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Floristic Composition, Life Form and Chorology of Plant Life at Al-Saoda, Asir Region, South-Western Saudi Arabia

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Abstract
Asir highlands constitute a major part of south-western Saudi Arabia, and have a temperate climate at elevations above 2500 m a.s.l. This area has a complicated topography. The variations in elevation and topography have resulted in distinctive vegetational zones. Floristic composition, life form and chorology of plant life at Al-Saoda region south – western Saudi Arabia was studied. Three major wadis (sites) were investigated , every site was represented by three localities representing up-stream , mid-stream and down-stream portions of each site. Nine field trips were carried out during 18 months .Vegetation of three localities (Wadi Tahlal , Wadi Al-Moght and Beni Mazen) was studied . Results revealed that the region considers a hot-spot in the Kingdom in term of plant diversity and more diverse compared with other well studied regions in Saudi Arabia. A total of 103 plant species belonging to 40 families were recorded in study area. The major plant families that contributed in the formation of vegetation of the area in question were Asteraceae (22.3%) followed by Papilionaceae(8.7%) ,poaceae, (6.7%), Lamiaceae (5%), Mimosoaceae (4%) while other families each was represented by two or one species. Therophytes exhibited the maximum number of species (35%), followed by chaemophytes (32%), hemicryptophytes (15%) and phanerophytes (9.8%), while the least frequent life form class was geophytes and epiphytes .Chorological characteristic of the recorded flora showed that Saharo-Arabian and Sudanian elements constitute % of the total flora.
Keywords: dsfloristic composition , vegetation , Asir region ,chorology , diversity

Introduction
The Kingdom of Saudi Arabia with its 225,000 sq. kilometer area, occupies four fifths of the Arabian Peninsula. As a result of its geologic history, the country shares its flora with Africa in the west, Asia in the northeast, east and southeast and with the Mediterranean region in the northwest and the north. In global geographical term, the vegetation of Saudi Arabia in general has been referred to as belonging to the Arabian sub-zone of the Saharo-Sindian phytogeographical zone (Zohary 1973 and Chaudhary 1999).

Vegetation
The vegetation of Saudi Arabia reflects the geographical position of the Arabian Peninsula between Africa, Asia and Europe. Consequently, the flora has many elements of two of the eight global terrestrial realms; namely the Palaearctic (Europe and Asia) and the Afro-tropical (Africa south of the Sahara) as well as a smaller complement of elements from the Indo-Malayan Terrestrial realm. It is thus an area of ecological and academic significance (Ghazanfar, 2007). A total of 2250 species (including pteridophytes and gymnosperms) in 142 families are recorded in the flora of the Kingdom of Saudi Arabia (Fig.1)..According to Collenette (1998), the greatest species diversity in Saudi Arabia occurs in Asir and Hejaz, the western mountainous area of the Kingdom, which borders the Red Sea which can be attributed to a greater rainfall and range of altitude from sea level up to 9,300 ft. Many previous studies showed that topography of the area and the climatic factors are the main factors affecting the degree of speciation (Abulfatih, 1992; El- Kady *et al.,* 1995; Shaltout&Mady 1996; Shaltout*et al.,* 1997)

Study area
Asir region is a mountainous region in southwestern Saudi Arabia located between latitudes 17.25 and 19.50 north and longitudes 50.00 and 41.50 east longitude. It covers approximately 40,000 sq km and consists of mountains, plains, and valleys (wadis). The mountains of southwestern region form a continuous chain of escarpments, extending from Taif to Yemen border. The peaks reach elevations of over 2000 m in the vicinity of Taif and extreme south and over 3000 m in Al-Saoda area. On the western side of the highlands, the mountains fall in a series of dramatic escarpments and finally merge with the Tihama coastal plain while the eastern sides slop more or less gradually towards the interior parts of the country. Asir Mountains are characterized by cool climate, high precipitation and high humidity. The landscape of the region holds a variety of plants, most of which have an affinity with the plants of East African countries. The spectacular beauty and pleasant climate of Asir Mountains attract many people from the central and eastern parts of the country during summer.

Materials and methods

The present work deals with an ecological study on three sites (wadis) at Al-Saoda region namely Wadi Tahlal, Wadi Al- Moght and Beni Mazen; each site was represented by three localities representing up-stream, mid-stream and down-stream portions of each site. Eight field trips were carried out during a period of 18months(2012-2013)

Data collection

The plant life in 3 wadis represents Al-Saoda region was surveyed from Jun 2012 to Dec 2013 .The following characters were studied to determine the floristic composition of plant species in the study regions: 1) list of species 2) degree of abundance-dominance (according to the scale of Braun Blanquet,1964. Presence of each species in all sites was calculated.

