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RESEARCH ARTICLE

FLORISTIC COMPOSITION, LIFE-FORMS AND CHOROLOGY OF AL-MADLOOM MOUNTAIN, ADHALE DISTRICT, SOUTHERN YEMEN

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Abstract

The floristic composition, life form, and chorology were conducted in Al-Madloom mountain, Adhale, South of Yemen. The flora consisted of 159 plant species belonging to 111 genera and 46 families. Apocynaceae (12 genera; 19 species), Euphorbiaceae (eight genera; 14 species), and Acanthaceae (eight genera; 8 species) were the most dominant families in terms of species richness. The plants were classified into different life forms and Chorotypes after standard methods. Among the life forms, Chamaephytes 60 species (37.73%) were the dominant followed by Therophytes 47 species (29.55%), Phanerophytes 29 species (18.23%), Geophytes 15 species (9.43%), Hemicryptophytes six species (3.77%), while two species were Parasites (1.25%). From the Chorological point of view, the study revealed that the highest number of species 56 (35.22%) was recorded in the Su-Za Chorotype, followed by Cosmopolitan 20 species (12.57%), Endemic 18 species (11.32%) and ZU-ZA+SA-SI 16 species (10.06%). The Sudano-Zambenzian constitute 56 species, which means the flora of the study area belongs to the Sudanian region. The domination of Chamaephytes and Therophytes indicates that the investigated area is under deep biotic stress. Endemism in the study area is relatively significant, represented by 11.32% of the total flora collected from the study area, and these taxa were listed to be globally endangered.

Keywords: Floristic, Life-Forms, Chorology, Endemism, Endangered, Invasive, Al-Madloom Mountain.

Introduction:

Vegetation and floristic composition are very important for the conservation of biodiversity by providing habitat for wildlife and contributing to the ecological sustainable management of natural resources. Adhale is located in the Southwestern part of the Yemeni western highlands, it lies between the longitudinal range "44°: 28:00 to 45^0:9:30 East and the latitudinal range between (13^0: 31:30 to 14^0: 12¨30 North". It covers an area of about 4, 132 km^2 which forms about 0.78% of the whole Yemeni area. More than 80 % of it is mountainous rangeland.

The flora of Adhale is very rich, there are several surveys have been conducted on the flora and vegetation of Adhale, [1 - 8]. On the other hand, fewer workers have studied the life form and phytogeographical affinities of Yemen, [5, 9 - 13]. The flora of Adhale consists of 705 species belonging to 395 genera and 104 families, among them 67 species are endemic and near-endemic [6].

The area under study is typically unfamiliar and there are no works on the flora and vegetation, although, it has a unique habitat and places for the occurrence of many endemic and endangered taxa, so we aim to appearance the plant biodiversity of this area.

Materials and Methods:

Study site and its characteristics:

Al-Madloom mountain is located in the Adhale district (One km northwest of Adhale city) at 13°42861 N, 044° 43594 E, with an altitudinal range from 1450 to 1554 meters above sea level. The total area is 0.063430 Km^2 (Figs.1& 2).

Fig. 1: Veiw of Al-Madloom Mountain.

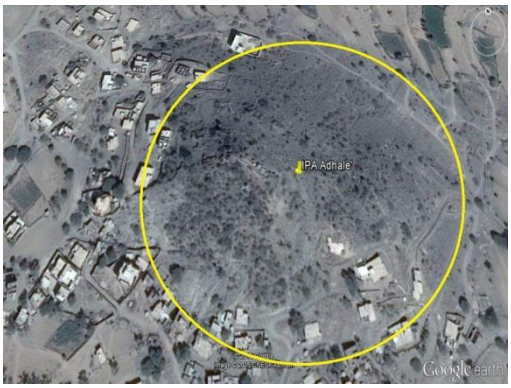

Fig. 2: Google view for the study area..

The mountain has a very small area and is pyramidal in shape. The climate features of Al-Madloom mountain are high temperatures in the summer, the mean temperature was 26ºC in June, July, and August to moderate temperatures in the winter (the mean was 17ºC) in January. Rainy season mostly in the late summer (July-August- September) with rainfall around 67.45 mm/year (Fig. 3). Average Wind Speed m/s 3.5-4.2 m/s. The soil textures are clay-silt to sandy, Ph range 7.44-7.45, Organic matter less varied from 2.08-2.55%, Electrical Conductivity is between 176-325/cm, Chloride raged from 0.14-0.16%, SO_4 and NO_3 have between 3.7-4.3 and 23-29 respectively, Magnesium from 0.25-0.14 mg/100 ml and Calcium is 0.18 mg/100 ml [5].

