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Check list of flora and vegetation of Hafer Albatin region, northeastern Saudi Arabia

Abstract

The piece of work has been designed to study the present–day vegetation and document the flora of wild plant of Hafr Al–Batin region northeastern Saudi Arabia. During this survey ,specimens were collected randomly from different sites during two successive year (2014 –2016) a total of 83species of plants were identified, belonging to 21 families(16 monocotyledonous from 5 families and 67dicotledonous from 16 families were recorded. The most highly represented families were *Asteraceae* was the richest (23 species) 28% followed by *mimosaceae* (7 species) 8.5% and *Poaceae* (6 species each) 7.3% over of abundance have been Estimated plenty fullness of a species of target group according to a predefined scale The most important plant species were either major dominant species, like *Schimpera arabica,Rumex vesicarius, Launea nudiculis, Malva parviflora ,citrullus colyocynthis ,Stipa capensis*. *Plantago boissieri* or rare endangered and vulnerable such as *Artemisia* sp, *Haloxylon salicornicum*, Calendula tripterocarpa and rare species such as *Acasia tortilis*. Check list of flora demonstrated high annual plant diversity (56.5%) and perennial (43%) the diversity of species corresponds higher means of percentage cover during rainy season in winter at the study area. Future effective conservation and management plans has been needed to the present day vegetation cover and floristic composition in the study area as it contains important species for sustainable development, preservation of biodiversity through the wild plants and endangered for a better environmental future.

Keywords: vegetation, diversity, floristic, sustainable, endanger

Volume 3 Issue 3 - 2018

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Received: November 14, 2017 | **Published:** May 15, 2018

Introduction

Exploration of biodiversity becomes more and more important than ever as to know the cause of rapid depletion of species and ecosystems kumar et al.[1] Native plants are the key components of the global biological diversity, are highly adapted to the local environmental and climatic conditions and represent wealth must be preserved and rational development. It is a major source of primary productivity upon which human and animal. Non–exploitation has resulted in environmental systems guide particularly dry areas which are decreasing in intensity and growth of many natural and pastoral species becoming endangered. Wild plant has been utilize by people to meet their food need especially in periods of food shortage.[2] Saudi Arabia is generally an arid desert country with a few exceptional sub–humid regions on the south–western part, located in the (Lat. 25°0'0" N, Long. 45°0'0" E) with an area of about 2250,000 sq kms covering the major part of the Arabian Peninsula. The flora of the Sudia has a wide range of ecological habitats and characterized by different ecosystems and diversity of plant species.[3] The flora is the admixture of the elements of Asia, Africa and Mediterranean region. Therefore Saudi Arabia is one of the richest of wild biodiversity areas in the Arabian Peninsula.[4]

Vegetation types in the Saudi

Very little is known about the floristic composition and vegetation diversity in this study area, there is lack in flora documentation and have not received much attention,except few studies of the vegetation desert of eastern and central part have been discussed by Vasey–Fitzeraid[5] and Mandaville[6] who made an illustrated guide to the flora of the Eastern Saudi Arabia. However several studied have been by the neighboring Kuwait.[7–11] Brown[12] studied major causes of desert land vegetation degradation and made plane to re–establishment of the natural vegetation in Kuwait. Blatter[13] was the first compiled most of the major and minor collections of the previous visitors and published a detailed checklist of the wild plants of Arabia Extensive work on environmental requirements and various studies of vegetations have been conducted by on regional flora of the country[14] have been published The most important studies that have been in Saudi Arabia and regarded as the as the reference.[15] The only one who has been described as plant species Chaudhary[16,17] who were evaluate the life of plant in deserts and xerophytes vegetation makes up the prominent features of the plant form life.[17] However desert annual may flower and set seeds within a few weeks after germination due to soil. Recently furthermore, Floristic composition and ecological studies has been published on the vegetation at different Areas at Saudi Arabia by many authors[18–21] who reported the medicinal plant diversity in the flora of the area. Wadis represent one of the most prominent desert land forms in the dry lands because the country has not permanent rivers. Natural Vegetation analysis and floristic composition of Wadi have been reported by El Ghazali et al.,[22] Alatar et al.,[23] Aldhebianai et al.[24] Wadi vegetation change from year to another depending upon moisture content.[25]

Theme of the work

The present investigation is the first study of wild flora of Hafer –Albtain area, this investigation is an attempt to gather base line information of the floristic composition, life form and to provide record of wild species flora of this area to contribute the distribution of

native plant species, in order to establish record of diversity, stimulate further study on the flora of Saudi Arabia, and prospect of development in the future due to the climate and environmental change.