Plant species were classified according to their life form (Rankiaer, 1934). Nomenclature and identification of plants followed Chaudhary, S.A. (ed.) 1983-1999and Collonette (1999) . The Chorotypes of the recorded species was determined from Zohary 1966, 1987; and Boulos 1999, 2000, 2005.

Results and discussion

The floristic composition of Asir Mountain in the Kingdom of Saudi Arabia consists of 103 species belonging to 40families, 85 dicotyledons (dicots), 18 monocotyledons (monocots). Asteraceae was the dominating family in the study area. According to the Raunkiaerian life form therophytes(35%) followed by . Chaemophytes(32%) hemicryptophytes (15%) and phanerophytes (9.8%), while the least frequent life form class was geophytes and epiphytes .Chorological characteristic of the recorded flora showed that Saharo-Arabian and Sudanian elements constitute (61%) of the total flora (Appendix 1) .

Species diversity

Species belonging to forty families of angiospermae were recorded in the concerned area (Al-Saoda region).These families comprise 103 species . Asteraceae , papilionaceae and poaceae contributed 37.7% of the total recorded species (Appendix 1)

Life form

The life form spectra of the vegetation in Al-Saoda mountains indicated that therophytes (35%) had the highest contribution in the study area of the total recorded species, followed by chamaephytes (32%), , hemicryptophytes (15%), phanerophytes (9.8%) and Geophytes (4.8%). While epiphytes were the lowest with a total relative value of 1.9% (Fig. 4).

Chorology

Chorological characteristic of the recorded flora showed that Saharo-Arabian and Sudano - Zambezian region elements recorded the highest number (58 species) followed by Mediterranean (26 species) , cosmopolitan (9)

Conclusion

A total of 2250 species in 142 families are recorded in the flora of the Kingdom of Saudi Arabia (Fig.1). The greatest species diversity in Saudi Arabia occurs in Asir and Hejaz, the western mountainous area of the Kingdom, which borders the Red Sea which can be attributed to a greater rainfall and range of altitude from sea level up to 2500 m.a.l. Many previous studies showed that topography of the area and the climatic factors are the main factors affecting species diversity. The floristic list of Al-Saoda region in Asir region- Kingdom of Saudi Arabia consists of 103 species belonging to 40 families. Asteraceae was the dominating family in the study area. The life form spectra of the vegetation in the study area indicated the dominance of therophytes (35% of the total recorded species) , followed by chamaephytes (32%). Saharo-Arabian and Sudano—Zambezian choroyypes were the most represented species (Abulfatih, 1992; El-Demerdash, et.al. 1994 Shaltout&Mady 1996; Shaltout *et al* 1997; Heneidy, *et al*. 2001 Al- Wadie, H. 2002; Yemeni & Sher, 2010; and AL-Sherif, et.al. 2013) .

