

## RESEARCH ARTICLE

## VEGETATION OF JABAL AL-BADDIEA, JEHAF DISTRICT, AL-DHALEA GOVERNORATE, YEMEN

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## Abstract

Vegetation analysis and plants diversity were examined in 4 (sites) directions (East - South - North -West) of Jabal Al-Baddiea, 44 quadrats covering various geomorphological land forms and eight edaphic variables. The flora consisted of 186 taxa (includes species and subspecies) belonging to 131 genera and 45 families. Among the 182 Angiosperm species, Dicots constitute 159, Monocots 23, while Pteridophytes represented by 4 species. Asteraceae (15 genera, 19 taxa), Apocynaceae (10 genera, 13 taxa), Acanthaceae (9 genera, 13 taxa) Fabaceae (7 genera, 16 taxa), and Euphorbiaceae (6 genera, 10 taxa) were the most common families. The vegetation analysis were dominated by: *Adenium obesum*, *Boerhavia diffusa*, *Buddleja polystachya*, *Cenchrus ciliaris*, *Cenchrus longisetus*, *Cynodon dactylon*, *Dracaena hanningtonii*, *Euphorbia cactus*, *Euphorbia inarticulata*, *Euphorbia granulate*, *Hypoestes forsskalii*, *Indigofera spinosa*, *Justicia flava* and *Justicia odora*. The chemical characters of soils at the different sites were more or less similar with little effect on the distribution of plant species.

**Keywords:** Jabal Al-Baddiea, Vegetation, Dominance, Al-Dhalea, Yemen.

## Introduction

The Republic of Yemen is located in the southwestern corner of the Arabian Peninsula. It extends between latitudes 12°40' -19°00'N and longitudes 42°30' -53°05'E. It is bordered by the Kingdom of Saudi Arabia in the north, the Arabian Sea and the Gulf of Aden in the south, the Sultanate of Oman in the east, and the Red Sea in the west. The flora of Yemen is characterized by its high diversity and density, particularly in the South and West regions. Furthermore, the related flora of this region has affinities with the floras of the Tropical African, Sudanese region, the Saharo - Arabian region, the Mediterranean countries and the Irano - Turanian region [1 - 3]. The flora of Yemen is extremely rich and diverse. Species diversity is a result of considerable climatic changes in former periods, which enabled different species to survive in the different ecological habitats. Previous studies reported approximately 2838 plant species belonging to 1068 genera within 179 families [4 - 9]. There are several workers on vegetation of Yemen [2, 10 - 21]. On the other there are some studies on the flora and vegetation of Adhale as [22 - 27]. The flora of Adhale consists of 705 species belonging to 395

genera and 104 families, among them 67 species are endemic and near-endemic [25].

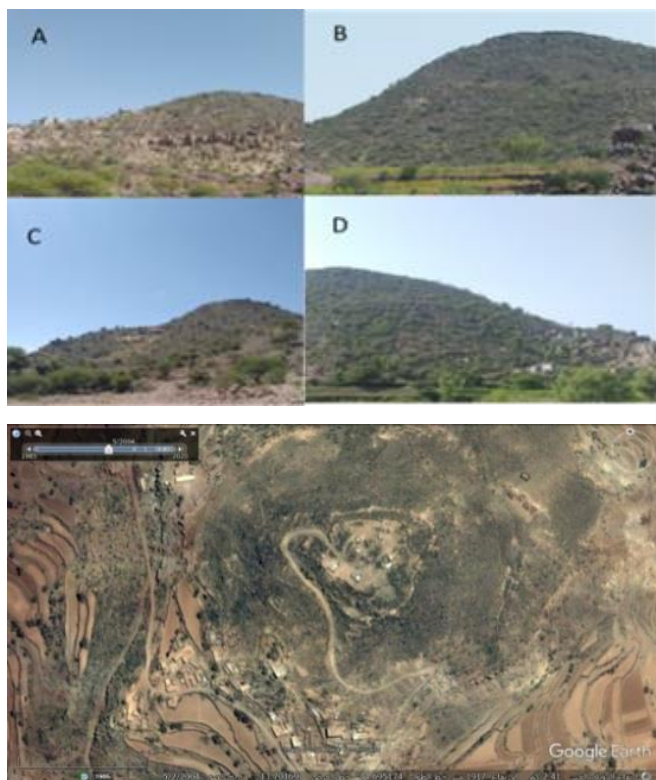
## Aim of Study:

The present study aims to carry out a comprehensive survey of the vegetation and ecology of the study area.

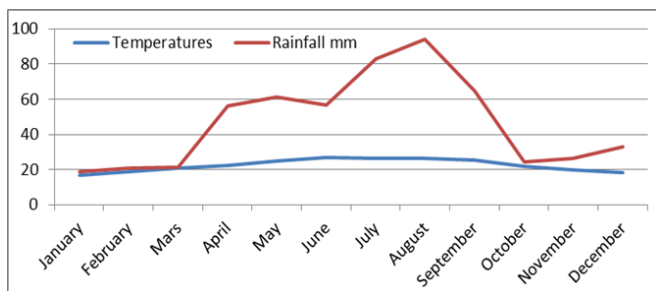
## Materials and Methods:

## Study Area:

The area of the present study is located in South West part of Gehaf directorate which is a part of the Yemeni western high lands (Fig.1). It lays between longitudinal range 13°42.3 south to 13°42.8 north and latitudinal range between 13°42.33 west to 13°41.38 east, the elevation between 1750 to 2004 masl. The climate features of study area are high temperatures in the summer (the mean temperature was 26°C) in June, July, and August to moderate temperatures in the winter (the mean was 17°C) in January. The precipitation is scanty, with an average annual of 20.2 mm, which usually falls during the summer months, the extreme rainfall occurring in July and August with more than 67 mm (Fig.2).