Study Area

The floristic survey in this research paper was carried in Hafer Albatin region, which is located in the Eastern Province. It is located 430 km north of Riyadh, 94.2 km from the Kuwait border, and about 74.3 from the Iraq border. The study area lies in the dry valley of Wadi Al–Batin, part of Wadi Al–Rummah, which leads inland towards Medina and formerly emptied into the Arabian Gulf (Figure 1).

Figure 1 Location of the study area of Hafr Al batin Area in Saudi Arabia.

Climate

The impact of climate change, manifested by warmer and drier climates of Hafer Albatin in recent decades, affects the ecosystems leading to a contraction of suitable habitats for endangered plants, and even the loss of endemic species. The climate is characterized by very hot, dry summers and cool rainy winters with temperature rising from 15°C in January to a maximum of about 42°C in August–September period. Annual rainfall means range from 20–55mm.

Materials and methods

Sampling sites

A total of four sites were selected in the study region to represent different composition habitats, in the period from January to September 2014–2016 represents the optimum growing and flowering seasons covering winter and summer seasons, in each sites four habitat were selected s as fallow:

I. **Site1:** Hafer Albatin and Qusoma city

II. **Site2:** Desert plane and Wadi Albatin and runnels are linear features formed in the landscape, which may flow with water during heavy rainfall.

In each site, species that are adapted to spread quickly in times of rainfall in residential neighborhoods fallow land, desert, and species that associated with man–made and man–influenced sites, such as roadsides, streets were surveyed and collected.

Collection and identification of plant components

The collected plant specimens were examined and identified by using the keys given by Mandaville,[6] Chaudhary,[16,17] Migahid,[26,27] Anderews,[28] & Cope[29] Norton et al.[30] a reference manual of Riyadh 2014 and different relevant regional and Asian Flora available, and taxonomic publications of Saudi and neighboring countries were used. Voucher specimens of these species were collected, pressed, mounted and deposited at Faculty of Science (Hafr Albatin University). Synoname of species were recorded from many references and cites Visual cover abundance were recorded by using a modified Braun–Blanquet system , along the random transect in khors, desert plane and fallow in filed for trees, shrubs and herbs, to record abundance of vegetation. Estimates plenty fullness of a species of target group according to a predefined scale such as rare, infrequent, abundant, etc.[31] (Table1) and all plant species studied, were classified according to their growth habits, and Raunkiaer's life forms system[32] was used. Field observation of vegetative part of floral has been noted during collection).Full species, list and diversity with estimate obtained for various sub–habitats in the study area.

Result and Discussions

Floristic diversity and composition

A total of 83 species of plants, belonging to 21 families (14 monocotyledonous and 69 dicotyledonous) Figure 2 were recorded from various sample occupying different habitat types in the study area (Table 1). The most highly represented families were *Asteraceae* was the richest (23 species) 28% followed by *mimosaceae* (7 species) 8.5% and *Poaceae* (6 species each)7.3%, *Curciferae, Chenopodiaceae, Zygophyllaceae* (3species) 3.3% Amaranthaceae, lilaceae, *Malvace polygonaceae Rhamnaceae, Euphorbiace, Plantagoaceae Apocynaceae* (2 species each) 2.4% and twelve plant families (*Acanthaceae, Convolvulaceae Tamaricaceae, Caparacaeae, scalpidaceae ,Caselpinaceae*) were represented by only one species occupying different habitats. A comparison of families in term of largest number of species recorded in this study is similar studies in different region of Saudi Arabia[23] Percentage of taxa relation to their family diversity has been given in Figure 3. Some of the scientific names, synonyms were extracted from references such as Migahid.[26,27] Life form and life span for species were mentioned. The results showed that the fallow of site1 permit the development of the highest number of plant species, the most plant species were annual herbs mainly due rainy season, with sufficient moisture content and fertile soil as found by[33] Wadi and runnels occupied an intermediate position with respect to species diversity They constituted about 50% % of the recorded species, and represented most of the floristic structure in the area by neighbors' Kuwait.[34] Species diversity and abundance, given in Table 1 show that the taxa evenness and diverse was highest in Study area fellow site, rood side and moisture habitat and wadi bed and desert. Check list species of present work revealed that study area was characterized by plants with different life forms (Table1) herb permit highest number 81.70% fallowed by shrub (9.70%) and tree (8.50%) and Life form are important ways of categorizing plants, and for the life span in the two year, all locations were characterized by highest annual plant diversity and lowest perennial diversity Aldhebianai et al.[24]