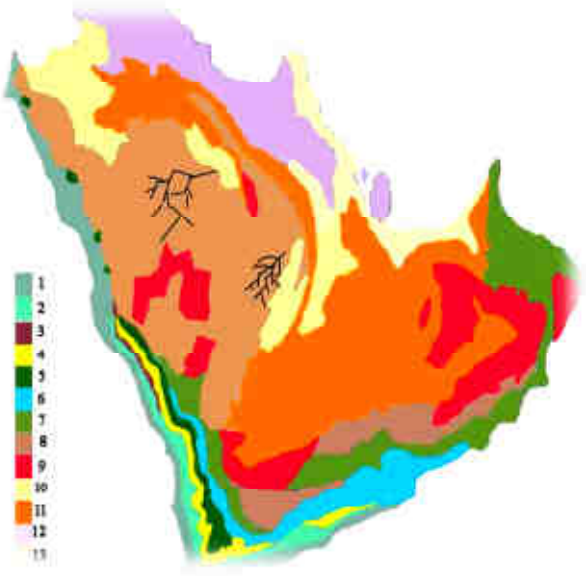

Fig.1

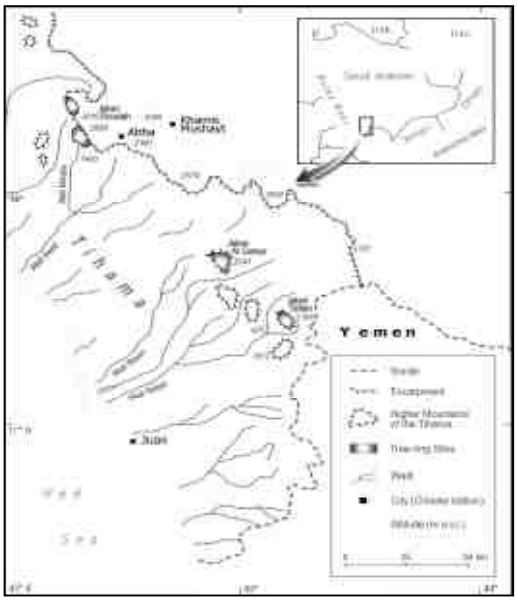

Fig. 2

Figure.1.vegetation of Saudi Arabia (1 and 13). Deserts and sparsely vegetated areas (8, 9 & 11), Dwarf shrublands and related communities (10 & 12, Mountain woodlands and xenomorphic shrublands (2, 3, 4, 5, 6 & 7), Wadi Communities (14)
Figure. 2. Location map of the studied area showing .

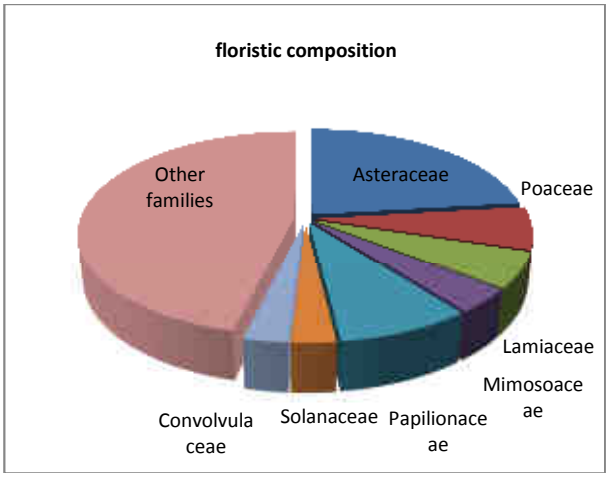

Fig.3.

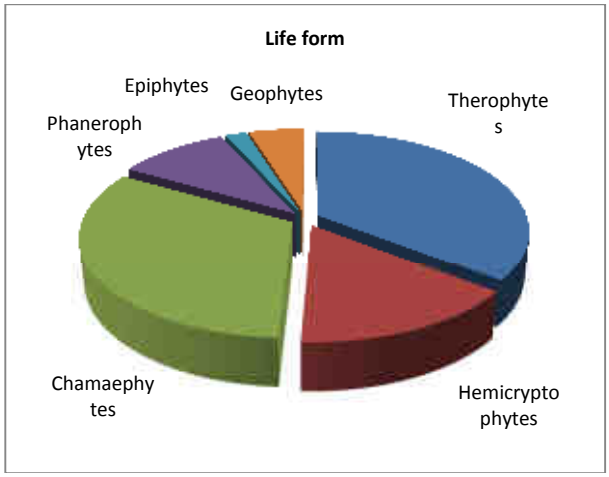

Fig.4.

Figure.3. Plant families dominated the studied area.
Figure.4. Proportional percentage of life forms for the study area.

Appendix (1) Floristic composition of plant species recorded in wadis of Al-Saoda .+++ = very common,++ = common , + = occasional , Life forms :
h = phanerophytes ,Ch = chamaephytes, H = hemicryptophytes, Cr = cryptophytes, Th = therophytes, HE = hemiepiphytes, Ep = epiphytes, P=presence, G.P = general presence The chorotypes are: Cosm, cosmopolitan AM, American; IT, Irano-Turanian; ME, Mediterranean; SA, Saharo-Arabian; SU, Sudano -
Zambezian and TR, Tropical, PAN, Paneotropic