**Fig.1:** Google View and Photos for Direcions (A-West, B- East, C-South, D- North) of Jabal Al-Baddiea.



**Fig. 2:** The Average Rainfall and Temperatures for the Study Area.

**Vegetation Sampling:**

The field studies were carried out through several trips during the different seasons in 2018-2020. About 44 quadrates (10X10 m) selected carefully and examined according to [28].

**Taxonomic Studies:**

The collected plant specimens within the various 44 quadrates were identified and named according to [4, 5, 9, 10, 29 - 42]. They are deposited in the Herbarium of Biology Department, Faculty of Education, Branch of Adhale, Aden University. The names of plants in Appendix1, were validated using the international reference databases of the world web service [43].

**Vegetation Characteristics:**

A checklist of all plants species found in the study area are given in [Appendix.1] Density(D), Frequency(F) and

Dominance (Do) were calculated according to the following equations [44].

$$Density (D) = \frac{\text{Number of a species}}{\text{Total area sampled}}$$

$$Frequency (F) = \frac{\text{Area of plots in which a species occurs}}{\text{Total area sampled}}$$

$$Dominance (Do) = \frac{\text{Total basal area of a species}}{\text{Total area sampled}}$$

**Data Analysis:**

The vegetation data Analysis 186 taxa (includes species, subspecies) from 44 quadrate were classified using Excell Programs according to above equations.

**Soil Analysis:**

Eight soil samples were collected from the different sites to the depth of 20 cm and mixed together in a composite soil sample for each site (direction). For each composite soil sample, Eight physio-chemical characteristics were determined e.g. electrical conductivity (EC), hydrogen ion concentration (PH), SO<sub>4</sub>, HCO<sub>3</sub>, Ca<sup>2+</sup>, Mg<sup>2+</sup>, Na<sup>-1</sup>, K<sup>+1</sup>. These edaphic parameters were calculated according to [45, 46]. Multi-way ANOVA were used for determining the soil properties in the field study.

**Results and Discussion:**

The vegetation reflects the shaping climatic, biotic, soil and topographical features of the study areas. From table one shows the plant species recorded in the four surveyed sites, the list includes 186 taxa (includes species, subspecies) and 131 genera belonging to 45 families. The ferns represented by two families (4.44%), Dicots and Monocots represented by 37 families (82.22%) and by 6 families (13.33%) respectively (Table.1& Appendix1). Their generic representation is quite variable. However, the most represented families were Asteraceae represented by 15 genera, followed by Apocynaceae 10 genera and Acanthaceae represented by 9 genera (Appendex.1). From the stand point of species richness within the described families of the Jabal, Asteraceae had the most species with 19, followed by Fabaceae with 16, and both Apocynaceae and Acanthaceae with 13 each, while Euphorbiaceae had 10 species. Five of collected families (Asteraceae, Fabaceae, Acanthaceae, Apocynaceae and Euphorbiaceae) contributed nearly to more one thirds of the total flora, our results agrees with [9, 22, 23, 26, 27, 47, 48]. The dominance of the plant families Asteraceae and Apocynaceae is attributed to their ability to with stand challenging conditions, disperse seeds quickly through wind, and flourish in rocky environments. On the contrary, Euphorbiaceae is resistant to drought and harsh conditions, and its

production of a toxic milky substance deters grazing, enabling it to thrive and proliferate extensively.

**Table 1:** Show the Main Groups, Families, Genera and Species of the Study Area.

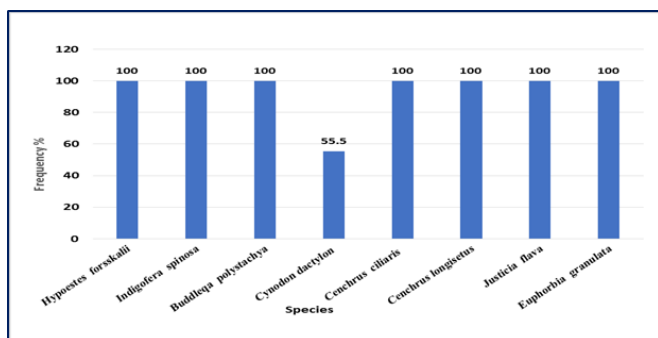
The Main Groups	Families	%	Genera	%	Species	%
Ferns	2	4.45	4	3.05	4	2.15
Dicots	37	82.22	112	85.50	159	85.48
Monocots	6	13.33	15	11.45	23	12.37
Total	45	100	131	100	186	100

### Analysis Vegetation of the Study Area:

The results show variations in species richness and diversity in the study area. The following is a descriptive account of the vegetation, from (44 quadrats). A total of 186 taxa were recorded (Appendix.1).

