاط			+		
Polygonum persicaria	حشيشة الكرعان				+	+
Polygonum salicifolium	كاط	+	+	+		
Polypogon monspeliensis	ذيل البزون	+				
Potamogeton berchteldii					+	+
Potamogeton crispus	حميرة ، حامول	+	+	+		+
Potamogeton lucens	لسان الثور	+	+	+		+
Potamogeton nodosus			+			+
Potamogeton pectenatus	الشتيتية	+	+			+
Potamogeton perfoliatua	ذيل الفرس	+	+			
Potamogeton pusillus					+	+
Rannunculus sphaerospermus	زهير البط	+	+	+	+	
Rannunculus trichuphyllus	زهير البط		+			
Rorippa amphibian	كوباني	+	+	+		
Ruppia maritima		+			+	
Sagittaria sagitifolia			+			
Salvinia natans	غزيزة	+	+	+	+	+
Samolus valerandi				+	+	
Schenoplectus litoralis	جولان	+	+	+	+	+
Schenoplectus maritimus	جولان			+	+	
Schenoplectus triquater	جولان					+
Sonchus maritimus				+		
Sparganium erectum		+			+	
Thelypteris palustris				+		

Typha domingensis	بردي	+	+	+	+	+
Typha lugdunensis	بردي				+	
Typha minina				+	+	
Utriculaia australis	شبيكة		+		+	
Utriculaia gibba			+			
Utriculaia minor			+			
Vallisneria spiralis	خويصة	+	+	+	+	+
Verbana officinalis						
Veronica anagallis						
Veronica beccabunga					+	
Veronica aquatica	قرة العين				+	
Zannichellia palustris		+				

H: Hammar C: Central He: Hewaiza , O: Other places , S: Shatt Al-Arab.

Plant Communities

Emergents

Phragmites australis (Reed), *Typha domingensis* (cattail) and *Schonemoplectus litoralis* (Sedege) are the main communities which very quickly re-established and dominated in the whole reflooded marshes of southern Iraq. However their cover and density vary from marsh to marsh. In Al-Hewaizah and Al-Chebaesh (Central marshes). *Phragmites australis* grows very densly and cover very wide areas and is the obvious dominated community while the other two species *Typha domingensis* and *Schoenoplectus litoralis* are rare or *Schoenoplctus* absent in Al-Hewaizah. In Al-Hammar (Barga and Nagara), *Typha domingensis* and *Schoenoplectus* are the dominant communities while the Reed is less frequent and rare or sometimes absent. In Abozerig and Kirmatia the three communities are physiognomically distinct and very obvious in different stations. Other vascular plants such as *Ceratophyllum demersum, Limna minor* , *Salinia natans* and *Paspalum paspaloides* may be occur in different places .

Submergents

Our information indicate five main noda of aquatic vegetation (nodum means abstract vegetation unit of undetermined rank status) (Poore, 1955).

Hydrilla nodum. A new nodum for Iraq. A Physiognomcally distinct community. Often luxuriantly developed and dominated particularly in Abozereq near Fuhod. *Hydrilla. verticillata* is the usual dominant species, typically forming dense, tangled stands. In many reaches *Myriophyllum spicatum* occurs just as occasional scattered individuals but in some places it is abundant. *Potmogeon lucens* occasionally present.

Ceratophyllum-Potamogeton perfoliatus nodum. A species-rich community, dominant, often luxuriantly developed. *C. demersum* is the main dominant species. Higher plants include *P. crispus* and other emergent associates such as *Schoenoplectus litoralis* and *Bolboschynus maritimus.* In summer in many places in Hammar the surface of water is covered by a thick scum of filamentus Algae (of Spirogyra

and Entromorpha) but some time chara is dominated.

Najas nodum. This is usually not luxuriantly developed , although a range of species may be present. The dominant species is *N. marina*, other associates are *N. minor*, *Potamogeton perfoliatus*, *Schoenoplectus litoralis*.

Vallisneria-Potamogeton nodum. This represents variable development of aquatic vegetation. *V. spiralis* is the main dominant species, often forming dense stands. In most reaches *Potamogeton crispus* and *P. perfoliatus* are dominant and form dense rafts. This nodum has affinities with Ceratophyllum-Potamogeton nodum.