No	Plant species	Family	Life form	chorotype	WadiTahlal				Wadi Al-Moght				BeniMazen				G.P %
					S1	S2	S3	P%	S1	S2	S3	P%	S1	S2	S3	P%	
Perennials																	
1	*Juniprus procera* Hochst.ex Endl.	*Cupressaceae*	Ph	Cosm	+++	+++	+++	100	+	++	+	100	+	+	+	100	100
2	*Acacia ehrenbergiana* Hayne.	Mimosoaceae	Ph	SU	+	+	+	100	+	++	+	100	+	++	+	100	100
3	*Dodnaea angustifolia* L.	Sapindacaceae	Ph	SU	+++	++	++	100	++	++	+	100	++	+	+	100	100
4	*Lavandula dentate* L.	Lamiaceae	Ch	SA+SU	+++	+++	+++	100	++	++	+++	100	+	++	+	100	100
5	*Achillea fragrantissima* (Forssk.) Sch.	Asteraceae	H	SA+SU	++	+++	+++	100	+++	+++	+	100	++	+	+	100	100
6	*Rumex vesicarius* L.	Polygonaceae	Ph	SA	+++	+++	+++	100	++	+++	+	100	++	++	+	100	100
7	*Opuntia dillenii Haw*	Cactaceae	Ch	PAN	++	+	+	100	+++	++	++	100	++	++	+	100	100
8	*Rhus abyssinica* Hochst.	Anacardiaceae	Th	SA+SU	+	+	-	66.7	+	+	+	100	+	+	+	100	89
9	*Euphorbia schimperiana* Scheele	Euphorbiaceae	Th	SA+SU	++	++	+	100	-	+	+++	66.7	+	+	+	100	89
10	*Cynodon dactylon* (L.)Press.	Poaceae	G	Cosm	+++	++	++	100	+	++	-	66.7	++	++	+	100	89
11	*Amaranthus spinisus L.*	Amaranthaceae	Th	AM	+	++	-	66.7	+	+	+	100	-	+	+	66.7	77.8
12	*Achillea biebersteinii* Afan.	Asteraceae	Th	SA	-	+	+	66.7	+	++	+	100	+	++	-	66.7	77.8
13	*Acacia gerrardii Benth.Zoh.*	Mimosoaceae	Ph	SU	+++	+	+	100	+	+	+	100	+	-	-	33.3	77.8
14	*Rumex steudelii* A.	Polygonaceae	Ph	SA	++	++	+	100	+	+	-	66.7	-	+	+	66.7	77.8
15	*Echinops abuzinadianus* Chaudhary	Asteraceae	H	SA+ME	-	-	+	33.3	+	++	++	100	++	++	+	100	77.8
16	*Rosa abyssinica* Lindly	Rosaceae	Ph	SA+SU	++	++	+	100	+	-	+	66.7	+	+	-	66.7	77.8
17	*Ajuga brateosa* Wall.	Lamiaceae	Ch	SA+ME	+	+	-	66.7	+	+	+	100	-	++	+	66.7	77.8
18	*Euphorbia schimperi* Presl.	Euphorbiaceae	Th	SA+SU	+++	+	+	100	+	++	+	100	-	-	+	33.3	77.8
19	*Crassula alba* Forssk	Crassulaceae	Ch	SA	+++	+	+	100	+	+	+	100	+	-	-	33.3	77.8
20	*Juncus fontanesii* J.Gay	Juncaceae	H	IT+SA	-	+	-	33.3	++	+++	+++	100	+++	+++	+	100	77.8
21	*Solanum incanum* L.	Solanaceae	Th	SU	+++	+	++	100	++	-	-	33.3	-	+	+	66.7	66.7
22	*Crepis faetida* L.	Asteraceae	Ch	SA+SU	+	-	+	66.7	+	+	+	100	+	-	-	33.3	66.7
23	*Echinops hystrichoides*	Asteraceae	H	SA+ME	+	-	+	66.7	+	+	+	100	+	-	-	33.3	66.6
24	*Artemisia abyssinica* Sch. Bip	Asteraceae	Ch	SA+ME	++	+	-	66.7	-	-	-	-	+	+	++	100	55.5
25	*Anthemis yemenensis*Podlech. Mitt.	Asteraceae	Th	ME	+	+	+	100	-	-	+	33.3	-	+	-	33.3	55.5
26	*Conyza variegata* Sch.	Asteraceae	Th	SA+SU	++	-	-	33.3	-	+	-	33.3	++	+	+	100	55.5
27	*Senecio bojeri Dc.*	Asteraceae	Th	SA+ME	-	+	+	66.7	+	+	-	66.7	+	-	-	33.3	55.5
28	*Echinops yemenicus* Kit.Tan	Asteraceae	Ch	SA	-	-	+	33.3	+	++	-	66.7	-	+	+	66.7	55.5
29	*Sonchus maritimus* L.	Asteraceae	Th	ME+IT	+	+	+	100	++	-	-	33.3	-	-	+	33.3	55.5
30	*Reseda alba*L.	Resedaceae	Th	ME+IT	-	-	-	-	-	+	+	66.7	++	+	+	100	55.5
31	*Convolvulus arvensis L.*	Convolvulaceae	G	Cosm	+	-	-	33.3	+	+	+	100	+	-	-	33.3	55.5
32	*Typha domingensis* (Pers.) Poir.	Typhaceae	Ch	SA+IN	-	-	-	-	-	++	+	66.7	+	+++	+++	100	55.5
33	*Phragmanthera austroarabicus* A.G.Miller	Loranthaceae	Ep	SA	+++	++	++	100	-	+	+	66.7	-	-	-	-	55.5
34	*Plicosepalus curvflorus* Benth	Loranthaceae	Ep	SA+SU	+++	+++	+++	100	-	-	-	-	+	-	-	33.3	44.4
35	*Plantago lanceolata* L.	plantaginaceae	Ch	SU	-	-	-	-	-	+	-	33.3	+++	++	++	100	44.4
36	*Aerva javanica* Juss.ExSchult	Amaranthaceae	Th	TR	-	-	-	-	-	+	-	33.3	++	++	++	100	44.4
37	*Ficus vasta* Forssk.	Moraceae	Ph	ME	-	++	++	66.7	-	+	+	66.7	-	-	-	-	44.4
38	*Ochradenus baccatus* Delile	Resedaceae	Ph	SA	+	-	-	33.3	+	-	-	33.3	+	+	-	66.7	44.4