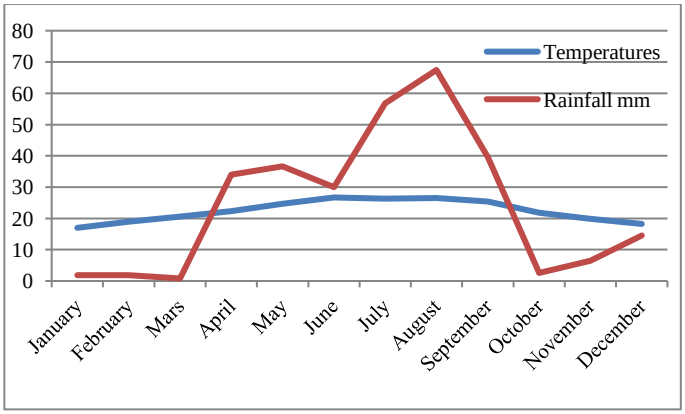

Fig. 3: The average rainfall and temperatures for the study area.

Field Trips and Identification:

The study was conducted from 2013 to 2022. Extensive and intensive field trips were carried out. The plant specimens dried, preserved and identified with the help of various Floras [14 - 29]. The plants were classified into different life forms as follows after [30] which is the most widely accepted system. Phytogeographical affinities follow [31 - 32] for the Saharo-Sindian and Sudanian regions, which are well known. The plant specimens were submitted to the herbarium of the Department of Biology, College of Education, Adhale, Aden University.

Results and Discussion:

Floristic composition:

One of the main characteristics of the vegetation cover of Al-Madloom mountain is its high floristic diversity compared with its small area, the results revealed that there are 159 taxa belonging to 111 genera and 46 families. Among them, three families, four genera, and four species of Pteridophytes, 35 families, 94 genera, and 137 species were dicots while the rest 8 families, 13 genera and 18 species were monocots. The flora of the study area constitutes 22.50 % (705/159) of species, 28.10% (395/111) of genera, 44.20% (104/46) of families of the total flora of Adhale as a whole (Appendix 1: Table 1).

The most common families were Apocynaceae with 19 species (11.94%), followed by Euphorbiaceae with 14 species (8.80%), Acanthaceae with 11 species (6.91%), Solanaceae 8 (5.03%) and Asteraceae, Lamiaceae, Malvaceae represented by 7 species each one (Appendix 1& Fig. 4). Apocynaceae, Euphorbiaceae and Acanthaceae were representing the largest families not only in the study area but also in Adhale and Yemen as whole. The number of species in families was compared to similar studies of nearby regions within similar habitats [1, 12, 13, 29, 33 - 37] which indicated to rich habitats in high altitude area. The results of these studies agree with those presented here.

Table 1: Floristic richness of Al-Mdloom Mountain.

Plant Group	Families	%	Genera	%	Species	%
Pteridophyta	3	6.52	4	3.60	4	2.51
Dicotyledons	35	76.08	94	84.68	137	86.16
Monocotyledons	8	17.39	13	11.71	18	30.18
Total	46	100	111	100	159	100

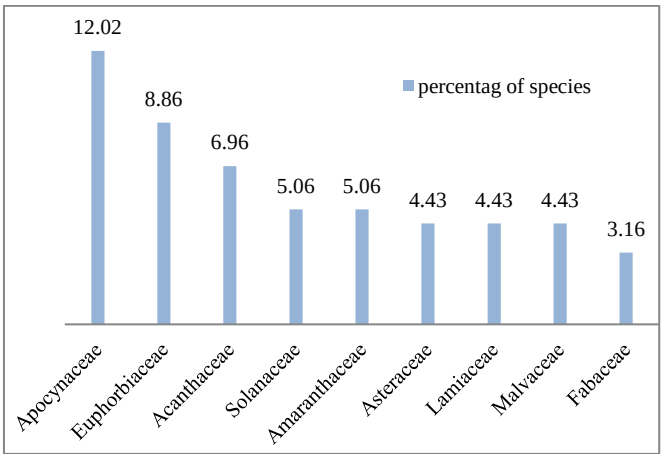

Fig. 3: The most families which contain a large percentage of species in the Study area.

The disturbing was rapidly growing invasive species in the last five years as *Solanum incanum*, *Datura ferox*, *Datura stramonium*, *Argemone mexicana*, *Physalis minima*, *Tagetes minuts*, *Alternanthera pungens*, *Opuntia ficus-indica*, and *Trianthema portulacastrum*, these species that potentially damaging the biodiversity or altering the ecosystems in general. Concerning the drought-resistant species, the succulent constitute 41 species (25.78%) of the total species, among them 17 species were endemic and near-endemic.