Species abundance

Species community members in the different habitat and soil types were, either dominance like *Schimpera arabica, Rumex vesicarius, Launea nudiculis, Malva parviflora, citrulluscolyocynthis, Stipa capensis, Plantago boissieri* or rare endangered and vulnerable such as *Artemisia* sp, *Haloxylon salicornicum, Calendula tripterocarpa* and rare species such as *Acasia tortilis*. Vegetation of Wadis and runnels in general is not constant; it varies from year to year, depending upon the moisture level and human effect fallow land that used as pastoral.[25]

Citation: Mohammed–Ibtisam MI, Doka GM. Check list of flora and vegetation of Hafer Albatin region, northeastern Saudi Arabia. *MOJ Eco Environ Sci.* 2018;3(3):138–143. DOI: 10.15406/mojes.2018.03.00078

Hafer A lbatin region comprises diverse ecosystems and presents very interesting aspects for vegetation studies.[35–37]

Table 1 List of species recorded in the study area with their families, life form, and abundance

S. No	Scientific name	Local name	Family	Life form & span	Ab	Site–1	Site2
1	Aaronsohnia factorovskyi	Alqaras	*Asteraceae*	A,h	C	H–K	
2	Acacia tortilis	Samur	*Mimosaceae*	p.t	VR		W
3	Achillea fragrantissima	Qisum	*Asteraceae*	A.h		H–K	
4	Allium ampeloprasum	Alkirath	*Liliaceae*	A,h	R	H–K	
5	Alhagi graecoru	Eaqul	*Mimosaceae*	p.h	R	H	Wd–dp
6	Amranthus spp		*Amranthaceae*	A,h	R	H–K	
7	dis Amranthus vir	kaff almahna	*Amranthaceae*	A,h		H–K	Kh
8	Anthemis edumea	'aqhwan	*Asteraceae*	A,h	R	H–K	
9	scoparaia Artemisia	Awzan	*Asteraceae*	bi,h,	R	G	Wd
10	Arnebia hispidissima	kahil – fanun	*Asteraceae*	A, h	R	H	
11	Artemisia sieberi	Shayh	*Asteraceae*	p, sh	vR	H– G	Kh
12	Artemisia monosperma	bieithran	*Asteraceae*	A,h	D	H	
13	Aristda adscensions	Safasaf	*Poaceae*				Dp
14	Asphodelus tenufolius	buruq	*Asphodelaceae*	h,b	vR	H–K	
15	Astragalus haurensis	'asabie aleurus	*Mimosaceae*	A,h	vR		Dp
16	Astragalus seiberi	Qita	*Mimosaceae*	A,h	vR		
17	Astragalus spinosa	Qita	*Mimosaceae*	A,h	vR	H	
18	Astragalus spinosus	qitad – kathad	*Mimosaceae*	A,h	R	H	Wd
19	Bassia eriophora	Ummhaas					
20	Blepharis ciliaris	Shook althub	*Acanthaceae*	p.h	D		Kh–w
21	Calendula officinalis		*Asteraceae*	A,h			Kh–w
22	Calendula ervensis		*Asteraceae*	A,h	R	H–K	
23	Calligonum comsum.	Arata	*Polgyonaceae*	p.t	R	H	
24	Cassia italica	Ishrig	*Caselpinaceae*	p.t	R	–	Kh–w
25	Calotropis procera	Usher	*Asclapidacea*	p.sh	R	H	
26	Citrullus colocynthis	Shri	*Cucurbitaceae*	p.h	D	H–G	Kh–w
27	Capparis spinosa	Shaflah	*Capparsaceae*	p.h			Kh–w
28	Carthamus Lanatus	juza'	*Asteraceae*	A.h	R	H–	
29	Chenopodium album	Zorbaih	*Chenopodiaceae*	A.h	R	H	
30	Chenopodium spp	–	*Chenopodiaceae*	A.h	R	H–G	
31	Chrozophora spp	Tanoom	*Euphorbiacaea*	A.h	v.r	G	
32	Convolvulaus prostrate	Muded	*convolvulaceae*	A.h	R	H	Wi
33	Cynodon dactlyon	Thyl	*Poaceae*	p.h	C	H–K	
34	Cyperus involucratus	Saed	*Cyperaceae*	p.h	R	W	H–K
35	Cyperus conglomerate	Saed	*Cyperaceae*	p.h	R	–	H
36	Diplotaxis Harra	Ghafash	*Brassicaceae*	A.h	R	–	H
37	Echinops husson	shadq aljamal	*Asteraceae*	P	v.r	–Kh	–
38	Euphorbia aegyptiaca Boiss.		*Euphorbiacea*	A.h	R	–	H–K
39	Eruca sativa (L.) Mill.		*Brassicaceae*	A.h	R		H–K
40	Fagonia indica Burm.f.	'abu shuk	*Zygophllaceae*	p.h	c	Dp–w	–
42	Forskoalea tenacissima	Allasig	*Urticaceae*	p.h	D	W	H–K–G