39	*Conyza incana* (Vahl) Willd.	Asteraceae	Ch	SA+SU	+++	++	++	100	-	+	-	33.3	-	-	-	-	44.4
40	*Senecio sumarae Del.*	Asteraceae	Th	SU	-	++	+	66.7	-	-	-	-	+	+	-	66.7	44.4
41	*Solanum villosum* (L.)Mill.	Solanaceae	Th	SA	+	-	-	33.3	-	-	+	33.3	-	++	+	66.7	44.4
42	*Pulicaria crispa* (Forssk) Oliv.	Asteraceae	Ch	SU	+	+	-	66.7	-	+	-	33.3	-	-	+	33.3	44.4
43	*Rhus natalensis* Krauss.	Anacardiaceae	Ch	SA+SU	-	-	-	-	-	+	-	33.3	+	+	+	100	44.4
44	*Capparis tementosa* Lam.	Capparaceae	Ch	ME	+	-	-	33.3	-	+	+	66.6	-	-	+	33.3	44.4
45	*Piutranthos tortusus* (Desf.)Benth.	Apiaceae	Ch	ME	-	-	+	33,3	+++	++	++	100	-	-	+	33.3	44.4
46	*Anagalis foemina* A.G.Mill.	Primulaceae	Th	ME	-	-	-	-	-	+	-	33.3	++	++	++	100	44.4
47	*Juncus inflexus* L.	Juncaceae	G	IT+SA	-	-	-	-	-	+	+	66.7	+	++	-	66.7	44.4
48	*Plantago albicans* L.	plantaginaceae	Ch	SA+SU+IT	-	-	-	-	-	+	-	33.3	+	++	++	100	44.4
49	*Verbascum bottae* Dell.	Scrophulariaceae	Ch	ME+ IT	-	-	-	-	+	-	-	33.3	+	+	-	66.7	44.4
50	*Acacia etbaica* Schweinf.	Mimosoaceae	Ph	SU	-	-	+	33.3	-	+	++	66.7	-	-	-	-	33.3
51	*Crepis ruepellii*Sch.	Asteraceae	Ch	ME+SU	-	+	-	33.3	-	-	-	-	+	+	-	66.7	33.3
52	*Blepharis ciliaris* (L.) B.L.Burtt.	Acanthaceae	Ch	IT+SA	-	-	-	-	+	+	-	66.7	-	-	+	33.3	33.3
53	*Conyza gouani*(L.) Willd.	Asteraceae	Ch	SA+SU	+	-	+	66.7	-	-	-	-	++	-	-	33.3	33.3
54	*Silene macrosolen* Steud.exA.Rich.	Caryophyllaceae	Th	ME	+	+	-	66.7	-	-	-	-	-	-	+	33.3	33.3
55	*Puilcaria vulgaris Gaertn.*	Asteraceae	Ch	SA+SU	-	-	-	-	-	-	-	-	+	-	+	66.7	22.2
56	*Acacia oerfota* (Forssk.) Schweinf.	Mimosoaceae	Ph	SU	-	-	+	33,3	+	-	-	33.3	-	-	-	-	22.2
57	*Launaea mucronata* (Forssk.)Muschl.	Asteraceae	H	SA	-	-	-	-	-	-	-	-	-	+	+	66.7	22.2
58	*Senecio hadiensis*Forssk	Asteraceae	Th	ME+IT	-	-	-	-	-	-	+	33.3	-	-	+	33.3	22.2
59	*Rnunculus peltatus* Schrank.	Rnanculaceae	G	SA+SU	-	-	-	-	-	+	+	66.7	-	-	-	-	22.2
60	*Pelargonium multibracteatum* A.Rich. Tent.	Geraniaceae	H	SU	-	+	-	33.3	-	+	-	33.3	-	-	-	-	22.2
61	*Silene conoidea* L.	Caryophyllaceae	Th	SA	-	+	-	33.3	-	-	-	-	-	+	-	33.3	22.2
62	*Pennisetum villosum* R.Br.exFresen.	Poaceae	H	SA	-	+	-	33.3	+	-	-	33.3	-	-	-	-	22.2
63	*Ruta chalepensis*L.	Rutaceae	Ch	SA	-	-	-	-	-	-	-	-	-	+	++	66.7	22.2
64	*Cyperus lavigatus*	Cyperaceae	G	Cosm	-	-	-	-	-	-	-	-	-	+	+	66.7	22.2
65	*Cenchrus ciliaris L.*	Poaceae	H	SA+SU	-	-	+	33.3	-	++	-	33.3	-	-	-	-	22.2
66	*Argyrolobium arabicum* (Decne.) Jaub&Spach	Papilionaceae	Ch	SA	-	-	-	-	+	-	-	33.3	-	-	-	-	11
67	*Argyrolobium confertum* Polhill.	Papilionaceae	Ch	SA+SU	+	-	-	33.3	-	-	-	-	-	-	-	-	11
68	*Crotalaria mucronata* Desv.	Papilionaceae	Ch	SA+SU	-	-	-	-		-	-	-	+	-	-	33.3	11
69	*Cirsium vulgare L.*	Asteraceae	Ch	IT	+	-	-	33.3	-	-	-	-	-	-	-	-	11
70	*Cichorium bottae* Dell.	Asteraceae	Th	IT	-	-	-	-	-	-	-	-	+	-	-	33.3	11
71	*Scutellaria arabica*	Lamiaceae	Th	ME	-	-	-	-	-	-	-	-	-	+	-	33.3	11
72	*Marrubium vulgare* L.	Lamiaceae	H	ME+IT	-	-	-	-	-	-	-	-	-	-	++	*33.3*	11
73	*Oleo chrysophylla L.*	Oleaceae	Th	ME	-	+	-	33.3	-	-	-	-	-	-	-	-	11
74	*Galium aparinoides* Forssk	Rubiaceae	H	IT+ME	+	-	-	33.3	-	-	-	-	-	-	-	-	11
75	*Dichondra repens J.R.* &G.Forst.	Convolvulaceae	Th	SA	-	-	-	-	-	+	-	33.3	-	-	-	-	11
76	*Imperata cylindrica* (L.)Raeusch.	Poaceae	H	SA	-	+	-	33.3	-	-	-	-	-	-	-	-	11
77	*Digitaria abyssinica (Hoch)* Stapf.	Poaceae	H	TR	-	-	-	-	-	-	-	-	-	-	+	33.3	11
78	*Panicum cloratum* L.	Poaceae	H	SA	-	-	-	-	-	-	-	-	-	-	+	33.3	11
79	*Asphodels aestivus* Brot.	Asphodolaceae	Th	SA+SU	-	-	-	-	-	-	-	-	-	+	-	33.3	11