Floating leaved plants

Nymphaea alba nodum. *N. alba*, in Arabic, Gogalla or Guaiba (with its large cordate leaves and white solitary flowers) is the dominant species and in late summer in kirmatia in certain places the surface of water is usually covered by the leaves of this species of water liliy. It is a Physiognomically distinct community and, floristically a variable unit. *Potamogeton pectinatus* occurs in some reaches and may be occasionally dominant, but in some places *Najas minor* is locally dominant, other emergents such as *Schoenoplectus litoralis* and *Typha domingensis* are often present and well developed.

4- Discussion

Plant diversity and distribution

Historicaly, Al-Mayah, 1978 reported 59 species of aquatic flowering plants to be occur in southern Iraq. But he (in Al-Sadi and Al-Mayah, 1983) mentiond 65 aquatic macrophytes, adding the ferns to the aquatic plants of Iraq. In 2004-2005 we collected 27 species, of which 2 are algae, (table 4) the reaming 25 species represents 42.3% of the total number of species recorded in 1978. The submergent macrophytes showed the highest percentage of recovery 62.5% (15 of 24), while the emergents showed the lowest percentage of recovery 13.5%, 8 of 59 species (tables 1 and 4). Among the plant groups, the Pteridophytes (ferns) showed less recovery than other groups, only one species *Salvina natans* of the four species reported in the past is recollected recently. The highest diversity of species were in Central marshes and Abozeriq where 22 and 15 species recorded recently respectively.

However the highest percentage of species re-establishment was 56.5% in Kirmatia (table 3). The highest diversity of macrophytes in central marshes and Abozeriq is may be because of receiving their water from Tigris which has low level of salinity. The healthy (Reeds) *Phragmites australis* and its clear dominancy over *Typha domingensis* (Cattail) and *Schoenopletus litoralis* in Al-Hewaizah comparable to that in Al-Hammar is perhaps because of the ability of the reed to stay for a long time in a deep level of water due to having strong subteranian rhizomes and strong arial sclerenchymataus stem, while the cattail has no such a reproductive and ecological strategies. *Typha domingeuis* has only basal leaves which can not tolerate deep water and full submergent for a long time. The water level in Al-Hammar is changeable during the year sometimes become very low 1-2 feet's.

Decreasing or eliminating a marsh water inflow can bring about drastic changes in

salinity and nutrient availability, which in turn lends to profound changes in plant and animal species composition (Cronk and Fennessy, 2001). Several workers mentioned that *P. australis* can tolerate a wide range of inundation and salinity level (Cook,1996 ; Shay and Shay 1986). In comparison with the historical status of marshland macrophytes of southern Iraq in which Al-Hilli, 1975 reported fifteen plant communities, our results indicated the recovery of more than 50% of these communities (eight communities described after desiccation in this paper). Two of these noda *Hydrilla nodum* and *Nymphaea alba* are not mentioned by Al-Hilli, 1975, but *N. alba* has been recorded by Al-Mayah in 1978.

Hydrilla nodum, which is a new nodum for Iraq described here for the first time is a characteristic community for Abozeriq and central marshes. Once established in a water body, it spreads very quickly. Now it is the most abundant submerged plants in Abozereq and Chabaesh and within a few years may invade all the marshes. *H. verticillata* has ability to tolerate low light levels which gives it a longer growing season than other submerged species and make it capable of outcompeting other submerged plants such as *Ceratophylum demersum, Vallisneria spiralis* and *Myriophyllum spicatum* (Grace and Wetzel, 1978). Schmitz *et al*. (1993) mentioned that *H. verticillata* produces allelopathic compounds that have been shown to inhibit the growth of *C. demersum*. He also emphasized that it may alter the trophic status of a water body.

Although the plant communities recognized have been mainly based on data from Abozereq and Kirmatia marshes, they certainly have a wider applicability. Comparable communities found in other marshes such as Al-Chebaish and Al-Hammar marshes, particularly *Ceratophyllum-potamogeten perfoiatus, Najas nodum* and *Vallisneria potamogeton nodum.*

Ceratophyllum-potamogeten perfoiatus nodum has some affinities with *Hydrilla nodum* but the latter usually confined to open and deeper water. However *Ceratophyllum* communities are more common. *Namphaea alba* is now a characteristic community for the Kirmatia, it is abundant locally while in the past it was widely distributed in central marshes and north Hammar. Tiner (1996) considered obligate hydrophytes to be the best vegetative indicators of wetlands because they are almost never found in any other habitat.

