

THE BIODIVERSITY OF BAHR AL-NAJAF DEPRESSION, AL-NAJAF AL-ASHRAF PROVINCE

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ABSTRACT

The tentative list of the biodiversity (plants and vertebrates) of Bahr Al-Najaf depression is found to comprise 104 vertebrate species including 2 fishes, 14 reptiles, 73 resident and migratory birds and 15 mammals. The flora consists of 31 species, mainly of plants well adapted to desert conditions that dominate the area, besides few examples of water plants. The salinity was found, through chemical analysis of the lake water, to be of high value which reduces the diversity of aquatic animal and plant diversity.

INTRODUCTION

Bahr Al-Najaf is a wetland depression area located to the west and south-west of Holy Najaf City. It extends at north west-south east direction of an area about 360-750 Km² of coordinates longitude 43° 40' - 44° 25' E and latitude 31° 40' - 32° 10' N and altitude elevation of about 11 m a. s. l. (Al-Atia, 2006, Benni and Al-Tawash, 2011). It is composed of a lake or marsh-like area with limited cultivated orchards beyond and surrounded by vast desert or semi desert areas. The area is classified as a part of the Arabian Desert and East Sahero-Arabian Xeric Shrub lands ecoregion (PA1303) (Bachmann *et al.*, 2011). Historically, it was a part of very wide water surface joined with Arabian Gulf by water canals which served transportation between ancient Levant and Europe via Syria (Al-Hakeem, 2004). Although some researchers referred to the drying of Najaf sea (Bahr Al-Najaf) had occurred at 1915 (37), it is believed, according to (38) that the draught was started since 1887 when water authorities blocked Euphrates canals preventing feeding the depression. Since that the area was subjected to substantial changes both in its nature and forms of life that it supports. Studies on the biodiversity of the area rather few and fragmentary including that of Hatt (1959), Abul Faith (1970), Thalen (1979) and Al-Awadi (1997). The aim of this work is to provide a preliminary report on the present status of biodiversity issues of this unique area of Iraq.

MATERIALS AND METHODS

Data on the biodiversity of the area was retrieved either through direct collection of biological material, photographing, or through interviews with hunters and locals through visiting the area twice each season during the period from January to December 2012. The specific identification was possible following the available pertinent keys and field guides including those of Al-Hassan (2006) for plants, Coad (2010) for fishes, Khalaf (1959) for herpetofauna, Salim *et al.* (2006) for birds, and Harisson (1968, 1981) for mammals.

RESULTS AND DISCUSSION

Field observations revealed that the studied area is distinct from the adjacent desert and semi desert areas. It includes cultivated orchards, salty lake, marshy area and semi desert strips ecosystems. This multiple system complex contributes to the enriching the biodiversity elements. The estimated area is varied according to authors and years, for example Al-Atia (2006) consider it as 750 Km² while Benni and Al-Tawash (2011) reduced the number by more than one half into 360 Km². This is may be related to the active evaporation during the six years period between the two studies. However, chemical analysis of the lake water clearly indicates that the water is should be classified as saline (Table 1), a situation which does not support living of many freshwater species of fishes and other animals, and perhaps because of pollution resulted from the natural drainage of Old Najaf City waste water into the lake due to the nature of topography of the area. This salinity may be due to the high rate of evaporation accompanied with unprecedented temperature levels and absence of continuous water resources feeding into the lake, while it is restricted now to the runoff of precipitation, which it is already low of mean about 97.1 mm annually for the period between 1975-2006 (Ali, 2008), accumulated in the neighboring valley. Moreover, the agricultural practices just adjacent to the lake depend mainly on the random well drilling which yields salty water drained finally with its contents of salt into the lake and subsequently increasing salinity level. Our results are in agreement with Al-Aboodi (2008) who mentioned that the water type of the Bahr Al Najaf area is of marine origin preserved in semi-confined basin.

Table 1: Chemical analysis for some parameters of a water sample from the lake of Bahr Al-Najaf.

Parameter	Lab. Analysis
pH	8.4
TDS (gm/L)	18.8
Salt (%)	3.23
C (%)	0.03
K (%)	0.20
Ca (%)	0.65
Sand (%)	0,48

Flora: it is found that the plants comprise 25 species belong to 15 families (Table 2).

Table 2: A systematic list of plants recorded in this study from Bahr Al-Najaf.

