A COMPARATIVE STUDY OF THE SAUDI ARABIA FLORA, MEDICINAL PLANTS OF AL- MANDAQ PROVINCE, AL-BAHA *REGION*.

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Abstract

Medicinal and aromatic plants are important sources for the production of many pharmaceutical compounds such as antibiotic drugs. The presented study aims to survey and record the various medicinal plant species in Al-Mandaq Governorate - Al-Baha region - Kingdom of Saudi Arabia with a number of targeted locations such as Mashnaih, Darake and Khleb valleys, Medhas and Darake Dams in 2018 and 2019. 160 species of vascular plants belonging to 52 plant families were surveyed and recorded. The study proved that the Poaceae family is the most contain of the plant species (22 species, 13.7%), followed by the Asteraceae family (19 species, 11.8%), then the Fabaceae family (11 species, 6.8%). According to the life forms, the annual plants represent the highest percentage among the recorded plants (56 species, 35%), followed by the perennial herbs (48 species, 30%), then shrubs (26 species, 16.25%) and the least recorded species are bi-perennials (5 species, 3.12 %), Palms and cactus (one species, 0.6%). The recorded results and statistics represent a database of the floral content in the study area and also provide important information for the recorded plants and their uses in the fields of food, ornamental and biological applications.

Key words: Medicinal plants, Flora, Urban Flora, Saudi Arabia, Economic Uses, Al-Baha Region.

Introduction

By the middle of the nineteenth Century, at least 80% of all medicines derived from different plants. Then, after the scientific revolution, which leads to development of the pharmaceutical industry, the synthetic drugs dominated (Gilani and Atta-ur-Rhaman, 2005). The using of plant species is the oldest medical science historically, it was heavily used in ancient times and the middle but even in our modern age, according to the reports, there are more than 70% of the Earth's population trust in the use of medicinal plants in the treatment and healing of various diseases that infect them with keeping in mind that there are some medicinal plants has harmful side effects, (Yuan, 2011). There are over 2.75,000 species of flowering plants known in the world today (Anonymous, 2000). Various plants and their parts used by man for the treatment of several diseases, particularly those caused by microorganisms. There is likelihood that all these plants used by the tribal people must have antimicrobial activities. A large number of antimicrobial agents already existing for various purposes have proved ineffective on target microorganisms (Babalola, 1988).

Medicinal plants play a significant role in providing primary health care services to the people (Rowinsky, *et al*., 1992). They serve as important therapeutic agents as well as important raw materials for the manufacture of traditional and modern medicines. It estimated that more than 25% of all prescription drugs used in the industrialized countries contain active principles that still extracted from plants including anticancer drugs (Shoeb, 2006).

Saudi Arabia covers an area of about 2,250,000 sq. km. the vast landscape is composed of a variety of habitats such as mountains, valleys, sandy and rocky deserts, meadows, and salt marshes. It has a hot desert climate and rainfall is scarce in most parts of the country. The flora of Saudi Arabia as well as the other countries in the Arabian Peninsula been neglected for a long time due to its arid climate. The first attempt to cover the flora of Saudi Arabia was in 1974 (Alfarhan et al., 1998). Many areas in Saudi Arabia, including Al-Baha region are rich in medicinal plants that traditionally used in treatment of some human and animal disease. This activity against diseases mainly attributed to presence of bioactive compounds in these plants; such as saponins, tannins, terpenoids, alkaloids, flavonoids, phenols and quinones. The percentage of endemic plants in Saudi Arabia is very low. About 50 species (2%) are considered endemic to this country compared to 137 species (5.5%) of Yemen and 60 species (5%) of Oman. However, there are about 152 undetermined specimens deposited at various herbaria in the Kingdom and Britain. The number of endemic species in Saudi Arabia probably goes even higher as and when the nomenclatural status of the undetermined specimens to be finalized. At present, most of the endemic species reported from the southwestern and northwestern highlands. It is probably due to these regions' rich variety of habitats and their affordable degree of environmental stability (Miller & Nyberg, 1991).