Some salt tolerate facultative wetland shrubs such as *Tamarix brachystichas* and *T. ramosissima* have invaded the dryed areas of the marshes during the desiccation period and had become a nuisance species and they are still abundant in many places of the reflooded wetlands of Iraq. Several important and Characteristic obligate aquatic plants which were once dominated in central and Hammar marshes such as water lilies (Geaiba in Arabic) *Nymphoides indica* and *N. peltata* and the insectivorous *Utriculara* sp. are seem to be disappeared.

The Prelminary peak biomass estimation for some dominant species in Abozeriq and Kirmatia (Table7 , Fig.1) were within the normal range recorded historically by Al-Hilli, 1975 and Al-Mayah, 1994. However the highest biomass was in Abozeriq. This results can be explained according to Cronk and Fennessy, (2001), as a result of a combination of low

salinity and nutrient release from decomposing letter. In conclusion, I believe that the aquatic macrophytes of the southern marshes of Iraq will recover soon and most species and communities will appear continuously within few years.

Table (3): Number of aquatic plant species previously recorded and recently in 2004-2005 recollected in the marshes of Iraq.

Period	Location and number of species				
	Abozereq	Kirmatia	Hammar	Hewaiza	Central
Before drying 1975-1990	32	23	40	37	44
After restoration 2001-2005	15	13	14	7	22
Restoration percentage %	46.5	56.5	35	19	50

Table (4): List of aquatic plants collected in 2004-2005 from the reflooded marshes.

Botanical name	Habitat			Distribution				
	S	F	E	A	K	H	He	C
Alternanthera sessilis			+					+
Baccapa monniera			+	+	+			+
Bolboschoenus maritimus			+	+	+			
Ceratophyllum demersum	+			+	+	+	+	+
Cladium mariscus			+			+		
Cyperus rotundus			+			+		
Lemna minor		+				+	+	+
Myriophyllum spicatum	+			+			+	+
Najas marina	+			+	+			+
Najas minor	+				+			
Nymphaea alba		+			+			
Phragmites australis			+	+	+	+	+	+
Potamogeton crispus	+			+		+		+
Potamogeton lucens	+			+		+		+
Potamogeton nodosus		+		+				+
Potamogeton pectenatus	+			+	+	+	+	+
Potamogeton perfoliatua	+			+	+	+		+
Rannunculus sphaerospermus	+						+	+
Rannunculus trichophyllus	+							+
Ruppia maritima	+							+
Salvinia natans		+		+	+	+	+	+
Schenoplectus litoratis			+	+	+	+	+	+
Typha domingensis			+	+	+	+		+
Vallisneria spiralis	+			+	+	+		+
Zannichellia palustris	+							+
Chara	+					+	+	+
Nitella	+							+

S: Submergent ; F: Floating ; E: Emergent ; A: Abozeriq ; K: Kirmatia ; He: Hewaiza ; C: Chebaish ; H: Hammar

Table (5): The aquatic pants lost from the marshes or not yet appeared with their previous distribution and habitat.

Botanical name	H	Ch	He	B	O	Ha
Alissma plantago-aquatica	+				+	E
Butomus umbellatus		+			+	E
Ceratopteris thalictroides		+				E
Limnophila indica	+					S
Marsilea capensis	+					F
Mentha aquatica	+					E
Myriophyllum verticillatum	+					S
Nymphoides indica	+					F
Nymphoides peltata	+					F
Ottelia alismoides		+			+	E+F
Polygonum amphibium				+		E
Polygonum lapathifolium			+			E
Polygonum salicifolium	+					E
Potamogeton berchteldii				+		S
Potamogeton pusillus				+		S
Rorippa amphibian	+		+			E
Sagittaria sagitifolia	+					E
Sparganium erectum	+					E
Thelypteris palustris			+			F
Typha minina			+			E
Utriculaia australis		+				S
Utriculaia gibba	+	+				S
Utricularia minor	+	+			+	S

E:Emergent ; F: Floation ; S: Submergent ; H: Hammar ; Ch: Chebaish ; He: Hewaiza ; B: Basrah ; Ha: Habitat ; O: Other places

Table (6): Aquatic plants lost after desiccation of the Iraqi marshes.