Life form spectrum:

The life-form spectra provide information that can help assess the effects of environmental factors on vegetation distribution [38]. The life form explains that chamaephytes with 62 species (47.73%) were the dominant followed by Therophytes with 46 species (29.11 %), phanerophytes with 29 species (18.35%), and geophytes with 15 species (9.49%). while the least frequent life forms were hemicryptophytes with 5 species (3.16%) and parasites with two species (1.26%) (Appendix 1; Figures5-6), two species were represented as parasite life forms *Cistanche phelypaea* and *Striga gesnerioides*. Compared with Raunkiaer's normal spectrum 1934 (Fig.6), the study site showed a high proportion of chamaephytes and therophytes while hemicryptophytes and phanerophytes were less than Raunkiaer normal spectrum. The combination of resist drought, intensive livestock grazing, and human activities led to the dominance and geographical distribution of chamaephytes and therophytes, our results agree with studies: [12, 13, 37, 39 - 46].

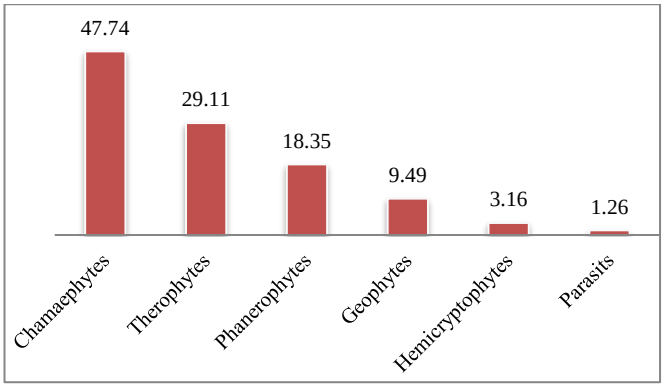

Fig.5: Life form classes of species in Al-Madloom mountain based on the Raunkiaer system 1934.

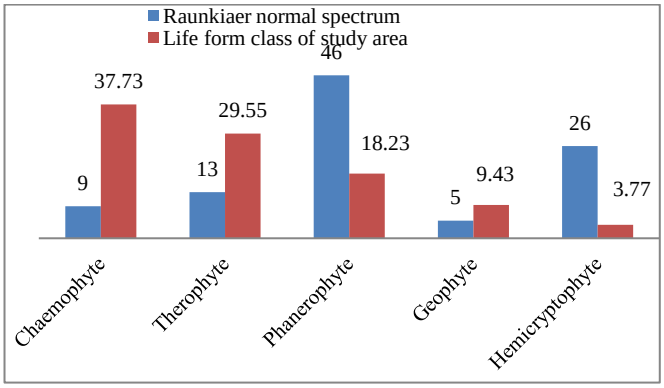

Fig. 6: Life forms A Raunkiaer normal spectrum, compared with Al-Madloom mountain life forms spectrum.

Geographical affinities:

From the chorological point of view, the site was classified into a mono-regional, bi-regional, pluri-regional, and endemic zone with percentages species 36.47%, 22.01%, 5.66 %, and 11.34 respectively, while the remaining 24.52 were distributed in cosmopolitan, pantropic, palaeotropic and Tropic. phytochoria. Sudano-Zambenzian element was the most dominant 57 species (36.07%), followed by cosmopolitan. 20 species, ZU-ZA+SA-SI 18 species (11.39 %) and endemic chorotype 18 species (11.39%) (Table 2; Fig.7). According to the results, the Sudano-Zambenzian element constitutes 55 species and the endemic 18 species, that means the flora of the mountain belongs to the Sudanian region, our results confirm those by [12, 13, 37, 42, 44, 47 - 49] (Fig. 7 & Table 2).

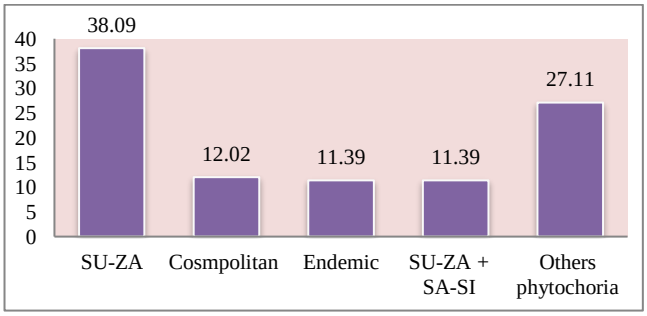

Fig.7: The main geographical distribution of plant elements in Al-Madloom mountain.