#### 1. Frequency:

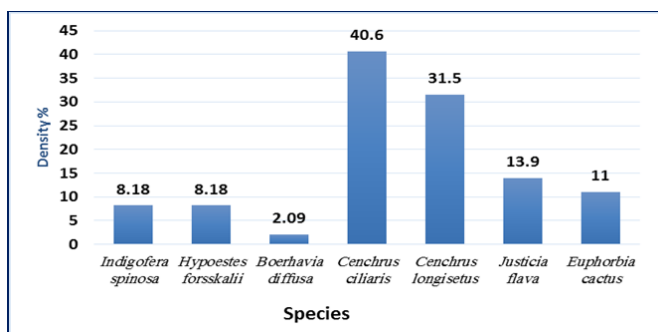
Results showed that the frequency percentage of species was highest by *Cenchrus ciliaris* (100%), *Cenchrus longisetus* (100%), *Buddleja polystachya* (100%), *Euphorbia granulate* (100%), *Hypoestes forsskalii* (100%), *Indigofera spinosa* (100%), *Justicia flava* (100%) and *Cynodon dactylon* (55.5%). (Fig.3)



**Fig. 3:** Show the Highest Frequency of Species of the Study Area.

#### 2. Density:

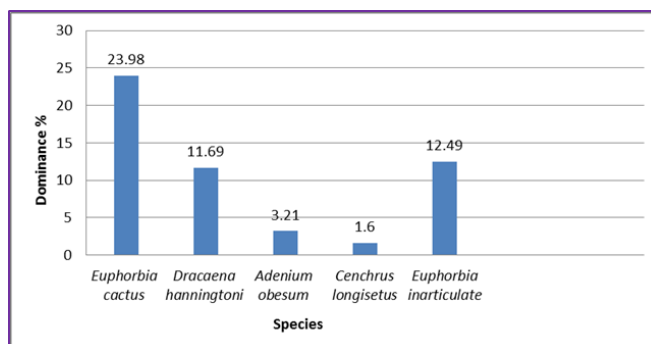
The density content results of species were highest by *Cenchrus ciliaris* (40.6%), *Cenchrus longisetus* (31.5%), *Justicia flava* (13.9%), *Euphorbia cactus* (11%), *Hypoestes forsskalii* (8.8%), *Indigofera spinosa* (8.8%) and *Boerhavia diffusa* (2.09%) (Fig.4).



**Fig. 4:** Show The Highest Density of Species of the Study Area.

### 3. Dominance:

Results showed that the Dominance of species was highest by *Euphorbia cactus* (23.98%), *Euphorbia inarticulate* (12.49 %), *Dracaena hanningtoni* (11.69 %), *Adenium obesum* (3.21%) and *Cenchrus longisetus* (1.6%), our results supported by [22, 24, 25] & (Fig.5). By analyzing the vegetation density, frequency, and dominance variables, slight differences were noticed in the most frequently found and dominant plant species in the study location's in each of the four directions.



**Fig. 5:** Show the Highest Dominance of Species of the Study Area.

Edaphology revealed that the soil texture was mostly Silt - Loam to clay (Table 2.), with pH ranging from 7.43 - 7.65, Organic matter was less varied from 1.89 - 2.55 %. The Electro conductivity was in between 329.2 - 654.2 ms / cm, Chloride ranged from 0.058 - 0.22 %,  $\text{NO}_3$  and  $\text{SO}_4$  had in between 12.80 - 27.80 ppm and 1.24 - 4.06 ppm respectively, Magnesium varied from 0.088 - 0.280 mg / 100 ml, Calcium between 0.048 - 0.208 mg / 100 ml and  $\text{HCO}_3$  between 0.106 - 0.276 ( Table 3.)

**Table 2:** Show Mechanical Analysis of Soil Samples of the Study Area.

Site (Direction)	Granulemetric Analysis %			Soil texture Class
	Clay %	Silt %	Sand %	
East	17.20	42.20	40.60	Clay
West	10.20	54.80	35.00	Silt-Loam
South	19.20	44.00	36.80	Silt-Loam
North	18.33	54.33	27.33	Silt-Loam

**Table 3:** Show Chemical Analysis of Soil Samples Collected from the Four Sites (Directions) of the Study Area

Soil Properties	North	South	West	East
pH	7.58	7.43	7.62	7.65
EC ms/cm	365.83	654.20	329.20	391.60
Mg mg/100ml	0.143	0.280	0.088	0.132
Ca mg/100ml	0.120	0.208	0.048	0.110
Cl mg/100ml	0.152	0.220	0.058	0.142
$\text{NO}_3$ Ppm	17.17	27.80	12.80	15.00
$\text{HCO}_3$	0.208	0.276	0.106	0.176
$\text{SO}_4$ ppm	3.40	4.06	1.24	3.10

Our results agree with [24, 49]. The chemical characters of soils at the different sites were more or less similar with little effect on the distribution of species. The study of the environmental places of the plants population need more soil analysis for several times in different seasons to obtain a real picture of the chemical elements in these environmental spots [50].