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Table Continued

S. No	Scientific name	Local name	Family	Life form & span	Ab	Site–I	Site2
43	Gagea reticulate	'abu jaris	*LILIACEAE*	A.h	R		K
44	Helianthemum lippii	Raqruq	*Poraginaceae*	A.h	R		H–K
45	Hirschfeldia incana	Alkhizami	*Cruciferae*	A.h	R		H
46	Heliotropium crispum	Ramram	*Poraginaceae*	A.h	R		H
47	asiocacopum Heliotropium		*Poraginaceae*	A.h	R		G–H
48	Lactuca salignal(L)		*Asteraceae*	A.h	D		H–K–
49	Ifloga spicata(forssk)	dhil alqat	*Asteraceae*	A.h	R		H
50	Lasiurus Scindicus	Daah	*Asteraceae*	p.h	R	W	–
51	Launaea nudicaulis(L)Hook	Hawa	*Asteraceae*	p.h	D	Dp	H–K–G
52	Launea capitata	Hawa'	*Asteraceae*	A.h	C		
53	Launea intybacea	Hawa'	*Asteraceae*	A.h	C		
54	Malva sylvestris L.	Khabiza	*Malvaceae*	A.h	D–v	W–DP	H–K–
55	Malva parviflora	khabiza	*Malvaceae*	A.h	D–v	W–DP	H–K
56	Matricaria Aurea	Babunj	*Asteraceae*	A.h	R		H–K
57	Merua crassifolia	Sarh	*Ccapparacea*	P,sh	R	w–dp	
58		–	*Geraniaceae*	A.h	R	Dp	
59	Neurada procumbens	–	*Neuradaceae*	A.h	–	W	G–
60	Nerium oleander	Dafalah	*Apocynaceae*	p.t			H
61	Ocimum basilicum	Rihan	*Labiatae*	p.h	R	Wd–dp	G–H–K
62	Phoenix canarienisis	Nakheel	*Palmae*	p.t	R	Wd–dp	H–k–G
63	Portulaca sp	Regla	*portulacaceace*	A.h	VR		H
64	Plantago boissieri	alrrabla ا	*Plantagonaceae*	A.h	C	Dp	H–K
65	Plantago afral	alrrabla ا	*Plantagonaceae*	A.h	R	Dp	H–K
66	picris abyssinca	–	*Asteraceae*	A.h	R		G–H–K
67	Prosopis sp	Mesquite	*Mimosaceae*	p.t	R	Wd	H
68	Pulicaria undulata	–	*Asteraceae*	A.h	R	Dp	H–K
69	Pulicaria crispa	Jisjas	*Asteraceae*	A.h	R		H–G
70	Pulicaria vulgris		*Asteraceae*	p.h	R	Wd	H
71	Rumex vesicarius	Humadh	ا polygonacea	A.h	D		H–K–G
72	Rhanterium apapposium	Arfaj	*Asteraceae*	p.sh	C	W	G
73	Stipa capensis	alssumea	*Poaceae*	A.h	C		H—G
74	Sonchus olaraceae	laeadid	*Asteraceae*	A.h	D	Wd–dp	H–G–K
75	Stipa capensis	alssumea	*Poaceae*	A.h	D	–	H–
76	Schimpera Arabica	safar	*Cruciferae*	A.h	D	Wd	H–G
	Schismus sp	Khafur	*Poaceae*	A.h	R		H
77	Stipa grostis	Niss	*Poaceae*	P	R		H
78	Tribulus parvispinus Persl.	Shari	*Zygophyllaceae*	A.h	D	Wd	G –H–K
79	Tribulus teristris	Shari	*Zygophyllaceae*	A.h	D		H–K
80	Zilla spinosa		*Brassicaceae*	Sh	C	Wd	–
81	Tancetum sp	alqarqas	*Asteraceae*	A.h	D		H–K
82	Ziziphus nummularia	Sidir	*Rhamnaceae*	p.t	R		H
83	Ziziphus spp	Sidir	*Rhamnaceae*	p.t	R	Wd	H