Table (2): The chorological analysis of the collected species according to Zohary 1983 and Al-Nafie, 2008.

Floristic categories	Total species	Percentage
Endemic	7	4.40
Near endemic	11	6.91
Mono-Regional		
Sudano-Zambenzian (Sud-Zam)	56	35.22
Saharo-Sindian(SA-SI)	2	1.26
Bi-Regional		
Sudano-Zambenzian + Saharo-Sindian	16	10.06
Sudano-Zambenzian + Irano-Turanian	8	5.06
Sudano-Zambenzian + Mediterranean	4	2.53
Sudano-Zambenzian + Tropical	4	2.53
Saharo-Sindian(SA-SI) +Tropical	1	0.63
Saharo-Sindian(SA-SI) + Irano-Turanian	1	0.63
Pantropic + Cosmopolitan	1	0.63
Pluri-Regional		
SU-ZA+ME+IT	3	1.89
SU-ZA+IT+TROP	2	1.26
SU-ZA+SA-SI+ME	1	0.63
SU-ZA+SA-SI+TROP	1	0.63
SU-ZA+ME+TROP	1	0.63
SU-ZA+SA-SI+ME+ IT	1	0.63
Cosmopolitan	20	12.57
Palaeotropic	8	5.06
Pantropic	7	4.43
Tropic	4	2.51
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Total species	**159**	**100**

The abbreviations:

Floristic Category	
1- COSM : Cosmopolitan	5- ME : Mediterranean
2- PAN : Pantropical	6- SA-SI : Saharo-Sindian
3- PAL : Palaeotropical	7- IR : Irano-Turanina
4- TR : Tropical	8- SU-ZA : Sudano-Zambezian

Endemism and Endangered Species:

A taxon (e.g. a species) is considered endemic to a particular area if it occurs only in that area [50]. The majority of endemic taxa in Yemen are associated with mountainous areas which provide a rich variety of ecological niches and offer a degree of environmental stability during periods of climatic changes. Endemism in the study area is relatively significant, represented by (18\159) 11.32% of the total collected area. 9 species belong to Apocynaceae, 3 species to Aloeaceae and the other sex species belong to sex families of the Angiosperms (Table 3). The Apocynaceae had the most number of endemics species our results agree with [29, 51, 52]. Endemic and Near endemic species constitute 26.86 % (18/67) of total endemic species of Adhale as whole. The recent study revealed that 24 species of study area were list to be globally endangered (Table 3). Therefore, the study area need protection , consideration, conservation and management.

Table (3): A compilation of endemic/near-endemic and threatened taxa in Al-Madloom mountain.

Species	Family	IUCN (Al Khulaidi & Miller, 2010)
Aloe lanata McCoy & Lavranos	Aloeaceae	* NT
Aloe lavranosii Reynolds	Aloeaceae	* NT
Aloe vacillans Forssk.	Aloeaceae	** NT
Caralluma awdeliana Deflers	Apocynaceae	* NT
Caralluma quadrangula (Forssk.) N. E. Br.	Apocynaceae	** NT
Ceropegia arabica H.Huber.	Apocynaceae	** NT
Cyanotis nyctitropa Deflers	Commelinaceae	** NT
Echidnopsis scutellata (Deflers) Berger ssp. *scutellata*	Apocynaceae	* NT
Echidnopsis sp. nov.	Apocynaceae	* NT
Echidnopsis squamulata (Decne.) Bally	Apocynaceae	* NT
Euphorbia inarticulata Schweinf.	Euphorbiaceae	** NT
Heliotropium longiflorium (A. DC.)Jaud & Spach. var.*Longiflorium*	Boraginaceae	** NT
Huernia marnieriana Lavranos	Apocynaceae	* NT
Leucas alba (Forssk.) Sebald	Lamiaceae	** NT
Orbea deflersiana (Lavranos) Bruyns	Apocynaceae	** NT
Pavetta longiflora Vahl. subsp. *longiflora*	Rubiaceae	** NT
Rhytidocaulon macrolobum Lavranos subsp. *macrolobum*	Apocynaceae	** NT
Ruellia grandiflora (Forssk.) Blatter	Acanthaceae	** DD
Caralluma penicillata (Deflers) Plowes	Apocynaceae	Regional NT
Caralluma subulata (Forssk.) Decne	Apocynaceae	Regional NT
Ceropegia bulbosa Roxb	Apocynaceae	Regional NT
Ceropegia somalensis Chiov	Apocynaceae	Regional NT
Ceropegia variegata (Forssk.) Decne. var. *variegata*	Apocynaceae	Regional NT
Eulophia petersii (Reichb.f.) Reichb.f.	Orchidaceae	Regional NT

* Mean = The species endemic to Yemen.
** Mean = The species endemic to the Arabian peninsula (Yemen, Oman and Saudi Arabia).
NT = near thread DD = data deficiency.

