

Biodiversity and Floristic Study of Al-Hdaba Treatment Plant Tripoli–Libya

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Abstract

Introduction: The aim of this study is to investigate the biodiversity status of Al-Hadaba treatment plant.

Methods: The study was carried out in the period between February and June 2016, with one trip per week, the result of the survey has led to the collection and identification of 84 plant species belonging to 23 families and 65 genera, of which 15 species are belong to monocotyledons and 69 belonging to dicotyledons.

Results and Conclusions: Floristic analysis were carried out which showed the predominance of the family Asteraceae with 20 species followed by the family Poaceae with 16 species, the result was also showed the predominance of the genus *Bromus* with 4 species. Life form analysis has showed absolute dominance of therophytes with 65 species.

INTRODUCTION

The Libyan vascular flora contains 2103 species that belong to 856 genera and 155 families [1]. The distribution among Libyan seed plants was characterized by a high proportion of herbs (annual to perennial), unlike the low number of woody (tree and shrub) species; these have an important influence on the structure of floral composition, the geographic element of the flora was predominantly tropical and Mediterranean, the local plants belong to representative tropical desert flora, these reflect the defensive capabilities of vegetation in such drought conditions [1].

The floristic composition of plants in Libya is still comparatively unknown as far as in-depth ecological and botanical studies go [2].

The most important comprehensive floristic studies in Libya were a check list of the flora of Libya by Keith [3] and Flora of Libya by Jafri and El-Ghadi [4], otherwise there were a small scattered regional floristic studies such as biodiversity of the Msallata national reserve [5], biodiversity of Shabyiat Gharan [6], biodiversity of Farwa island [7], and others elsewhere.

The present paper provides an overview of plant diversity of Al-Hadaba treatment plant to ascertain its biodiversity and inventory status, with special reference to identification of vegetation patterns.

Study Area

Al-Hadaba treatment plant situated in Tripoli, about 10 km. south to the city centre (N32° 83' 55 E13° 16' 09). The site established in 1968 and start working in 1970 with a daily maximum capacity of 110,000 m³ during dry seasons and 330,000 m³ during precipitation season. Five pools receiving the water after treatment processes. The area of lagoons (pools) is dominated by *Eucalyptus* and *Acacia* trees, as well as other species

of grasses, in addition, the establishment of treatment and purification of waste water plants has led to the creation of new wetlands, which favor growing of some aquatic plants such as *Tamarix* and *Phragmites* and other species (Fig 1) [8, 9].



Figure 1: Study Area

METHODS

The study was conducted during growing season 2015, in the period between February and July with one trip per week, collected plant specimens were brought to herbarium and subjected routine herbarium procedures such as drying, pressing, mounting, and identification. Identification of plant species were done using data from literatures provided [4, 10-12].

The collected and identified plant species were deposited at the National herbarium, Botany Department, Faculty of Sciences, University of Tripoli.

RESULTS AND DISCUSSION

At the end of the survey a total of 84 plant species belonging to 23 families and 65 genera were collected and identified, of which 16 species belonging to 13 genera are belong to monocotyledones which all belonging to the only family Poaceae, and 68 species belonging to 22 families and 65 genera are belonging to dicotyledones (Table 1 and Table 2).

Table 1: Shows Collected and Identified Species With Their Life Forms (Monocots)

	Life Form
Poaceae	
<i>Avena sterilis</i> L.	Th
<i>Bromus diandrus</i> Roth.	Th
<i>Bromus madritensis</i> L.	Th
<i>Bromus rigidus</i> Roth.	Th
<i>Bromus rubens</i> L.	Th
<i>Cutandia maritima</i> (L.) Barbey	Th
<i>Cyrdon dactylon</i> (L.) Pers.	G
<i>Hordeum murinum</i> Steud.	Th
<i>Lamarckia aurea</i> (L.) Moench	Th
<i>Lolium rigidum</i> Gaudin	Th
<i>Lophochloa cristata</i> (L.) Tzvelev	Th
<i>Phragmites australis</i> (Cav.) Trin. ex Steud	G
<i>Piptatherum miliaceum</i> (L.) Coss.	G
<i>Poa annua</i> L.	Th
<i>Polypogon monspeliensis</i> (L.) Desf.	Th
<i>Stipa capensis</i> Thunp.	Th

Abbreviations: Th, therophytes; H, hemicryptophytes; G, geophytes; NP, nanophanerophytes; P, phanerophytes.

Table 2: Shows Collected and Identified Species With Their Life Forms (Dicots)

	Life Form
Amaranthaceae	
<i>Amaranthus blitoides</i> S. Watson	Th
Asclepiadaceae	
<i>Calotropis procera</i> (Aiton) Aiton.	N
Asteraceae	
<i>Amberboa libyca</i> (Viv.) Alavi.	Th
<i>Artemisia campestris</i> L.	H
<i>Carduus argentatus</i> L.	Th
<i>Calenula arvensis</i> L.	Th
<i>Centaurea dimorpha</i>	Th
<i>Conyza bonariensis</i> (L.) Cronq.	Th
<i>Echinops spinosissimus</i> Turra.	H
<i>Filago fuscescens</i> Pomel.	Th
<i>Hypochoeris achyrophorus</i> L.	Th
<i>Hypochoeris glabra</i> L.	Th