Habitat and Habit	Plant groups				Total
	Macroalgae	Pteridophytes (ferns)	Flowering plant		
			Dicots	Monocots	
Submergent	0	0	2	5	7
Flonting	0	3	2	1	6
Emergent	0	0	5	5	10
Shrubs or Trees	0	0	0	0	0
Total	0	3	9	11	23

Table (7): Biomass and cover percentage of some aquatic plants of Abozeriq and Kirmatia

Botanical name	Abozeriq		Kirmatia	
	Biomass gm/m^2	Cover%	Biomass gm/m^2	Cover %
Ceratophyllum demersum	800	100	700	100
Hydrlla verticillata	600	100	-	-
Myriophyllum Spicatum	650	20-50	540	10-40
Najas marina	250	60-90	270	70-100
Najas minor	-	-	150	85-100
Phragmites australis	1000	100	800	100
Potamogeton lucens	240	30-80	150	20-60
Potamogeton perfoliatus	140	30-60	-	-
Schenoplectus litoralis	60	10-50	72	40-80
Typha domingensis	65	80-100	74	100

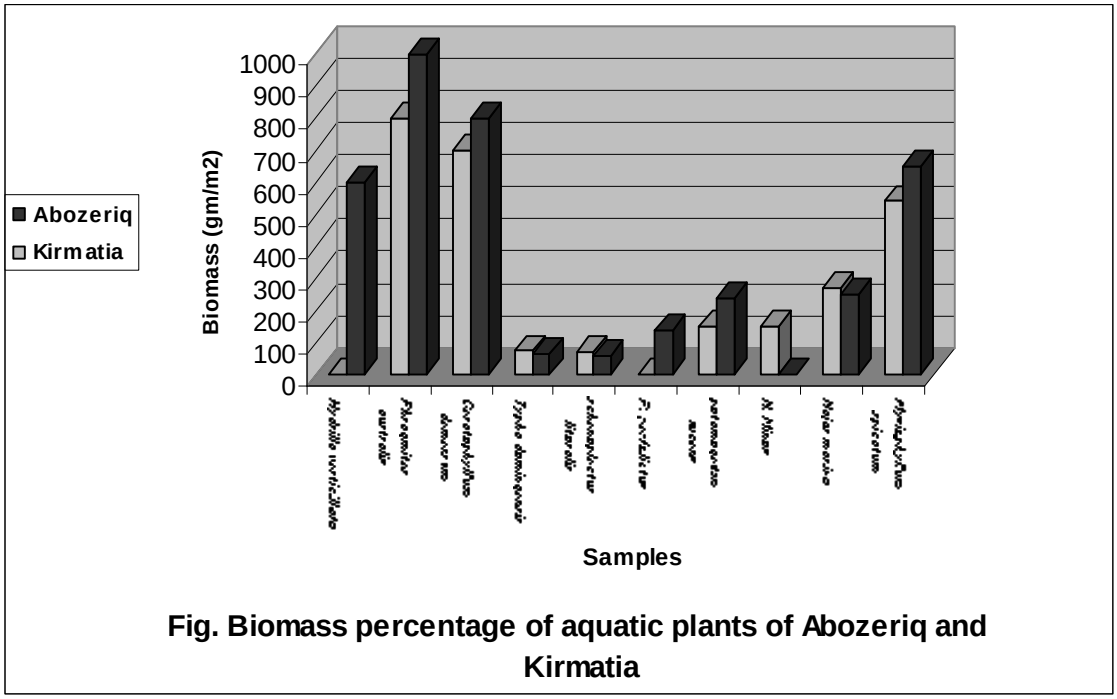

Fig. Biomass percentage of aquatic plants of Abozeriq and Kirmatia

References

Al-Hilli, M.R. 1977. Studies on the plant ecology of the ahwar region in southern Iraq. Unpub. Ph. D. Thesis Unir. Cairo.

Al-Khattab, A. 1967. The marshes in southern Iraq, MSc. Thesis (in Arabic) Cairo Univ.

Al-Mayah, A. Alwan. 1994. The aquatic plants of the marshes of southern Iraq. Mann. Sci. Cent. 18: 127-143

Al-Mayah, A. Alwan and Al-Hamim, F.I. 1991. A quatic plant, and the Algae. Univ. Basrah in Arabic.

Al-Mayah, a. Alwan. 1978. (Common water and Marsh angiosperms of southern Iraq. J. Bang. Aca. Sci. 2(2): 47-54.