Conclusion:

The results show that Almadloom Mountain is an area of significant biological diversity, with high species richness. Floristic composition revealed the dominance of members of Apocynaceae, Euphorbiaceae, and Acanthaceae. The life form spectrum exhibited predominant Chamaephytes and Therophytes. The flora belong to the Sudanian region. Endemism was relatively significant, represented by 11.32% of the total collected area, and revealed that 24 species were listed to be globally endangered. Catchpole, Mortality

Acknowledgment

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Appendix (1): List of plant species recorded from Al-Madloom Mountain with their families, life-forms and Chorotype.

Family	Taxa	Life Form	Chorotype
Pteridophytes			
Actiniopteridaceae	*Actiniopteris semiflabellata* Pic-Serm	Th	ZU-ZA + ME
Adiantaceae	*Adiantum capillus-veneris* L.	He	COSM
	Negripteris sciona (Chiov.) Pic-Ser.	Ge	ZU-ZA
Selaginellaceae	*Selaginella yemensis* (Swartz) Spring	Ge	ZU-ZA
Dicotyledonea			
Acanthaceae	*Acanthus arboreus* Forssk	Ph	ZU-ZA
	Anisotes trisulcus (Forssk.) Nees	Ph	ZU-ZA
	Blepharis ciliaris (L.)B. L. Burtt.	Th	ZU-ZA + SA-SI
	Barleria parviflora R.Br. ex T. Anders.	Ch	ZU-ZA
	Ecbolium viride (Forssk.) Alston.	Th	ZU-ZA + IT
	Justicia flava (Vahl)Vahl	Th	ZU-ZA
	Justicia heterocarpa T. Anders.	Ch	ZU-ZA + IT
	Justicia odora (Forssk.) Lam	Th	ZU-ZA
	Hypoestes forskalei (Vahl) Sol. ex Roem. & Schult.	Th	ZU-ZA
	Ruellia grandiflora (Forssk.) Blatter.	Ch	END **
	Ruellia patula Jacq.	Th	ZU-ZA + Me
Aizoaceae	*Corbichonia decumbens* (Forssk.)Jack. ex Exell.	Th(S)	ZU-ZA + IT
	Trianthema triquetrum Rottler ex Willd.	Th(S)	Am
Amaranthaceae	*Aerva javanica* (Borm.f.) Juss. ex Schult.	Ch	TR
	Aerva lanata (L.) Juss. ex J.A. Sechult.	Ch	TR
	Alternanthera pungens Kunth.	Th	PAN
	Achyranthes aspera L.	Ch	TR
	Amaranthus graecizans L.	Th	COSM
	Amaranthus spinosus L.	Th	COSM
	Amaranthus viridis L.	Th	COSM
	Pupalia lappacea	Ch	PAl
Apocynaceae	*Adenium obesum* (Forssk.) Roem. & Schult.	Ph (S)	ZU-ZA
	Caralluma quadrangula (Forssk.) N. E. Br.	Ch(S)	END **
	Caralluma awdeliana Defl.	Ch(S)	END **
	Caralluma subulata (Forssk.) Decne	Ch(S)	ZU-ZA
	Calotropis procera (Aiton) W. T. Aiton	Ph	SA-SI
	Ceropegia arabica H.Huber.	Ge(S)	END **
	Ceropegia bulbosa Roxb	Ge(S)	ZU-ZA + SA-SI
	Ceropegia somalensis Chiov	Ch(S)	ZU-ZA
	Ceropegia variegata (Forssk.) Decne. var. *variegata*	Ch(S)	ZU -ZA
	Cynanchum viminale L. subsp. *stipitaceum* (Forssk.) Meve & Liede	Ch(S)	ZU-ZA
	Desmidorchis penicillata (Defl,) Plowes	Ch(S)	ZU-ZA
	Echidnopsis sp. nov.	Ch(S)	END *
	Echidnopsis scutellata (Defl.) Berger subsp. *scutellata*	Ch(S)	END *
	Echidnopsis squamulata (Decne.) Bally	Ch(S)	END *
	Glossonema varians (Stocks) Benth. Ex Hook	He	ZU-ZA
	Huernia marnieriana Lavranos	Ch(S)	END *
	Orbea deflersiana (Lavranos) Bruyns	Ch(S)	END **
	Pergularia tomentosa L.	Ch	ZU-ZA
	Rhytidocaulon macrolobum Lavranos subsp. *macrolobum*	Ch(S)	END **
Asteraceae	*Bidens pilosa* L.	Th	PAN
	Echinops spinosissimum Turra.	He	ZU-ZA + ME
	Kleinia odora (Forssk.) A. Berger	Ch(S)	ZU-ZA
	Pulicaria jaubertii Gamal-Eldin.	Th	ZU-ZA
	Sonchus oleraceus L	Th	COSM
	Tagetes minuta L	Th	COSM
	Vernonia cinerascens Sch. Bip.	Ch	ZU-ZA
Boraginaceae	*Heliotropium aegyptiacum* Lehm.	Ch	ZU-ZA
	Heliotropium longiflorium (A. DC.) Jaud & Spach. var. *longiflorium*	Ch	END**
Bignoniaceae	*Tecoma stans* (L.) H. B. & K.	Ph	COSM