Study Area:

Al-Baha region lies in the southwest of the kingdom of Saudi Arabia, located between the area of Makkah, and Asir, it is the smaller provinces of Saudi Arabia with a

total area of 11000 square kilometers, surrounded by many of the cities where bordered to the north by the city of Taif, from the east is Bisha city, from the southern is Abha city, and to the West by the center of the Quanfonda. Al-Baha region has high plant vegetation, dense agricultural spaces. The six major cities of Al-Baha region are Beljarshy, Almandaq, and Almekhwah, in addition to Al-Baha city in the center of the province. The province comprises 31 administrative centers and has a population of 533,001. It is known for its forests, wildlife areas, valleys, and mountains that attract visitors from all parts of the kingdom and the Arabic Gulf area. Some of these areas are the forests of Raghdan, Ghomsan, Fayk, and Aljabal, and many other historical and archeological sites. It contains more than 53 forests. Al-Baha region is situated in the central foothills of the western mountains at an altitude of approximately 1899.68 m above sea level (20º1771ˈN 0 41º2757ˈ E) (Map 1). The climate in Al-Baha greatly affected by its varying geographic features. Generally, the climate in Al-Baha is mild with temperatures ranging between 12 to 23 °C (53.6 to 73.4 °F). Due to its location at 2,500 meters (8,200ft) above sea level, Al-Baha's climate is moderate in summer and cold in winter. The area attracts visitors looking for a moderate climate and pristine, scenic views. In the Tehama area of the province, which is down on the coast, the climate is hot in the summer and warm in the winter. Humidity ranges from 52%–67%. While in the mountainous region, which known as As-Sarah, the weather is cooler in summer and winter, (Yassin, *et al*., 2013). Rainfall in the mountainous region lies in the range of 229 to 581 millimeters (9 to 23 in). The average throughout the whole region is 100 to 250 millimeters (3.9 to 9.8 in) annually, (Abdul-Razzaq, 2001), (Table 1).

<u>Map 1:</u> Showing Al-Baha region of Saudi Arabia,
(http://www.citiestips.com/city/AlBahaSaudiArabia**)**

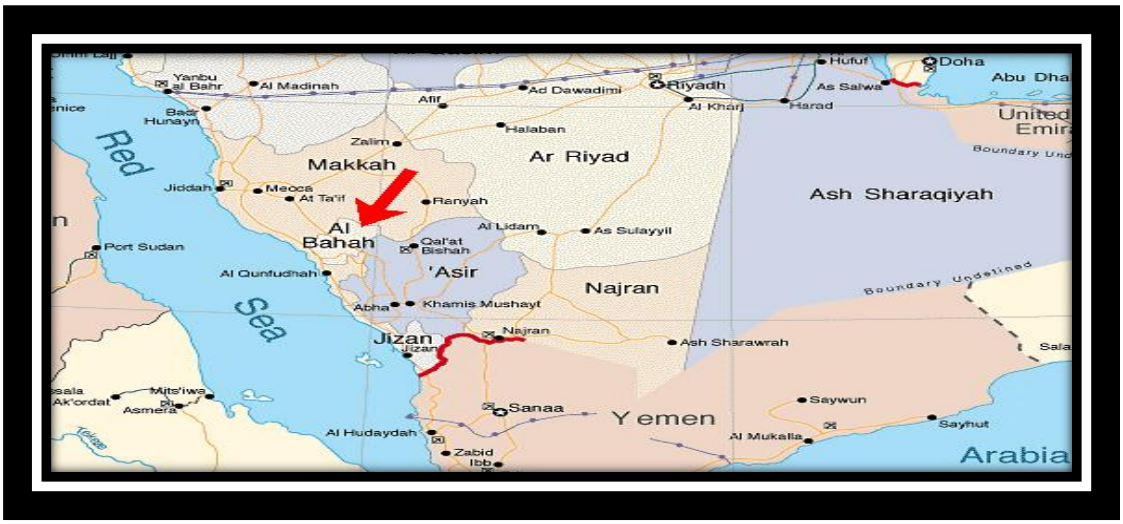


Table 1: Monthly variation in air temperature (ºC), relative humidity (percentage), and rainfall (mm monthº) as recorded at Al-Baha region that located in the study area. The data are long-term average (Jeddah Regional Climate Center, KSA, 1985-2015).