<i>Lactuca serriola</i> L.	Th
<i>Launaea resedifolia</i> (L.) Kuntz.	Th
<i>Leontodon simplex</i> (Viv.) Widder.	Th
<i>Matricaria aurea</i> (Loefl.) Svhatz Bip.	Th
<i>Onopormum arenarium</i> Hossain & Sarraf	H
<i>Reichardia tingitana</i> (L.) Roth.	Th
<i>Senecio gallicus</i> Chiav. vin.	Th
<i>Senecio vulgaris</i> L.	Th
<i>Silybum marianum</i> (L.) Gaertn.	Th
<i>Sonchus oleraceus</i> L.	Th
Boraginaceae	
<i>Hornuzakia aggregata</i>	Th
<i>Echium angustifolium</i> Mill.	H
Brassicaceae	
<i>Brassica tournefortii</i> Goun.	Th
<i>Enarthrocarpus clavatus</i> Delile ex Godr.	Th
<i>Lobularia maritima</i> (L.) Desv.	H
<i>Lobularia libyca</i> (Viv.) Meisner.	Th
<i>Sisymbrium irrio</i> L.	Th
<i>Sisymbrium orientale</i> (L.) Scop.	Th
Caryophyllaceae	
<i>Polycarpon tetraphyllum</i> (L.) L.	Th
<i>Silene gallica</i> L.	Th
<i>Spergularia diandra</i> (Guss.) Boiss.	Th
<i>Stellaria media</i> (L.) Vill.	Th
Chenopodiaceae	
<i>Chenopodium ambrosoides</i>	Th
<i>Chenopodium album</i> L.	Th
<i>Chenopodium murale</i> L.	Th
<i>Salsola kali</i> auct. non. L.	Th
Cuscutaceae	
<i>Cuscuta campestris</i> Yunchr.	Th
Euphorbiaceae	
<i>Euphorbia terracina</i> L.	H
<i>Ricinus communis</i> L.	N
Fabaceae	
<i>Hippocrepis multisiliquosa</i> L.	Th
<i>Lotus halophilus</i> Boiss et Spruner.	Th
<i>Medicago polymorpha</i> L.	Th
<i>Ononis reclinata</i> auct. Pal. non L.	Th
<i>Retama raetam</i> (Forssk.) Webb	N
<i>Trifolium tomentosum</i> L.	Th
<i>Vicia villosa</i> Roth.	Th
Geraniaceae	
<i>Erodium laciniatum</i> (Car.) Willd.	Th
<i>Erodium moschatum</i> (L.) L'Her.	Th
<i>Geranium molle</i> L.	Th
Ilcebraceae	

<i>Paronychia arabica</i> (L.) DC.	Th
Malvaceae	
<i>Malva parviflora</i> L.	Th
Mimosaceae	
<i>Acacia cyanophylla</i> Lindley	P
Myrtaceae	
<i>Eucalyptus leucoxylon</i> F.Muell.	Ph
<i>Eucalyptus camaldulensis</i> Dehnh.	Ph
Plantaginaceae	
<i>Plantago lagopus</i> L.	Th
<i>Plantago albicans</i> L.	H
Polygonaceae	
<i>Emex spinosus</i> (L.) Camp.	Th
<i>Polygonum equisetiforme</i> Sibth.	H
<i>Rumex vesicarius</i> L.	Th
Primulaceae	
<i>Anagalis arvensis</i> L.	Th
Santalaceae	
<i>Thesium humile</i> Vahl.	Th
Solanaceae	
<i>Datura innoxia</i> Mill.	Th
<i>Nicotiana glauca</i> Graham.	N
<i>Solanum nigrum</i> L.	Th
Tamaricaceae	
<i>Tamarix aphylla</i> (L.) Karsten	N
Urticaceae	
<i>Urtica pilulifera</i> L.	Th

Floristic analysis were carried out which showed the predominance of the family Asteraceae with 20 species, followed by the family Poaceae with 16 species, the result was also showed the predominance of the genus *Bromus* with 4 species, followed by genus *Chenopodium* with 3 species, then the genera *Senecio*, *Hypochoeris*, *Lobularia*, *Sisymbrium*, *Euphorbia*, and *Plantago* with 2 species each.

Life forms of collected species were analyzed according to Raunkia system [13] as modified by Govaerts et al. [14], which showed absolute dominance of Therophytes with 65 species, the rest of life forms were with little appearance, that Hemicryptophytes with 8 species, Nanophanerophytes with 5 species, then both Phanerophytes and Geophytes with 3 species each (Table 3 and Fig 2).

Life Form	Number of Species
Therophytes	65
Nanophanerophytes	5
Hemicryptohyts	8
Geophytes	3
Phanerophytes	3

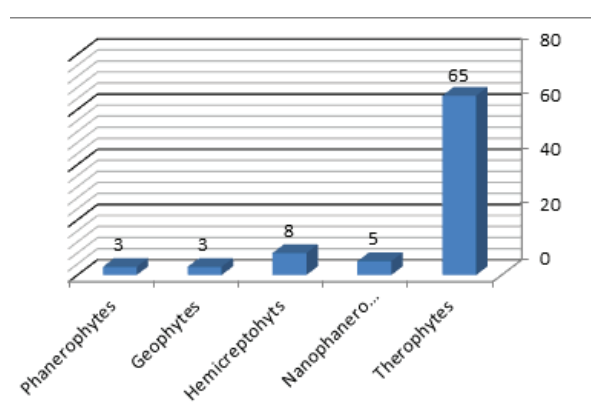


Figure 2: Shows a Number of Species According to Their Life Forms

The dominance of the family Asteraceae and Poaceae were expected because these families are dominated the Mediterranean climate, in addition, these families are cosmopolitan in distribution, and the dominance of Therophytes was expected as well because the study area located within the coastal Mediterranean region in which the Therophytes are dominated.

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CONFLICTS OF INTEREST

There is no conflict of interest.

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