Al-Rekabi, H.Y. 1992. Ecological and physiological study on some aquatic plants in Al-Hammar marsh. MSc.. Thesis. Basrah. Univ.

Al-Saadi, H.A. and Al-Mayah A. A. 1983. Aquatic plants of Iraq . Cent. Arab Gulf. Univ. Basrah. (Arabic).

Bowes, B.C. 1999. Plant propagation and conservation . Manson pub. Ltd.

Cook, C.D.K. 1996. Aquatic plant Book. The Haque.

Cronk, J.K. and M.S. Fennessy, 2001. Wetlands pants Biology and Ecology. CRC Prees LLC.

Grace, J.B. and Wetzel, R.G. 1978. The production biology of Eurasian water milfoil (Myriophyllam spicatum)J. Aquatic plant management 16: 1-11.

Haslam, S.M. 1978. River plants. Cambridge Univ. Press. Cambridge.

Hussain, N.A. and T.S. Ali, 2006. Trophic Nature and feeding Relationships among Al-Hammar marsh fisher, southern Iraq. Marsh Bulletin., 1(1): 9-18.

Maltby, E. , 1994. An environmental and ecological study of the marshlands of Mesopotamia. Draft consultive Bulletin Amar Appeals Trust London .

Maunder, M. and Culham, A. 1999. In plant propagation and conservation . Manson pub. Muhlberg, H. 1982. The complete guiidc to plants. Ep. Published Lim. Germany.

Nicholson E. and Clark, 2003. The Iraqi marshlands: A Human and Environmental study London.

Quest, E. 1966. Flora Iraq Vol. Baghdad .

Ray, D. and Ingram, D. 1999. In plant propagation and conservation. Manson. Pub.

Richardson, C.J. ; Reiss ; P. Hussain, N.A. ; Alwash, A. and Pool, D.J. 2005. The Restoration potential of the Mesopotamian marshes of Iraq. Science 307: 1307-1331.

Schmitz, R.L. ; Schard, J.D. and Leslie, A.J. , 1993. The ecological management history of three invasive alien aquatic plant species in Florida in Biological pollution. Ind. Acad. Science.

Shay, J.M. and Shay, C.T. 1986. Prairie marshes in western Canda, with special references to the ecology of five emergent macrophytes. Cand. J. Bot. 64: 443-454.

Tiner, R.W. 1996. Practical considerations for wetland identification and boundary delineation. In wetlands. New York Lewis Publ.

UNEP, 2001. Phytoremediation, freshwater management no. 2. Canada.

UNEP, 2004. Integrated watershed management Manual Italy.

الحالة الماضية والحاضرة للنباتات المائية في اهوار جنوب العراق

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الملخص

تم تقديم عرض عن الأنواع النباتية وتوزيعها الجغرافي التي كانت مسجلة في اهوار العراق قبل عملية تجفيف الاهوار، وقد أظهرت الجرودات أن هناك أكثر من مائة نوع من النباتات المائية والبرمائية معروفة في العراق تاريخياً. وان اقل من 50% من هذه الانواع تم تجميعها خلال العامين 2004-2005 من المناطق التي تم اغمارها حديثاً وان هناك عدد من الانواع المهمة المميزة للاهوار مثل زنابق الماء التي تعرف محلياً بالكعيبة بنوعيه *Nymphoides indica* و *N. peltata* ونبات قانص الحشرات *Utricalaria australis* ونبات رأس السهم *Sagittaria sagitifolia* لم يعثر عليها لحد الآن وربما قد اختفت كلياً، فان ستة عشر نباتاً مائياً اجبارياً لم يتم العثور عليها.

وهناك نوعين من الشجيرات المزعجة للبيئة والتي تسمى محلياً الزور هما النوعان *Tamarix ramosissima* و *T. brachystichas* قد غزت المنطقة وانتشرت بشكل كثيف، وقد تم تشخيص ووصف ثمانية انماط من المجتمعات البيئية التي بدأت بالتكون حديثاً واحدة منها يعتبر نمطاً جديداً للعراق وهو *Hydilla nodum*. كما تم قياس الكتل الحية لعدد من الأنواع السائدة التي ظهرت بعد الاغمار وتم مقارنة النتائج الحالية مع ما كان معروفاً في السابق.