Climate data for Al-Baha region (1985-2015)													
Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Record high ºC	29	32	36	35	38	39	38	39	38	35	37	29	39
Average high ºC	22	24	26	29	32	35	35	35	33	29	26	23	29
Daily mean	15	17	20	22	25	28	28	29	27	23	19	16	22
Average low ºC	9	11	13	16	19	22	22	22	20	16	13	10	16
Record low ºC	1.6	0.0	4.0	8.0	12.2	12.0	15.8	14.0	15.0	8.5	5.8	2.0	0.0
Average precipitation mm	10.9	1.1	16.5	36.3	24.1	6.0	10.2	10.8	2.9	7.2	8.1	4.0	138.1
Average precipitation days	22	1.0	3.9	9.5	8.7	2.7	3.9	5.5	1.5	2.1	3.5	2.8	47.3
Average relative humidity (%)	55	48	46	45	35	25	27	28	25	30	46	53	39

Materials and Methods:

The important sites in Al-Baha region (Mashnyia, Medhas Dams, Darak, and Elkhalab valleys) were visited and surveyed in 2017 and 2018. In each site, the following data were recorded: First and second dominant plant species, GPS data (global positioning system) and height above sea level, photography of all plant species, list of the annual, perennial, and biannual plant species. Collection samples of different plant species from most sites. The herbarium sheets of the recorded species kept in the Herbarium of Biology Department, Faculty of Science and Arts, Al-Baha University. Nomenclature according to (Boulos, 1983 and 1995), (Shaltout, 1997) and (Tackhlom, 1974). The potential and actual economic uses of the wild plant species assessed, on three bases:

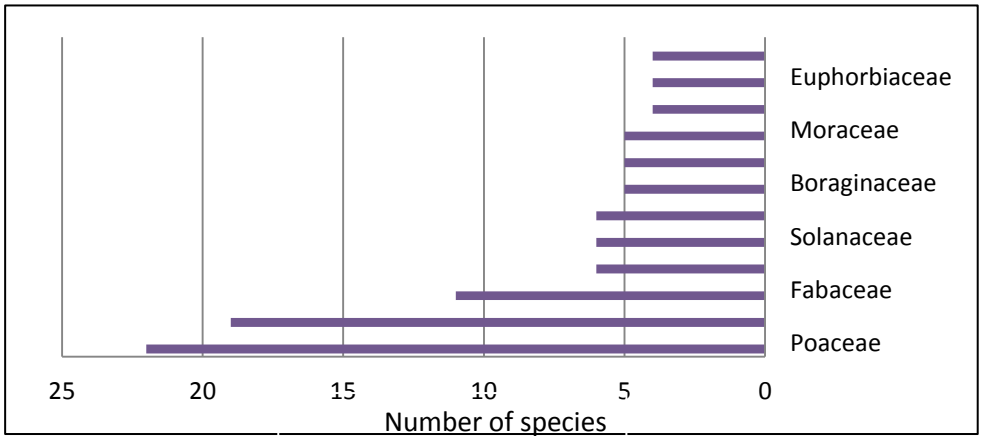
- Field observations.
- Information collected from local inhabitants.
- Literature reviews and recording the origin of each plant species.

Results and Discussion

The floristic composition of Mandaq province, Al-Baha was collected from four regions: Mashnia Dam (123 species), Medhas Dam (102 species), Darak Valley (103 species), and Elkhalab valley (84 species) (five sites for each). Plants of the database described using the following attributes; family name, botanical name, life form, common uses, origin (native), and locations of presence (Table 2). A total of 160 species of the vascular plants were recorded belonging to 52 families. Largest families (included the highest number of species) were Poaceae (22 species = 13.7%) and Asteraceae (19 species = 11.8%) followed by Fabaceae (11 species = 6.8%). Three families were represented by six species such as Amaranthaceae, Solanaceae, three families were represented by five species such as Borabinaceae and Moraceae. Three families represented by four species (Chenopodiaceae, Euphorbiaceae, and Malvaceae). While the families represented by three species were six such as Anacardiaceae, Resedaceae, and Rhamnaceae. There are ten plant families represented by only two species such as Aizoaceae, Aloaceae, and Apocynaceae. On the other hand, there are 23 families represented by only one species such as Cyperaceae, Myrtaceae, and Meliaceae (Figure 1).

According to life forms, the annual herbs had the highest contribution of the recorded plant species (56 species = 35%), followed by perennial herbs (48 species = 30%), shrubs and shrublets (26 species = 16.25%), Trees (23 species = 14.37%), biennial herbs (five species = 3.12%). On the other hand, the palms and cactus had the lowest contribution (one species for each) (Figure 2).

Figure 1: Survey of the recorded plant families in Al-mandq, Al-Baha (KSA).