Family Amaranthaceae

1. *Amarathus blitoides*

Family Capparidaceae

2. *Capparis spinosa*

Family Ceratophyllaceae

3. *Ceratophyllum demersum*

Family Chenopodiaceae

4. *Chenopodium vulgaria*
5. *Haloxylon Salicornicum*
6. *Salsola cycloohylla*
7. *Suaeda fruticosa*

Family Convolvulaceae

8. *Convolvulus arvensis*

Family Cucurbitaceae

9. *Citrullus colocynthis*

Family Fabaceae

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10. *Albizia amara*
11. *Alhagi maurorum*
12. *Astagulus spionsus*
- Family Gentaceae
13. *Ephedra alata*
- Family Graminae
14. *Aeluropus lagopoides*
15. *Aeluropus littoralis*
16. *Cynodon dactylon*
17. *Imperata cylindrica*
18. *Phragmites communis*
- Family Juncaceae
19. *Juncus arabicus*
- Family Plantaginaceae
20. *Plantago boissier*
- Family Polygonaceae
21. *Rumex cyprius*
22. *Rumex dentatus*
- Family Rutaceae
23. *Peganum harmala*
- Family Tamaricaceae
24. *Tamarix aphylla*
- Family Typhaceae
25. *Typha domingensis*

Most of plants listed above are belonging to the Arabian sub- zone of the Saharo- Sindian phytogeographical zone (Zohary, 1973). Light intensity or scattering of plants is might be a result of successive dry years, livestock grazing, and extensive human activities. Some plants are aquatic. The increase of water salinity of the lake negatively affected the biodiversity either inside water or in the adjacent areas in contact with the lake. The exception was in some borders where few of fresh water seep into the depression causing partial improvement of plant diversity.

Fauna: In regard to vertebrate fauna, results show presence of only two species of fishes; *Liza abu* of small size only and Black Bream *Acanthopagrus perda*. This is expected in view of poor water quality. Al-Awadi *et al.* (2010a) published a paper on parasites of 11 fish species collected in the area in 1995. This gives how the fish diversity was going decreased with a downward trend since that year.

For the herpetofauna, 13 reptilian species were reported from the area including 6 snakes, 6 lizards and one turtle (Table 3). Except for the dice snake *Natrix tessellata* and the soft shelled turtle *Rafetus euphraticus*, the rest of species seem well adapted to xeric conditions which dominate the studied area now. However, continuous presence of *N. tessellata* and *R. euphraticus* in this saline water reflects high degree of tolerance to physiological as well as environmental pressure resulted from the ecological stress of poor water condition. This conclusion is in general agreement with Ahmadzadeh (2011) and Ioannidis and Mebert (2011) for the dice snake and Karami *et al.* (2006) and Ghaffari *et al.* (2008) for the soft shelled turtle. The birds comprise the largest faunistic group of Bahr Al-Najaf with 72 species many of them are migratory birds (Table 3). On comparison with the records of the Iraq Natural History Research Center and Museum/University of Baghdad for the last four decades the collective number of bird species showed decrease in the number of species especially the waterfowl

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which dropped sharply from 69 species frequently reported with relatively high individual numbers according to the records of the museum into 35 species only with rather small numbers of individuals within their populations. This result could be directly linked to the deterioration of the lake water quality. However, Al-Awadi (1997) and Al-Awadi *et al.* (2010b) listed 53 bird species, belonging to 21 families, in Bahr Al-Najaf depression stating that it attracts a large number of aquatic birds.

The mammals comprise 15 species without any representative of water habitat dweller (Table 3). All of them are known to be animals of desert and semi desert areas. In general, the vertebrate fauna of Bahr Al-Najaf comprise 104 species. This rather reflects the poor environmental conditions of the area, especially those linked to water habitat. It is worthy to note the absence of amphibian representatives from the lake of Bahr Al-Najaf.

Table 3: A systematic list of vertebrate fauna reported in this study from Bahr Al-Najaf.

Class Pisces	
Family Mugilidae	
1-	<i>Liza abu</i>
Family Sparidae	
2-	<i>Acanthopagrus perda</i>
Class Reptilia	
Family Trionychidae	
3-	<i>Rafetus euphraticus</i>
Family Agamidae	
4-	<i>Uromastix microlepis</i>
Family Gekkonidae	
5-	<i>Alsophylax tuberculatus</i>
6-	<i>Stenodactylus affinis</i>
7-	<i>S. doriae</i>
Family Lacertidae	
8-	<i>Messalina brevisrostris</i>
9-	<i>Ophisops elegans</i>
Family Boidae	
10-	<i>Eryx jaculus</i>
Family Colubridae	
11-	<i>Malpolon moilensis</i>
12-	<i>Natrix tessellata</i>
13-	<i>Psammophis schokari</i>
14-	<i>Platycephalus ventromaculatus</i>
15-	<i>Splaerosophis cliffordi</i>
Family Viperidae	
16-	<i>Cerastes cerastes</i>
Class Aves	
Family Phalacrocoracidae	
17-	<i>Phalacrocorax carbo</i> *
Family Ardeidae	
18-	<i>Ardea cinerea</i> *
19-	<i>Egretta garzetta</i>
20-	<i>Ixobrychus minutus</i> *
21-	<i>Nycticorax nycticorax</i>
Family Ciconiidae	
22-	<i>Ciconia ciconia</i> *