80	*Carex distans*	Cyperaceae	H	Cosm	-	-	-	-	-	-	-	-	+	-	-	*33.3*	11
81	*Arnebia decumbens* (Vent.) Cross. &k.	Boraginaceae	Th	SA+SU	-	-	-	-	+	-	-	33.3	-	-	-	-	11
82	*Oxalis corniculata* L.	Oxalidaceae	Th	ME+IT	-	-	+	33.3	-	-	-	-	-	-	-	-	11
83	*Verbascum bottae Dell.*	Scrophulariaceae	Ch	SA	+	-	-	-	+	-	33.3	-	-	-	-	-	11
84	*Monsonia nivea* Decne.	Geraniaceae	Th	SU	-	-	-	33.3	-	-	-	-	-	-	-	-	11
85	*Caralluma acutangula* (Decne.) N.E.Br.	Asclepiedaceae	Th	SA+SU													
Annuals																	
86	*Capsella bursa-pastoris* (L.) Medik.	Brassicaceae	Th	Cosm	+++	++	++	100	++	+	+	100	+	+	+	100	100
87	*Silybum marianum* (L.) Gaertner.	Asteraceae	Th	SA+SU	++	++	+	100	-	+	+	66.6	+	+	+	100	88.9
88	*Indigofera spinosa* Forssk.	Papilionaceae	Th	ME	+	-	+	66.7	+	+	+	100		-	+	33.3	66.7
89	*Medicago lupulina* L.	Papilionaceae	Th	Cosm	-	-	-	-	+	-	+	66.7	+	+	-	66.7	44.4
90	*Ocimum menthaefolium* Hochsh.	Lamiaceae	*Ch*	SA	-	-	-	-	++ +	+	+	100	+	-	-	33.3	44.4
91	*Lepidium africanum*	Brassicaceae	*Ch*	Cosm	-	-	-	-	-	+	+	66.7	+	+	-	66.7	44.4
92	*Argemone Mexicana* L.	Papaveraceae	Ch	TR	+	-	-	33.3	-	-	-	-	+	+	+	100	44.4
93	*Lepidium sativum* L.	Brassicaceae	Ch	Cosm	-	-	-	-	++	++	+	100	-	-	+	33.3	44.4
94	*Malva verticulata* L.	Malvaceae	Th	ME+IT	+	++	-	66.7		+	-	33.3	-	-	+	33.3	44.4
95	*Bromus tectorum L.*	Poaceae	Th	ME+IT	+	-	+	66.7	+	-	-	33.3	-	+	-	33.3	44.4
96	*Centaurea* sudosinaicaCzerp.	Asteraceae	Ch	ME	-	-	-	-	+	+	-	66.7	-	+	-	33.3	33.3
97	*Astragalus annularis* Forssk.	Papilionaceae	Th	SA	-	-	+	33.3	+	++	-	66.7	-	-	-	-	33.3
98	*Crotalaria retusa* L.	Papilionaceae	Ch	SU	-	-	-	-	-	-	+	33.3	-	+	+	66.7	33.3
99	*Papaver dubium* L.	Papaveraceae	*Ch*	Cosm	+	-	-	33.3	-	-	-	-	-	-	+	33.3	22.2
100	*Ipomea eriocarpa R.B.*	Convolvulaceae	Th	Cosm	-	-	-	-	+	+	-	66.7	-	-	-	-	22.2
101	*Vigna ambacensis* Welw.ex Bak.	Papilionaceae	Th	SU	-	-	-	-	-	-	-	-	-	+	+	66.7	11
102	*Trifolium arvensis* L.	Papilionaceae	Th	ME	-	-	-	-	-	++	-	33.3	-	-	-	-	11
103	Hordeum murinum L	Poaceae	Th	IT	-	-	-	-	-	-	-	-	-	-	+	33.3	11