## References

- [1] M. Zohary, "Geobotanical Foundations of the Middle East". Vol. 2, Gustav. 1973.
- [2] A. Al-Hubaishi & K. Muller-Hohenstein, "An Introduction to the Vegetation of Yemen: Ecological Basis, Floristic Composition and Human Influence. –Published by Deutsche Gesellschaft Technische Zusammenarbeit (GTZ). 1984.
- [3] F. White & J. Leonard, "Phytogeographical Link between Africa and Southwest Asia. FI.Veg. Mundi 9:229 -246. 1991.
- [4] L. Boulos, "A Contribution to the Flora of South Yemen (P.D.R.Y)". Candollea, 43: 549-585. 1988.
- [5] J. R. I. Wood, "A handbook of the Yemen Flora". Royal Botanic Gardens, 1997.
- [6] M. Thulin, A. N. Al-Gifri, M.A. Hussein & S. Gabali, "Additions to the Yemen Flora". - Biol. Skr. 54:137–153. 2001.
- [7] N. Kilian, P. Hein & M. A. Hubaishan, "New and noteworthy recorded for the flora of Yemen, chiefly of Hadhramout and Al-Mahrah". -Willdenowia32: 239–269. 2002.
- [8] N. Kilian, P. Hein & M. A. Hubaishan, "Further notes on the flora of the southern coastal mountains of yemen" -Willdenowia 34:159-182. 2004.
- [9] A.A. Al-Khulaidi, "Flora of Yemen." The Sustainable Natural Resource Management Project (SNRMP II). Sana'a, Yemen .2013.
- [10] A.A. Al-Khulaidi, "Environmental and Human Determinates of Vegetation Distribution in the Hadhramut Region, Yemen." Ph.D thesis, University of Edinburgh. 2006.
- [11] A. N. Al-Gifri, "Contribution to the vegetation of Hadhramout, Yemen". Journal of Natural Applied Science Vol.10 . No.2. PP 291-297. 2006.
- [12] HA Saleh, "Vegetation of Wadi Tuban, Lahej Governorate, Republic of Yemen". Ph.D. Thesis, Dept. of Biology, Faculty of Science, Sana'a University.2016
- [13] S. A. Gabali, "Plant life in Yemen. A general survey and preliminary checklist of the flowering plant species," Univ. of Aden, Series 4, Yemen, 1995.
- [14] S. A. Gabali, "Studies in the flora of Yemen 4. The endemic species". Cons. Et. Jor. Bot.53 (1) pp. 73 Geneva. 1998
- [15] S.A. Gabali & A. N. Gifri, "Flora of South Yemen - Angiospermae." A provisional checklist. Feddes Repertorium. 101 (7-8): 373-383.1990.
- [16] S. A. Gabali & A. N. Gifri, "A survey of the vegetation of Hadhramout". Fragn. Flor. Geobot. Ann. 36: 127-133. 1991.
- [17] Al-Khulaidi & J. J. Kessler, "Plants of Dhamar". Obadi Center for Studies and Publisher. Sana'a Yemen. 1999. (in Arabic).
- [18] H. M. Ibrahim, "Studies on the Flora of Al-Mahweet Governorate, Republic of Yemen". M.Sc , Faculty of Science, Sana'a University, Yemen. 2006.
- [19] O. S. S. Hamood, "Flora of Toor Al-Baha District, Lahej governorate, Republic of Yemen and its Phytogeographical Affinities". Unpublished Ph.D. Thesis, Fac. of Sci. Sana'a Univ. 2012].
- [20] H. A. Al-Quhbi, A. A. Saeed, A.A. Al-Gifri, "Floristic Composition and Vegetation Cover Analysis of Delta Outlet Wadi Kharaz, Lahej, Yemen". International Journal of Botany Studies 6(4):269-277 India. 2021.
- [21] O. S. Al-Hawshabi & S. M. El-Naggar, "Vegetation patterns and floristic composition of Yemen". Current Life Sciences; 1 (3): 103-111. 2017.
- [22] A.A. Al-Khulaidi, "Vegetation and bee forage of Adhale governorate." Community Resource Management Project, Ministry of Agriculture and Irrigation, Republic of Yemen. pp. 99. 2010. (Report in Arabic, Unpublished).
- [23] F.A. Al-Hood, "Wild plants from Adhale". Adhale Community Resource Management. Project, Ministry of Agriculture and Irrigation, Republic of Yemen.pp.144.2013 (in Arabic).
- [24] F. A. AL-Hood, "Taxonomical and Ecological study of some succulent families of Adhale governorate, Yemen".(Ph. D thesis).2020 .
- [25] F.A. Al-Hood, " Floristic Composition, life-forms and Chorology of Al-Madloom Mountain, Adhale District, Southern Yemen", Electron. J. Univ. Aden Basic Appl. Sci., vol. 5, no. 1, pp.131-140. DOI: <https://doi.org/10.47372/ejuaba.2024.1.000.2024> .
- [26] M. A. Ba-Abad, "Study on the Flora of Al-Hoisin District, Adhale Governorate, Republic of Yemen". (M. Sc. thesis).2015. (in Arabic, Unpublished).