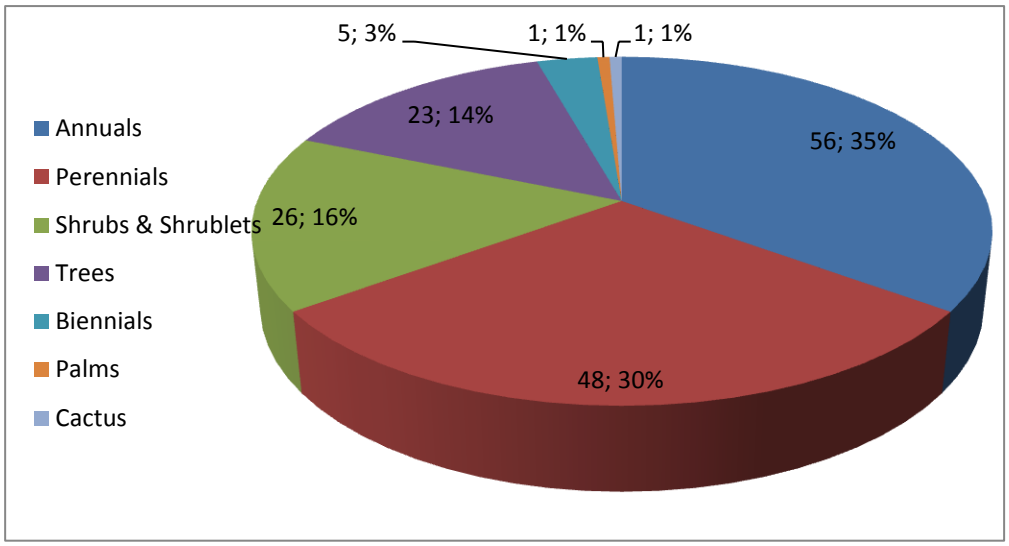


Figure 2: Classification of life forms of the recorded plant species in Almandq, Al-Baha region, (KSA).

Seventy-nine of total recorded plant species (49.37%) have medicinal uses, Twenty-five of total recorded plant species (15.62%) are edible, and while twenty of total recorded plant species (12.5-%) are used as ornamental. On the other hand, there are fifteen of total recorded plant species (9.37%) are foliage, thirteen of total plant species (8.12%) are used as economic, finally eight of total recorded plant species (5%) are has biological uses (Figure 3).

Figure 3: Classification of the recorded plant species of Al-Baha region according to common uses.

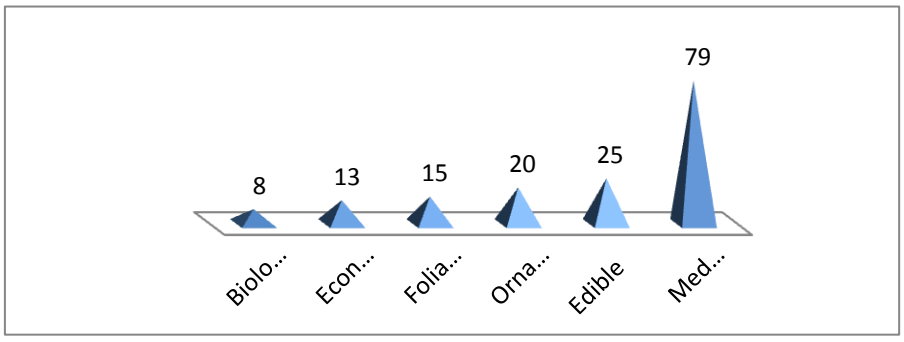


Table 2: Floristic composition of plant species recorded at different locations of Almandq Province, Al-Baha Region (KSA).

