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

Mohammed H. Mahklouf [1,*], Fathi G. Al Sghair [1]

[1] *Department of Botany, Faculty of Sciences, University of Tripoli, Tripoli, Libya*

** Corresponding author: Mohammed Hadi Mahklouf, Department of Botany, Faculty of Sciences, University of Tripoli, Tripoli, Libya. E-mail: mahklouf64@yahoo.com*

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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-Hadba 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 m^3 during dry seasons and 330,000 m^3 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 *Phragmitis* 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 monoctyledones 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	
Avena sterilis L.	Th
Bromus diandrus Roth.	Th
Bromus madritensis L.	Th
Bromus rigidus Roth.	Th
Bromus rubens L.	Th
Cutandia maritima (L.) Barbey	Th
Cyrodon dactylon (L.)Pers.	G
Hordeum murinum Steud.	Th
Lamarckia aurea (L.) Moench	Th
Lolium rigidum Gaudin	Th
Lophochloa cristata (L.) Tzvelev	Th
Phragmites australis (Cav.) Trin. ex Steud	G
Piptatherum miliaceum (L.) Coss.	G
Poa annua L.	Th
Polypogon monspeliensis (L.) Desf.	Th
Stipa capensis Thunp.	Th

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

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

	Life Form
Amaranthaceae	
Amaranthus blitoides S. Watson	Th
Asclepiadaceae	
Calotropis procera (Aiton) Aiton.	N
Asteraceae	
Amberboa libyca (Viv.)Alavi.	Th
Artemisia campestris L.	H
Carduus argentatus L.	Th
Calenula arvensis L.	Th
Centaurea dimorpha	Th
Conyza bonariens (L.) Cronq.	Th
Echinops spinosissimum Turra.	H
Filago fuscescens Pomel.	Th
Hypochoeris achyrophprus L.	Th
Hypochoeris glabra L.	Th
Lactuca serriola L.	Th
Launaea resedifolia (L.) Kuntz.	Th
Leontodon simplex (Viv.) Widder.	Th
Matricaria aurea (Loefl.) Svhutz Bip.	Th
Onopormum arenarium Hossain & Sarraf	H
Reichardia tingitana (L.) Roth.	Th
Senecio gallicus Chiax vin.	Th
Senecio vulgaris L.	Th
Silybum marianum (L.) Gaertn.	Th
Sonchus oleraceus L.	Th
Boraginaceae	
Hornuzakia aggregata	Th
Echium angustifolium Mill.	H
Brassicaceae	
Brassica tournefortii Goun.	Th
Enarthrocarpus clavatus Delile ex Godr.	Th
Lobularia maritima (L.) Desv.	H
Lobularia libyca (Viv.) Meisner.	Th
Sisymbrium irrio L.	Th
Sisymbrium oreintale (L.) Scop.	Th
Caryoplhyllaceae	
Polycarpon tetraphyllum (L.) L.	Th
Silene gallica L.	Th
Spergularia diandra (Guss.) Boiss.	Th
Stellaria media (L.) Vill.	Th
Chenopodiaceae	
Chenopodium ambrosoides	Th
Chenopodium album L.	Th
Chenopodium murale L.	Th
Salsola kali auct. non. L.	Th
Cuscutaceae	
Cuscuta campestris Yunchr.	Th
***Euphorbia*ceae**	
Euphorbia terracina L.	H
Ricinus communis L.	N
Fabaceae	
Hippocrepis multisiliquosa L.	Th
Lotus halophilus Boiss et Spruner.	Th
Medicago polymorpha L.	Th
Ononis reclinata auct. Pal. non L.	Th
Retama raetam (Forssk.)Webb	N
Trifolium tomentosum L.	Th
Vicia villosa Roth.	Th
Geraniacea	
Erodium laciniatum (Car.) Willd.	Th
Erodium moschatum (L.) L'Her.	Th
Geranium molle L.	Th
Illcebraceae	

Paronychia arabica (L.) DC.	Th
Malvaceae	
Malva parviflora L.	Th
Memosaceae	
Acacia cyanophylla Lindley	P
Myrtaceae	
Eucalyptus leucoxylon F.Muell.	Ph
Eucalyptus camaldulensis Dehnh.	Ph
Plantaginaceae	
Plantago lagopus L.	Th
Plantago albicans L.	H
Polygonaceae	
Emex spinosus (L.) Camp.	Th
Polygonum equisetiforme Sibth.	H
Rumex vesicarius L.	Th
Primulaceae	
Anagalis arvensis L.	Th
Santalaceae	
Thesium humile Vahl.	Th
Solanaceae	
Datura innoxia Mill.	Th
Nicotiana glauca Graham.	N
Solanum nigrum L.	Th
Tamaricaceae	
Tamarix aphylla (L.) Karsten	N
Urticaceae	
Urtica pilulifera 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 Raunkiae 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 Panerophytes and Geophytes with 3 species each (Table 3and Fig 2).

Table 3: Shows a Number of Species According to Their Life Forms

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

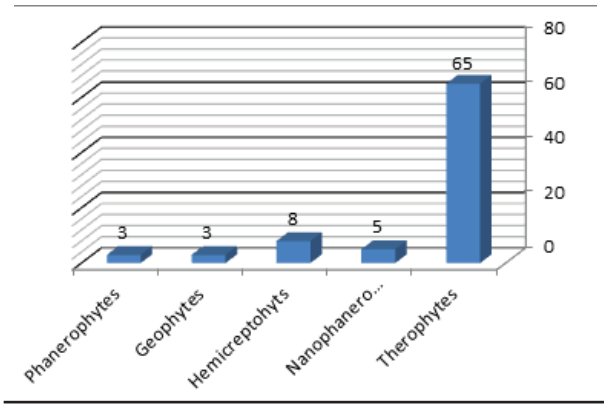

Figure 2: Shows a Number of Species According to Their Life Forms

The dominance of the family Asreraceae 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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