- [27] A. A. Ba-Haroon, "Plant life of Rishan Area, Qataba, District, Adhale Governorate - Republic of Yemen". Aden University (M.Sc. Thesis).2021.
- [28] J. Braun-Blanquet, "Plant Sociology" {Translated by G.D.Fuller and H.S. Conrad}. Mc. Graw -Hill Book Co., N.Y. 1964
- [29] A. M. Migahid, "Flora of Saudi Arabia". Vols 1 & 2. Riyadh University, Riyadh, Saudi Arabia. 1978.
- [30] A. M. Migahid, "Flora of Saudi Arabia", 3rd Edition, Vols 1, 2 & 3, King Saud University Press, Riyadh, Saudi Arabia. 1988-1990.
- [31] M. Thulin, "Flora of Somalia", Vol. 1, Royal Botanic Gardens, Kew, 493p.1993.
- [32] M. Thulin, "Flora of Somalia". Vol. 4, Royal Botanic Gardens, Kew. 1995.
- [33] M. Thulin, "Flora of Somalia".Vol. 2, Royal Botanic Gardens, Kew. 1999.
- [34] M. Thulin, "Flora of Somalia". Vol. 3, Royal Botanic Gardens, Kew. 2006.
- [35] F. Albers, & U. Meve, "Illustrated Handbook of Succulent Plants" Asclepiadaceae Springer-Verlag Berlin Heidelberg New York .2002 .
- [36] A.A. Al-Khulaidi, "Flora of Ibb (Uses & Distribution)". Social Fund for Development, Agriculture & Rural Development Unit. Yemen pp. 376. 2012. (In Arabic).
- [37] S. A. Chaudhary, "Flora of the Kingdom of Saudi Arabia" Illustrated. Vol.1, National Herbarium, National Agriculture and Water Research Center, Ministry of Agriculture and Water, Riyadh, Kingdom of Saudi Arabia,.1999.
- [38] S. A. Chaudhary, "Flora of the Kingdom of Saudi Arabia" Illustrated. Vol. 2 (3), National Herbarium, National Agriculture and Water Research Center, Ministry of Agriculture and Water, Riyadh, Kingdom of Saudi Arabia, 2000.
- [39] S. A. Chaudhary, "Flora of the Kingdom of Saudi Arabia" Illustrated. Vol. 2 (1), National Herbarium, National Agriculture and Water Research Center, Ministry of Agriculture and Water, Riyadh, Kingdom of Saudi Arabia., 2001a.
- [40] S. A. Chaudhary, "Flora of the Kingdom of Saudi Arabia" illustrated. Vol. 2 (2), National Herbarium, National Agriculture and Water Research Center, Ministry of Agriculture and Water, Riyadh, Kingdom of Saudi Arabia.2001b.
- [41] S. A. Chaudhary, " Flora of the Kingdom of Saudi Arabia" Illustrated.Vol.3, National Herbarium, National Agriculture and Water Research Center, Ministry of Agriculture and Water, Riyadh, Kingdom of Saudi Arabia pp. 368.2001c.
- [42] I. S. Collenette, "Wild flowers of Saudi Arabia". National Commission for Wild Life Conservation, Riyadh. pp.799.1999.
- [43] POWO, "Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew". Published on the Internet; <http://www.plantsoftheworldonline.org/> Retrieved April 2024. 2024.
- [44] R. S. Shukla & P. S. Chundel, "A text book of Plant Ecology." S. Chand And Company Limited. New Delhi, India pp. 526. 2018.
- [45] A.S. AL-Dukail, " Laboratory Guide in Plant, Water and Soil Analysis Methods". Minister of Agriculture, Alkude Research Center, P.D.R.Y. pp. 64.1982. (in Arabic).
- [46] C. S. Piper, " Soil and plant analysis". Univ. of Adelaide Press. Australia. 1950.
- [47] O. S. Al-Hawshabi, M. A. Al-Meisari, S. M. El-Naggar, and A. M. A. Dahmash, "Floristic Composition, Life-forms and Biological Spectrum of Toor Al-Baha District, Lahej Governorate, Yemen". Current Life Sciences; 3 (4): 72-91.2017.
- [48] S. A. Ghazanfar, "An annotated catalogue of the vascular plants of Oman". Scripta Bot. Belgica. .1992.
- [49] S.S. Ahmed, "Final Report of Natural Resource Survey in Adhale". Adhale Community Resource Management, Project. Ministry of Agriculture and Irrigation .2010.
- [50] M.A Al-Mutairy, "Taxonomic and Ecological Studies on some Species of the Genus Rumex in the Kingdom of Saudi Arabia." College of Science, King Saud University, M.Sc. thesis .2003. (In Arabic, Unpublished.)