References

Abulfatih, H.A. 1992. Vegetation zonation along an altitudinal gradient between sea level and 3000 meters in southwestern Saudi Arabia.J. Sci. Res. 7:69-78.

Abd El-Ghani, M.M. and K.N. Abdel-Khalik. 2006. Floristic Diversity and Phytogeography of the Gebel Elba National Park, South-East Egypt. *Turk J Bot*., 30: 121-136.

Hegazy A. K., M. A. El-Demerdash and H. A. Hosni ((1998) Vegetation, species diversity and floristic relations along an altitudinal gradient in south-west Saudi Arabia Journal of Arid Environments **38**: 3–13

Al-Farhan, A.H. 2000. An evaluation of the current status of the flora of Saudi Arabia. Country report presented at the 2nd Arabian Plants Subject Group Meeting, Abudhabi, May 2000. (Draft paper).

AL-Sherif, E. A., A. M. Ayesh and S.M. Rawi (2013) Floristic composition , life form and chorology of plant life at Khulais region , western Saudi Arabia

Al-Turki, T.A. 2002. An initiative in exploration and management of plant genetic diversity in Saudi Arabia. pp. 339-349. In. J.M. Engels, V.R. Rao, A.H. Brown and M. T. Jackson (eds.) Managing plant genetic diversity. CAB International. Wallingford, UK.