Family	Botanical Name	Life form	C.U.	Origin (Native)	Locations			
					Mas.	Med.	Dha.	Elk
Acanthaceae	Blepharis ciliaris (L.) B. L. Burtt	Perennial	M.	Arab. Pen.	+	+	+	-
Aizoaceae	Aizoon canariense L.	Annual	Orn.	Maur. & Mali	+	+	-	+
Aizoaceae	Gisekia pharnaceoides L.	Annual	M.	India	+	+	-	-
Aloaceae	Aloe pseudorubroviolacea Lavranos & Collen	Perennial	M.	KSA	-	-	+	+
Aloaceae	Aloe vera (L.) Burm.f.	Perennial	M.	Arab. Pen.	+	+	+	-
Amaranthaceae	Achyranthes aspera L.	Perennial	M.	Tropics	-	+	+	-
Amaranthaceae	Aerva javanica (Burm.f.) Shult	Perennial	M.	W. & S. Asia	-	+	+	-
Amaranthaceae	Alternanthera pungens Kunth	Annual	M.	Am.	+	-	-	-
Amaranthaceae	Amaranthus graecizans L.	Annual	Ed.	E. & C. Asia to India	-	-	+	+
Amaranthaceae	Amaranthus tricolor L.	Annual	Orn.	S. Am.	+	-	+	-
Amaranthaceae	Amaranthus viridis L.	Annual	M.	India	-	+	+	+
Anacardiaceae	Pistacia atlantica L.	Tree	Orn.	N. Afr.	-	-	+	+
Anacardiaceae	Pistacia falcata Beccari ex Martelli	Tree	Orn.	KSA, Oman, Yemen & Afr.	-	+	+	-
Anacardiaceae	Rhus glabra L.	Shrub	M.	N. Am.	+	-	+	+
Apiaceae	Anethum graveolens L.	Annual	M.	Asia & Med.	-	+	+	-
Apocynaceae	Carissa spinarum L.	Shrub	Ed.	Afr., S. Asia, & Aus.	+	-	-	-
Apocynaceae	Gomphocarpus fruticosus (L.) .T.Aiton	Shrub	M.	S. Afr.	-	+	-	+
Arecaceae	Phoenix dactylifera L.	Palm	Eco.	S. Asia & N. Afr.	+	+	+	-
Asclepiadaceae	Calotropis procera (Aiton) R.Br.	Shrub	M.	N. Afr., W. & S. Asia	+	+	+	-
Asclepiadaceae	Leptadenia pyrotechnica (Forssk.) Decne.	Perennial	Fol.	Afr. & India	-	-	+	+
Asphodelaceae	Asphodelus tenuifolius Cav.	Annual	Eco.	Med., Asia & Mas. Is.	+	-	+	-
Asteraceae	Achillea fragrantissima (Forssk.) Sch.Bip.	Shrub	M.	Eu., t. Asia & N. Am.	-	+	-	+
Asteraceae	Anthemis cotula L.	Annual	M.	Med.	-	-	+	+
Asteraceae	Anvillea garcinii (Burm.f.) DC.	Shrub	M.	N. Afr., Mid. East, & Arab. Pen.	-	+	-	+
Asteraceae	Artemisia abyssinica Sch.Bip. ex A.Rich	Shrub	M.	Eurasia & N. Afr.	+	+	-	+
Asteraceae	Artemisia vulgaris L.	Perennial	M.	Eu. & N. Am.	-	+	-	-
Asteraceae	Atractylis carduus (Forssk.) Christ	Annual	M.	Greek Is. of Crete	+	-	+	-
Asteraceae	Bidens pilosa L.	Annual	M.	Am.	+	+	-	-
Asteraceae	Calendula arvensis L.	Annual	Orn.	C. & S. Eu.	+	+	+	-
Asteraceae	Centaurea pseudosinaica Czerep.	Annual	M.	Calif.	-	+	-	+
Asteraceae	Conyza bonariensis (S.Moore)	Perennial	M.	Tr. & W. Reg.	-	+	+	+