## Appendix 1.: List of the Plant Species Recorded in Different Directions of Jabal Al-Baddiea.

Groups	Families	Species
Ferns	Pteridaceae (3genera -3sp.)	<i>Actiniopteris semiflabellata</i> Pic.Serm
		<i>Adiantum capillus-veneris</i> L.
		<i>Hemionitis farinosa</i> (Forssk.) Christenh.
	Selaginellaceae	<i>Selaginella yemensis</i> (Sw.) Spring.
Dicotyledon	Acanthaceae (9genera -13sp.)	<i>Acanthus arboreus</i> Forssk.
		<i>Barleria bispinosa</i> (Forssk.) Vahl.
		<i>Barleria hillcoatiae</i> J.R.I.Wood.
		<i>Barleria proxima</i> Lindau.
		<i>Blepharis edulis</i> (Forssk.) Pers.
		<i>Crossandra johanninae</i> Fiori.
		<i>Dicliptera paniculata</i> (Forssk.) I.Darbysh
		<i>Ecbolium viride</i> (Forssk.) Alston.
		<i>Justicia flava</i> (Forssk.) Vahl .
		<i>Justicia odora</i> (Forssk.) Lam.
		<i>Hypoestes forskalii</i> (Vahl.) R.Br.
		<i>Ruellia forsskaalii</i> Thulin.
		<i>Ruellia patula</i> Jacq.
	Amaranthaceae (8genera-8sp.-1ssp.)	<i>Achyranthes aspera</i> L.
		<i>Aerva javanica</i> (Burm.f.) Juss. ex Schult.
		<i>Alternanthera pungens</i> Kunth .
		<i>Amaranthus blitum</i> subsp. <i>blitum</i>
		<i>Amaranthus graecizans</i> L .
		<i>Celosia polystachya</i> (Forssk.) C.C.Towns.
		<i>Chenopodium album</i> L.
		<i>Dysphania carinata</i> (R.Br.) Mosyakin & Clemants.
		<i>Ouret lanata</i> (L.) Kuntze.
	Anacardiaceae (2genera-2sp.)	<i>Pistacia falcata</i> Becc.ex Martelli.
		<i>Searsia retinorrhoea</i> (Steud. ex Oliv.) Moffett.
	Apocynaceae (10genera-13sp.)	<i>Acokanthera schimperi</i> (A.DC.) Schweinf.
		<i>Adenium obesum</i> (Forssk.) Roem. & Schult.
		<i>Calotropis procera</i> (Aiton.) W.T.Aiton.
		<i>Caralluma quadrangular</i> (Forssk.) N.E.Br.
		<i>Caralluma subulata</i> (Forssk.) Decne.
		<i>Ceropegia arabica</i> H.Huber.
		<i>Ceropegia rupicola</i> Deflers.
		<i>Cynanchum viminale</i> (L.) L.
		<i>Gomphocarpus fruticosus</i> (L.) W.T.Aiton.
		<i>Kanahia laniflora</i> (Forssk.) R.Br.
		<i>Pergularia daemia</i> (Forssk.) Chiov. .
		<i>Pergularia tomentosa</i> L.
	<i>Rhytidocaulon macrolobum</i> Lavranos.	
	Aristolochiaceae	<i>Aristolochia bracteolata</i> Lam.
	Asteraceae (15genera-19sp.)	<i>Acatospermum hispidum</i> L.
		<i>Bidens Pilosa</i> L
		<i>Crepis rueppellii</i> Sch.Bip.
		<i>Echinops spinosissimus</i> Turra .

		<i>Euryops arabicus</i> Steud. ex Jaub. & Spach .
		<i>Flaveria trinervia</i> (Spreng.) C.Mohr.
		<i>Helichrysum foetidum</i> (L.) Moench.
		<i>Kleinia odora</i> (Forssk.) DC.
		<i>Kleinia pendula</i> (Forssk.)DC.
		<i>Pulicaria jaubertii</i> E.Gamal-Eldin.
		<i>Pulicaria petiolars</i> Jaub. & Spach.
		<i>Pulicaria undulata</i> (L.) C.A.Mey.
		<i>Psiadia punctulata</i> (DC.)Vatke.
		<i>Reichardia tingitana</i> (L.) Roth.
		<i>Tarchonanthus camphoratus</i> L.
		<i>Tagetes minuta</i> L.
		<i>Tridax procumbens</i> L.
		<i>Xanthium spinosum</i> L.
		<i>Xanthium strumarium</i> L.
	Boraginaceae (4genera -5sp.)	<i>Ehretia cymosa</i> Thonn.
		<i>Ehretia obtusifolia</i> Hochst.ex A.DC.
		<i>Euploca strigosa</i> (Willd.) Diane & Hilger
		<i>Heliotropium longiflorum</i> (A.DC.) Jaub. & Spach.
		<i>Trichodesma ehrenbergii</i> Schweinf.ex Boiss.
	Brassicaceae (1genus - 2sp.)	<i>Farsetia longisiliqua</i> Decne.
		<i>Farsetia stylosa</i> R.Br.
	Burseraceae (1 genus -2sp.)	<i>Commiphora kua</i> (R.Br. ex Royle) Vollesen.
		<i>Commiphora kataf</i> (Forssk.) Engl.
	Capparidaceae (1genus -2sp.)	<i>Capparis cartilaginea</i> Decne.
		<i>Capparis spinosa</i> L.
	Caryophyllaceae	<i>Arenaria serpyllifolia</i> L.
	Convolvulaceae (2genera -2sp.)	<i>Convolvulus arvensis</i> L.
		<i>Ipomoea nil</i> (L.) Roth.
	Cucurbitaceae (3genera - 3sp.)	<i>Citrullus colocynthis</i> (L.) Schrad.
		<i>Coccinia grandis</i> (L.)Voigt.
		<i>Cucumis prophetarum</i> L.
	Euphorbiaceae (6genera -10sp.)	<i>Acalypha fruticose</i> Forssk.
		<i>Chrozophora oblongifolia</i> (Delile.) A.Juss. ex Spreng.
		<i>Euphorbia ammak</i> Schweinf.
		<i>Euphorbia cactus</i> Ehrenb. ex Boiss.
		<i>Euphorbia granulata</i> Forssk.
		<i>Euphorbia hirta</i> L.
		<i>Euphorbia inarticulata</i> Schweinf.
		<i>Jatropha spinosa</i> Vahl.
		<i>Ricinus communis</i> L.
		<i>Tragia pungens</i> (Forssk.) Müll.Arg.
	Fabaceae (7genera-16sp -1ssp.)	<i>Cadia purpurea</i> (G.Piccioli.) Aiton.
		<i>Crotalaria incana</i> L.
		<i>Indigofera arabica</i> Jaub. & Spach.
		<i>Indigofera caerulea</i> Roxb.
		<i>Indigofera oblongifolia</i> Forssk.
		<i>Indigofera spinosa</i> Forssk.