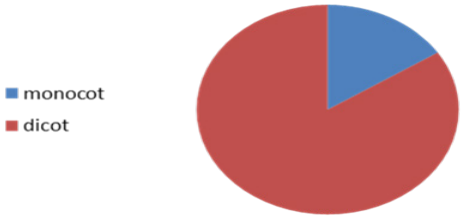
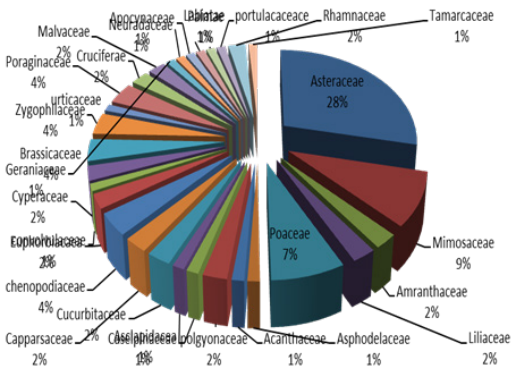


Figure 2 Percentage of plant type



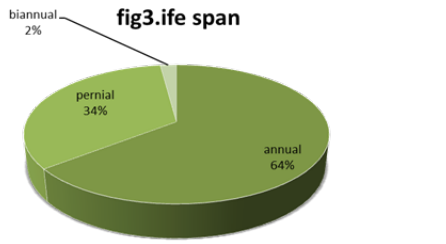


Figure 3 Percentage of taxa relation to their family.

Conclusions and recommendations

The study is reported for the first time the list of wild flora on the aspect to determine, vegetation life form, and diversity. Selected major dominant plant species, endangered, or, rare species composition. Document the present vegetation abundance of the natural systems of the study area by identification, improvement of status of natural vegetation unites is a vital to the future stability of pastoral a study area. The study will facilitate strategies for management of wild plant and conservation habitat that are best to sustain medicinal, fodder, aromatic, wildflowers and native vegetation habitat. Most of the natural vegetation in the study are were medicinal and fodder plant, and their habitat are threatened by continued degradation. Study recommended that the collection and Identification of vegetation and wild plant from wild sources should be managed on sustainable base and can only be known and maintained by performing more studies of this type This will shade light on endangered species and other important types.

Acknowledgements

None.

Conflict of interest

Author declares there is no conflict of interest.

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Citation: Mohammed–Ibtisam MI, Doka GM. Check list of flora and vegetation of Hafer Albatin region, northeastern Saudi Arabia. *MOJ Eco Environ Sci.* 2018;3(3):138–143. DOI: 10.15406/mojes.2018.03.00078