- Family Phoenicopteridae
23- *Phoenicopterus ruber*
- Family Anatidae
24- *Aethya ferina**
25- *Anas acuta**
26- *A. clypeata**
27- *A. crecca**
28- *A. penelop**e
29- *A. platyrhynchos**
30- *A. strepera**
31- *Marmaronetta angustirostris*
32- *Netta rufina**
33- *Tadorna ferruginea**
- Family Accipitridae
34- *Buteo rufinus**
35- *Circus aeruginosus*
36- *Milvus migrans**
37- *Neophron percnopterus*
- Family Falconidae
38- *Falco timunculus*
- Family Phasianidae
39- *Francolinus francolinus*
- Family Rallidae
40- *Fulica atra*
41- *Gallinula chloropus*
42- *Porphyrio porphyrio*
43- *Rallus aquaticus**
- Family Charadriidae
44- *Charadrius alexandrines*
45- *Chettusia leucura*
46- *Hoplopterus indicus*
47- *H. spinosus*
- Family Scolopacidae
48- *Calidris alpine**
49- *C. minuta**
50- *Gallinago gallinago**
51- *Lymnocyptes minimus**
52- *Tringa tetanus**
- Family Recurvirostridae
53- *Himantopus himantopus*
- Family Laridae
54- *Larus canus**
55- *L. genei*
56- *L. ridibundus**
57- *Sterna albifrons**
58- *S. hirundo**
- Family Columbidae
59- *Columba livia*
60- *Columba palumbus*
61- *Streptopelia decaocto*
62- *S. senegalensis*

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- Family Tytonidae
 - 63- *Tyto alba*
- Family Meropidae
 - 64- *Merops superciliosus**
- Family Coraciidae
 - 65- *Coracias benghalensis*
- Family Upupidae
 - 66- *Upupa epops**
- Family Alaudidae
 - 67- *Ammomanes deserti*
 - 68- *Galerida cristata*
- Family Hirundinidae
 - 69- *Hirundo rustica**
- Family Motacillidae
 - 70- *Anthus spinoletta*
 - 71- *Motacilla alba**
- Family Pycnonotidae
 - 72- *Pycnonotus leucogenys*
- Family Laniidae
 - 73- *Lanius collurio**
 - 74- *L. nubicus**
- Family Hypocoliidae
 - 75- *Hypocolius ampelinus*
- Family Turdidae
 - 76- *Oenanthe oenanthe**
 - 77- *Saxicola torquata**
 - 78- *Phoenicurus phoenicurus**
- Family Timaliidae
 - 79- *Turdoides caudatus*
- Family Sylviidae
 - 80- *Hippolias pallid**
 - 81- *Prinia gracilis*
 - 82- *Cisticola juncidis*
 - 83- *Sylvia mystacea*
- Family Corvidae
 - 84- *Corvus corone*
 - 85- *C. frugilegus*
- Family Sturnidae
 - 86- *Sturnus vulgaris**
- Family Ploceidae
 - 87- *Passer domesticus*
 - 88- *P. hispaniolensis**
 - 89- *P. moabiticus*
- Class Mammalia
 - Family Emballonuridae
 - 90- *Taphozous nudiventris*
 - Family Vespertilionidae
 - 91- *Pipistrellus kuhlii*
 - Family Canidae
 - 92- *Canis aureus*
 - 93- *C. lupus*

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- 94- *Vulpes vulpes*
Family Mustelidae
95- *Meles meles*
Family Viverridae
96- *Herpestes auropunctatus*
Family Hyaenidae
97- *Hyaena hyaena*
Family Felidae
98- *Felis chaus*
Family Suidae
99- *Sus scrofa*
Family Leporidae
100- *Lepus capensis*
Family Hystricidae
101- *Hystrix indica*
Family Muridae
102- *Mus musculus*
103- *Nesokia indica*
104- *Rattus rattus*

*Migratory bird

A wide range of invertebrates forms were noted in the area including insects, scorpions, centipedes, millipedes, spiders, ticks, mites, crustaceans, molluscans, and annelids will be studied later in a separate paper.

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التنوع الإحيائي لمنخفض بحر النجف، محافظة النجف الأشرف

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الخلاصة

تتألف القائمة المؤقتة للتنوع الإحيائي لمنخفض بحر النجف، بالإضافة إلى العديد من أشكال الحيوانات اللاقارية، من ١٠٤ من الفقريات تتضمن نوعين من الأسماك، ١٤ نوعا من الزواحف، ٧٣ من الطيور المقيمة أو المهاجرة، و ١٥ نوعا من اللبائن. تتكون المجموعة النباتية من ٢٩ نوعا متكيفة جيدا للظروف الصحراوية التي تغلب على المنطقة، إلى جانب أمثلة قليلة من النباتات المائية. بينت نتائج التحليل الكيميائي لمياه البحيرة إن الملوحة كانت عالية مما يقلل من تنوع الحيوانات والنباتات المائية.