Al- Wadie ,H.(2002) .Floristic composition and vegetation of wadi Talha, Aseer Mountains south west Saudi Arabia .Journal of biological science 2(5):285-288.

Al-Yemeni, M, and H Sher (2010) Biological spectrum with some other ecological attributes of the flora and vegetation of the Asir Mountain of South West, Saudi Arabia . African Journal of Biotechnology Vol. 9(34), pp. 5550-5559

Assaeed, A.M. and A.A. Al-Doss 2002. Soil seed bank of a desert range site infested with Rhazya stricta in Raudhat al-Khafs, Saudi Arabia. Arid Land Res. & Manage.16:83-95.

Batanouny, K.H. 1987. Current knowledge of plant ecology in the Arab Gulf countries.

Catena 14:291-316.

Boulos, L. (1999). Flora of Egypt: Volume one (Aizoaceae – Oxalidaceae). Alhadara, Publishing, Cairo, Egypt.

Boulos, L. (2000). Flora of Egypt: Volume Two (Geraniaceae- Boraginaceae). Al-Hadara Pub., Cairo, Egypt.

Boulos, L. (2005). Flora of Egypt: Volume Four Monocotyledons (Alismataceae-Orchidaceae). Al-Hadara Pub., Cairo, Egypt.

Chaudhary, S.A. (ed.) 1999. Flora of the Kingdom of Saudi Arabia (vol. 1). Ministry ofAgriculture and Water. Riyadh.

Chaudhary, S.A., 1983. Vegetation of the great Nafud, Saudi Arabia. Nat. Hist. Soc. 2, 32–37.

Chaudhary, S.A., 1999. Flora of the Kingdom of the Saudi Arabia, vol. I. Ministry of Agriculture and Water, Riyadh, Saudi Arabia.

Chaudhary, S.A., 2000. Flora of the Kingdom of the Saudi Arabia, vol. II. Ministry of Agriculture and Water, Riyadh, Saudi Arabia.

Chaudhary, S.A., 2001. Flora of the Kingdom of the Saudi Arabia, vol. III. Ministry of Agriculture and Water, Riyadh, Saudi Arabia.

Collenette, S., 1999. Wild Flowers of Saudi Arabia. National Commission for Wild Life Conservation and Development (VCWCD),Riyadh, Saudi Arabia, 799pp.

Cope, T., 1985. A key to the grasses of Arabian Peninsula. Arab. J. Sci. Res. Special Publication.

El-Demerdash, M.A., A.K., Hegazy and A.M. Zilay. 1994 .Distribution of plant communities in Tihamah coastal plains of Jazan region, Saudi Arabia. *Vegetat*., 112: 141-151.

El-Ghanem, W.A., L.M. Hassan, T.M. Galal and A. Badr. 2010. Floristic composition and vegetation analysis in Hail region north of central Saudi Arabia. *Saud. J. Biol. Scien*., 17: 119-128.

Heneidy, S.Z. and L.M. Bidak. 2001. Biodiversity of plant species in Bisha, Asir region, Souwthwestern Sadi Arabia. *Pak. J. Biol. Scie*., 4(11): 1323-1330.

Hosni, H.A. and A.K. Hegazy. 1996. Contribution to the flora of Asir, Saudi Arabia. *Candollea*, 51: 169-202.

Raunkiaer C (1934). Life form of plants and statistical plant Geography. Clarendon Press, Oxford

Wafaa M. A .El-Ghanim, L M. Hassan, T M. Galal B. Abd el Fattah (2010) Floristic composition and vegetation analysis in Hail region north of central Saudi Arabia. Saudi Journal of Biological Sciences 17, 119–128

Zahran, M.N.1982 Vegetation types of Saudi Arabia. Faculty of meteorology and environmental studies. King Abdulaziz University, Jeddah-Saudi Arabia.

Zohary, M. (1966). Flora Palaestina. (Part 1). Israel Acad. Sci. and Humanities, Jerusalem.

Zohary, M. (1973). Geobotanical Foundations of the Middle East, 2 vols. Gustav Fischer Verlag, Stuttgart.

Zohary, M. (1987). Flora Palaestina (Part II). Jerusalem. Isr. Acad. Sci. Human.

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