		<i>Senegalia asak</i> (Forssk.) Kyal. & Boatwr.
		<i>Senegalia mellifera</i> (Vahl.) Seigler & Ebinger.
		<i>Senna italica</i> Mill.
		<i>Senna occidentalis</i> (L.) Link.
		<i>Vachellia etbaica</i> (Schweinf.) Kyal. & Boatwr.
		<i>Vachellia nilotica</i> (L.) P.J.H.Hurter & Mabb. Subsp .kraussiana (Benth.) Brenan.
		<i>Vachellia nilotica</i> subsp. <i>indica</i> (Benth.) Kyal. & Boatwr.
		<i>Vachellia seyal</i> (Delile) P.J.H.Hurter.
		<i>Vachellia yemenensis</i> (Boulos) Ragup., Seigler,Ebinger & Maslin.
		<i>Rhynchosia minima</i> (L.) DC.
	Gentianaceae	<i>Enicostema axillare</i> (Poir. ex Lam.) A.Raynal.
	Lamiaceae (5genera – 8sp.)	<i>Coleus cylindraceus</i> (Hochst. ex Benth.) A.J.Paton.
		<i>Lavandula pubescens</i> Decne.
		<i>Leucas alba</i> (Forssk.) Sebald.
		<i>Leucas glabrata</i> (Vahl.) Sm.
		<i>Leucas inflata</i> Benth.
		<i>Leucas urticifolia</i> (Vahl.) R.Br.
		<i>Ocimum forskoelei</i> Benth.
		<i>Otostegia fruticosa</i> (Forssk.) Schweinf. ex Penzig
	Malvaceae (4genera -7sp.)	<i>Abutilon fruticosum</i> Guill. & Perr.
		<i>Corchorus tridens</i> L.
		<i>Grewia tembensis</i> Fresen.
		<i>Grewia tenax</i> (Forssk.) Fiori.
		<i>Hibiscus deflersii</i> Schweinf. ex Cufod.
		<i>Hibiscus trionum</i> L.
		<i>Hibiscus vitifolius</i> L.
	Moraceae (2genera - 6sp.)	<i>Dorstenia barnimiana</i> Schweinf.
		<i>Dorstenia foetida</i> Schweinf.
		<i>Ficus cordata</i> Thunb
		<i>Ficus palmata</i> Forssk.
		<i>Ficus populifolia</i> Vahl.
		<i>Ficus vasta</i> Forssk.
	Nyctaginaceae (2genera - 3sp.)	<i>Boerhavia diffusa</i> L.
		<i>Commicarpus helenae</i> (Roem. & Schult.) Meikle.
		<i>Commicarpus plumbagineus</i> (Cav.) Standl.
	Orobanchaceae (4genera - 4sp.)	<i>Alectra parasitica</i> A.Rich
		<i>Cistanche phelypaea</i> (L.) Cout.
		<i>Orobanche aegyptiaca</i> Pers. .
		<i>Striga gesnerioides</i> (Willd.) Vatke.
	Oxalidaceae	<i>Oxalis corniculata</i> L.
	Papaveraceae	<i>Argemone mexicana</i> L.
	Polygonaceae	<i>Rumex nervosus</i> Vahl.
	Portulacaceae (1genus - 2sp.)	<i>Portulaca oleracea</i> L.
		<i>Portulaca quadrifida</i> L.
	Phyllanthaceae	<i>Fleuggia virosa</i> (Roxb. exWilld.) Royle.
	Resedaceae	<i>Ochradenus baccatus</i> Delile .
	Rhamnaceae (2 genera - 2sp.)	<i>Rhamnus staddo</i> A.Rich.
		<i>Ziziphus spina-christi</i> (L.) Desf.