Burseraceae	*Commiphora schimperi* (Berg.) Engl	Ph(S)	ZU-ZA
Opuntiaceae	*Opuntia ficus-indica* (L.) Mill.	Ph(S)	COSM
Caesalpiniaceae	*Senna italica* Mill.	Ch	ZU-ZA + SA-SI
Capparaceae	*Capparis cartilaginea* Decne.	Ch(S)	ZU-ZA + SA-SI
	Maerua oblongifolia (Forssk.) A.Rich.	Ph	ZU-ZA
Chenopodiaceae	*Chenopodium* carinatum R. Br.	Th	COSM
	Chenopodium album L.	Th	COSM
	Chenopodium murale L.	Th	COSM
Convolvulaceae	*Convolvulus siculus* L. subsp. *agrestis* (Schweinf.) Verdc.	Ch	ZU-ZA +ME+IT
	Seddera arabica (Forssk.) Choisy.	Th	ZU-ZA
	Ipomoea obscura (L.) Ker.- Gawl.	Th	ZU-ZA +TR
Cucurbitaceae	*Cucumis prophetarum* L. var. *prophetarum*	Th	ZU-ZA + SA-SI
	Kedrostis gijef (J. f. Gmel.) C.Jeffrey.	Ch	PAL
	Momordica balsamina L.	Th	PAN
	Zehneria scabra L. subsp. *argyrea* (A.Zimm) Jeffrey.	He	PAL
Euphorbiaceae	*Acalypha fruticosa* Forssk.	Ch	ZU-ZA
	Chrozophora oblongifolia (Del.) Juss ex Spring	Ch	ZU-ZA +IT + ME
	Euphorbia arabica Hochst. & Steud. ex Boiss	Th	ZU-ZA + ME
	Euphorbia cactus Ehrenb var. *cactus*	Ph (S)	ZU-ZA
	Euphorbia granulate Forssk. var. *glabrata* (Gay) Boiss	Th	ZU-ZA + SA-SI
	Euphorbia heterophylla L.	Ch	ZU-ZA + TR
	Euphorbia hirta L.	Th	TR
	Euphorbia inaequilatera Sond.	Th	ZU-ZA
	Euphorbia inarticulata Schweinf.	Ph(S)	END **
	Flueggea virosa (Roxb. ex Willd.) Voight.	Ph	PAL
	Jatropha spinosa (Forssk.)Vahl	Ph(S)	ZU-ZA
	Micrococca mercurialis (L.) Benth.	Th	PAL
	Ricinus communis L.	Ph	PAN + COSM
	Tragia pungens (Forssk.) Muell.- Arg.	Th	ZU-ZA + TR
Fabaceae	*Crotalaria pycnostachya* Benth.	Th	PAL
	Indigofera articulata Gouan.	Ch	ZU-ZA
	Indigofera oblongifolia Forssk	Ch	ZU-ZA
	Indigofera spiniflora Hochst. & Steud. ex Boiss.	Ch	ZU-ZA
	Indigofera spinosa Forssk	Th	ZU-ZA + SA-SI+Me
Lamiaceae	*Becium filamentosum* (Forssk.) Chiov.	Ch	ZU-ZA
	Lavandula pubescens Decne.	Ch	ZU-ZA
	Endostemon tenuiflorus (Benth.) Ashby.	Th	ZU-ZA + SA-SI
	Leucas alba (Forssk.) Sebald.	Ch	END**
	Leucas urticifolia (Vahl.)R.Br.	Th	ZU-ZA
	Leucas glabrata (Vahl.) R. Br. var. *glabrata*	Ch	ZU-ZA
	Ocimum forskolei Benth.	Ch	ZU-ZA+ SA-SI
Malvaceae	*Abutilon fruticosum* Guill. & Perr.	Ch	ZU –ZA + IT
	Hibiscus aeristaevalvis Garcke	Th	ZU-ZA
	Hibiscus calyphyllus Cav.	Ch	ZU-ZA
	Hibiscus deflersii Schweinf. ex Cufod.	Ch	ZU-ZA
	Hibiscus ovalifolius (Forssk.) Vahl.	Th	ZU-ZA
	Hibiscus vitifolius L.	Ch	PAL
	Sida alba L	Ch	PAN
Mimosaceae	*Acacia etbaica* Schweinf. subsp. *etbaica*	Ph	ZU-ZA
	Acacia nilotica (L.) subsp. *indica* (Benth.) Brenan	Ph	ZU-ZA + SA-SI
	Acacia nilotica (L.)Willd. ex. Del. subsp. *kraussiana*	Ph	ZU-ZA + SA-SI
Moraceae	*Dorstenia barnimiana* Schweinf.	Ge(S)	ZU-ZA
	Ficus cordata L. subsp. *salicifolia* (Vahl) Berg.	Ph	ZU-ZA + IT
	Ficus palmata Forssk. subsp. *palmata*	Ph	ZU-ZA
Nyctaginaceae	*Boerhavia diffusa* L.	Ch	SA -SI + ZU-ZA + TR
	Boerhavia repens L.	Ch	SA-SI+ TR
	Commicarpus helenae (J.A.Scholtes) Meikle.	Ch	ZU-ZA + TR
	Commicarpus plumbagineus (Cav.) Standl.	Ch	ZU-ZA
Orobanchaceae	*Cistanche phelypaeal* (L.) Cout.	P	ZU-ZA+TR+ME