	Rubiaceae	<i>Pentas lanceolata</i> (Forssk.) Deflers.
	Salvadoraceae	<i>Salvadora persica</i> L.
	Sapindaceae	<i>Dodonaea viscosa</i> Jacq.
	Scrophulariaceae	<i>Buddleja polystachya</i> Fresen.
	Solanaceae (4genera - 8sp.)	<i>Datura ferox</i> L.
		<i>Datura innoxia</i> Mill.
		<i>Lycium shawii</i> Roem & Schults.
		<i>Solanum glabratum</i> Dunal
		<i>Solanum incanum</i> L.
		<i>Solanum nigrum</i> L.
		<i>Solanum</i> sp.
	<i>Withania somnifera</i> (L.) Dunal.	
	Urticaceae ( 2genera - 2sp.)	<i>Forsskaolea tenacissima</i> L.
		<i>Urtica urens</i> L.
	Verbenaceae (1genus - 2sp.)	<i>Lantana camara</i> L.
		<i>Lantana viburnoides</i> (Forssk.)Vahl.
	Vitaceae ( 2genera - 3sp.)	<i>Cissus quadrangularis</i> L.
		<i>Cissus rotundifolia</i> Vahl.
		<i>Cyphostemma digitatum</i> (Lam.) Desc.
	Zygophyllaceae (2genera- 2sp.)	<i>Tribulus terrestris</i> L.
		<i>Zygophyllum indicum</i> (Burm.f.) Christenh. & Byng.
Monocotyledon	Asparagaceae (3genera - 5sp.)	<i>Agave sisalana</i> Perrine.
		<i>Dracaena forskaliana</i> (Schult. & Schult.f.) Byng & Christenh.
		<i>Dracaena hanningtonii</i> Baker.
		<i>Dracaena serrulata</i> Baker
		<i>Ledebouria revoluta</i> (L.f.) Jessop .
	Asphodelaceae (1genus - 3sp.)	<i>Aloe inermis</i> Forssk.
		<i>Aloe lanata</i> T.A. McCoy & Lavranos
		<i>Aloe vacillans</i> Forssk.
	Commelinaceae (2genera - 4sp.)	<i>Cyanotis nyctitropa</i> Deflers
		<i>Commelina albescens</i> Hassk. .
		<i>Commelina benghalensis</i> L.
		<i>Commelina forskaolii</i> Vah .
	Poaceae (7genera - 9sp.)	<i>Cenchrus ciliaris</i> L.
		<i>Cenchrus longisetus</i> M.C.Johnst.
		<i>Chloris barbata</i> Sw.
		<i>Cynodon dactylon</i> (L.) Pers .
		<i>Dactyloctenium aegyptium</i> (L.) Willd.
		<i>Digitaria ciliaris</i> (Retz.) Koeler
		<i>Urochloa deflexa</i> (Schumach.) H.Schol
		<i>Urochloa lata</i> (Schumach.) C.E.Hubb.
<i>Zea mays</i> L.		
Typhaceae	<i>Typha domingensis</i> Pers.	
Velloziaceae	<i>Xerophyta arabica</i> (Baker) N.L.Menezes .	

## الغطاء النباتي لجبل البضيع، مديرية جحاف، محافظة الضالع، اليمن

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## المُلخَص

تم دراسة تحليل الغطاء النباتي في 4 "مواقع" اتجاهات (شرق - جنوب - شمال - غرب) في جبل البضيع، مديرية جحاف، محافظة الضالع/اليمن. 44 مربعًا تغطي أشكالًا جيومورفولوجية مختلفة للأرض وثمانية متغيرات للتربة. يتكون الغطاء النباتي من 186 وحدة تصنيفية (تشمل الأنواع وتحت الأنواع) تنتمي إلى 131 جنسًا تقع ضمن 45 فصيلة، من بين 186 نوعًا من مغطاة البذور، تشكل ثنائية الفلقة 159 نوع نباتي، أحادية الفلقة 23 نوع نباتي، بينما تمثل السراخس 4 أنواع نباتية. الفصائل الأكثر سيادة هي الفصيلة المركبة Asteraceae (15 جنس و 19 نوع نباتي)، الفصيلة الدفلية Apocynaceae (10 اجناس و 13 نوع نباتي)، الفصيلة السنفية Acanthaceae (9 اجناس و 13 نوع نباتي)، الفصيلة البقولية Fabaceae (7 اجناس و 16 نوع نباتي) والفصيلة اللبينية Euphorbiaceae (6 اجناس و 10 أنواع نباتية)، من خلال تحليل الغطاء النباتي فقد كانت الأنواع النباتية السائدة هي: *Cenchrus longisetus*، *Cenchrus ciliaris*، *Cynodon dactylon*، *Dracaena hanningtonii*، *Euphorbia cactus*، *Euphorbia*، *Boerhavia diffusa*، *Adenium obesum*، *Buddleja polystachya*، *Cenchrus*، *Euphorbia*، *Justicia odor* و *Justicia falva*، *Indigofera spinosa*، *Hypoestes forsskalii*، *Euphorbia inarticulata*، *granulate*. كانت الصفات الكيميائية للتربة في المواقع المختلفة أكثر أو أقل تشابهًا مع تأثير ضئيل على توزيع الأنواع النباتية.

الكلمات المفتاحية: الغطاء النباتي، جبل البضيع، السيادة، الضالع، اليمن.

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