Papaveraceae	*Argemone mexicana* L.	Th	PAN
Polygalaceae	*Polygala abyssinica* R.Br. ex Fresen. var. *abyssinica*	Ch	ZU-ZA
	Polygala senensis Klotzsch.	Ch	ZU-ZA + SA-SI
Portulacacea	*Portulaca oleracea* L.	Th(S)	COSM
	Portulaca quadrifida L.	Th(S)	COSM
	Talinum portulacifolium (Forssk.) Aschers. ex Schweinf.	Ph(S)	ZU-ZA + SA-SI
Rhamnaceae	*Ziziphus spina* -christi (L.)Willd	Ph	ZU-ZA + SA-SI
Rubiaceae	*Pavetta longiflora* Vahl.	Ph	END **
Salvadoraceae	*Salvadora persica* L.	Ph	ZU-ZA + SA-SI
Scrophulariaceae	*Striga gesnerioides* (Willd.) Vatke.	P(S)	ZU-ZA
Solanaceae	*Datura ferox* L.	Ch	COSM
	Datura innoxia Mill	Ch	COSM
	Datura strauminum L.	Ch	COSM
	Lycium shawii Roem & Schult	Ph	ZU-ZA + IT
	Physalis angulata L.	Th	PAN
	Solanum nigrum L.	Th	COSM
	Solanum incanum L.	Ch	ZU-ZA
	Withania somnifera (L.) Dun.	Ch	ZU-ZA + SA-SI + IT
Tiliaceae	*Corchorus olitorius* L.	Th	TR
	Grewia tembensis Fresen.	Ph	ZU-ZA
	Grewia tenax (Forssk.) Fiori.	Ph	ZU-ZA + IT+TR
	Grewia velotina (Forssk.) Vahl. Symbg.	Ph	ZU-ZA
Urticaceae	*Forsskaolea tenacissima* L	Th	ZU-ZA + SA-SI
Verbenaceae	*Lantana viburnoides* (Forssk.) Vahl.	Ch	ZU-ZA
Vitaceae	*Cissus quadrangularis* L.	Ch	ZU-ZA
	Cyphostemma digitatum (Forssk.) Desc.	Ch(S)	ZU-ZA
Zygophyllaceae	*Fagonia indica* Burm. F.	Ch	SA-SI
	Tribulus terrestris L. var. *terrestris*	He	ZU-ZA + IT+ME
Monocotyledonea			
Agavaceae	*Agave sisalana* Perr.	Ge(S)	COSM
Aloeaceae	*Aloe lanata* McCoy & Lavranos	Ph(S)	END *
	Aloe vacillans Forssk.	Ph(S)	END **
	Aloe lavranosii Reynoids	Ph(S)	END *
Commelinaceae	*Commelina forsskalii* Vahl.	Th	ZU-ZA
	Commelina albescens Hassk	Th	ZU-ZA
	Cyanotis nyctitropa Deflers	Ge(S)	END**
Cyperaceae	*Cyperus laevigatus* L.	Ge	PAN
	Cyperus rotundus L.	Ge	PAN
Dracaenaceae	*Sansevieria ehrenbergii* Schweinf. ex Bak.	Ge(S)	ZU-ZA
	Sansevieria forskaliana (Schult.f.) Hepper & Wood.	Ge(S)	ZU-ZA
Hyacinthaceae	*Dipcadi viride* (L.) Moennch.	Ge(S)	ZU-ZA
	Ledebouria revoluta (L.f.) Jessop	Ge(S)	ZU-ZA + SA-SI
Orchidaceae	*Eulophia petersii* (Reichb.f.) Reichb.f.	Ge(S)	ZU-ZA
Poaceae	*Cenchrus ciliaris* L.	He	ZU-ZA
	Cynodon dactylon (L.) Pers	Ge	COSM
	Dactyloctenium aegyptium (L.) Willd.	Th	PAL
	Digitaria pennata (Hochst.) T. Cooke.	Th	COSM

General abbreviation of the present study:

Floristic Category 1- COSM : Cosmopolitan 2- PAN : Pantropical 3- PAL : Palaeotropical 4- TR : Tropical 5- ME : Mediterranean 6- END : Endemic 7- SA-SI : Saharo-Sindian 8- IR : Irano-Turanina 9- SU-ZA : Sudano-Zambezian	**Life-form abbreviations:** 1- Th : Therophytes 2- Ch : Chamaephytes 3- Ph : Phanerophytes 4- He : Hemicryptophytes 5- Ge : Geophytes 6- P : Parasites	**END : Endemic**

مقالة بحثية

التركيب الفلوري، اشكال الحياة، التوزيع الجغرافي لجبل المضلوم، محافظة الضالع، جنوب اليمن

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المُلخّص

اظهرت دراسة التركيب الفلوري واشكال الحياة والتوزيع الجغرافي لنباتات جبل المضلوم، ان فلورا المنطقة تكونت من 159 نوعا نباتيا تنتمي الى 111 جنسا و46 عائلة نباتية. الفصائل الاكثرسيادة اعتمادا على الغنى النوعي كانت ل: الفصيلة الدفلية احتوت على (12 جنسا و19 نوعا) يليها الفصيلة الافوربية (8 اجناس و14 نوعا) فالسنفية (8 اجناس و8 انواع). تم تصنيف الانواع المسجلة الى اشكال الحياة والانتماء الجغرافي اعتمادا على الطرق العلمية القياسية المتعارف عليها، حيث توزعت اشكال الحياة كالتالي: أكثر الانواع سيادة كانت للنباتات الكامفيتس 60 نوعا (37.73 %) يليها نباتات الثيروفيتس 47 نوعا (29.55%) فا نباتات الفانيروفيتس 29 نوعا (18.23%) والجيوفيتس 15 نوعا (9.43%) والهيموفيتس 6 انواع (3.77%) بينما الانواع المتطفلة تمثلت بنوعين (1.25%). الانتماء الجغرافي للأنواع المسجلة توزعت كالتالي: 56 نوعا (35.22%) كانت ضمن النطاق السوداني – الزيمبابوي، يليه الانواع عالمية الانتشار مثلت ب 20 نوعا (12.57%) بينما الانواع المتوطنة مثلت ب 18 نوعا (11.32%)، الانواع ثنائية الاقاليم (السوداني – الزيمبابوي + الصحراوي السندي) مثلت ب 16 نوعا (10.16%). سيادة الانواع المنتمية للاقليم السوداني – الزيمبابوي (56 نوعا) دل على ان منطقة الدراسة تنتمي جغرافيا الى المنطقة السودانية. سيادة انواع الكامفيتس والثيروفيتس مؤشر ان المنطقة تعاني من ضغوطات حيوية كبيرة. التوطن للمنطقة ذو اهمية عالية نسبيا حيث ان النباتات المتوطنة المسجلة تم ادراجها ضمن الانواع العالمية المعرضة لخطر الانقراض..

الكلمات المفتاحية: التركيب الفوري، اشكال الحياة، الانتماء الجغرافي، التوطن، الانواع المهددة، الغازية، جبل المضلوم.

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