	Cufod.							
Asteraceae	Echinops spinosissimus Turra	Perennial	Fol.	S. Eu.,N. Afr., & S. Asia	+	+		
Asteraceae	Flaveria trinervia (Spreng.) C.Moh.	Annual	M.	Aus.	+	-	-	-
Asteraceae	Imperata cylindrical (L.) P. Beauv.	Perennial	M.	E. & S. Asia	+	+	+	+
Asteraceae	Onopordum acaulon L.	Biennial	M.	S. Eu., N. Afr., & Can. Is.	-	+	-	+
Asteraceae	Pulicaria vulgaris Gaertn.	Shrub let	M.	Alb., Alg. & Bos.	-	+	+	+
Asteraceae	Reichardia tingitana (L.) Roth	Annual	M.	Afr.	-	+	-	+
Asteraceae	Senecio vulgaris L	Annual	M.	Eu.	+	+	+	+
Asteraceae	Sonchus oleraceus L.	Annual	M.	Eu., & W. Asia	+	+	+	+
Asteraceae	Xanthium strumarium L.	Perennial	M.	N. Am.	+	+	-	+
Boraginaceae	Alkana orientalis (L.) Boiss.	Perennial	Eco.	S. Eu.	+	-	-	-
Boraginaceae	Anchusa arvensis (L.) M.Bieb.	Annual	Ed.	Eu.	-	+	-	-
Boraginaceae	Heliotropium arborescens L	Shrub	M.	Peru	+	-	-	-
Boraginaceae	Heliotropium ramosissimum (Lehm.) DC.	Perennial	M.	Arab. Pen. & Eu.	+	+	-	-
Boraginaceae	Moltkiopsis ciliata (Forssk.) I.M.Johnston	Annual	Fol.	Afr. & Asia	+	-	+	-
Brassicaceae	Brassica tournefortii Gouan	Annual	Ed.	Calif.	+	+	-	-
Brassicaceae	Capsella bursa-pastoris (L.) Medik.	Annual	Fol.	E. Eu. & Asia	+	+	-	+
Brassicaceae	Diplotaxis erucoides (L.) DC.	Annual	Ed.	W. Med.	+	-	+	-
Brassicaceae	Farsetia stylosa R. Br	Annual	Fol.	Afr.	+	+	-	+
Brassicaceae	Sisymbrium irio L.	Annual	M.	Med. & Britain	+	+	+	-
Cactaceae	Opuntia ficus-indica (L.) Mill.	Cactus	Ed.	Mexico	+	+	+	+
Cannabaceae	Celtis africana Burm. f.	Tree	Ed.	S. Afr. & Eth.	-	-	+	-
Capparaceae	Boscia angustifolia A. Rich.	Shrub	M.	Afr. & semi-arid Tr.	-	+	+	+
Capparaceae	Capparis spinosa L.	Shrub	M.	Med.	+	-	+	-
Chenopodiaceae	Bassia indica (Wight) A. J. Scott	Perennial	Fol.	Arab. Pen.& W. Asia	+	+	+	+
Chenopodiaceae	Bassia muricata (L.) Aschers.	Perennial	M.	W. Med.& E. Asia	+	-	+	-
Chenopodiaceae	Chenopodium album L.	Annual	Ed.	Eu.	+	-	+	+
Chenopodiaceae	Chenopodium murale L.	Annual	M.	Eu. & Asia	+	+	+	+
Convolvulaceae	Convolvulus arvensis L.	Perennial	M.	Eu. & Asia	+	+	+	-
Cucurbitaceae	Citrllus colocynthis (L.) Schard.	Perennial	M.	Med & Asia	-	-	-	+
Cupressaceae	Cupressus sempervirens L.	Tree	Orn.	E. Med., & N. Lib.	+	+	-	+
Cupressaceae	Juniperus phoenicea L.	Tree	Eco.	W. KSA & Med.	+	+	+	+
Cupressaceae	Juniperus procera Hochst. ex Endl.	Tree	Eco.	Mou. Afr. & Arab. Pen.	+	+	+	+
Caryophyllaceae	Gymnocarpos decandrus Forssk.	Perennial	M.	N. Afr. & Asia	-	-	+	+
Cyperaceae	Cyperus rotundus L.	Perennial	Fol.	Afr. S. Eu. & S. Asia	+	-	-	+
Ericaceae	Erica arborea L.	Shrub	Eco.	Afr.	+	-	+	-
Euphorbiaceae	Euphorbia helioscopia L.	Annual	M.	Eu., Afr. & Asia	+	-	+	-
Euphorbiaceae	Euphorbia hirta L.	Annual	M.	India	+	-	+	-
Euphorbiaceae	Euphorbia peplus L.	Annual	M.	Eu., N. Afr., and W.	+	-	+	-

				Asia				
Euphorbiaceae	Ricinus communis L.	Shrub	M.	Tr. Afr.	+	-	+	+
Fabaceae	Acacia ehrenbergiana Hayne.	Tree	Fol.	E. Afr. & Arab. Pen.	+	+	-	-
Fabaceae	Acacia etbaica Schweinf.	Shrub	Eco.	Afr. & Aus.	-	+	+	-
Fabaceae	Acacia gerrardii Benth.	Tree	Eco.	Afr. & W. Asia	+	+	-	+
Fabaceae	Acacia seyal Del.	Tree	M.	Afr.	+	-	+	+
Fabaceae	Acacia tortilis (Forssk.) Hayne	Tree	M.	Afr. (Sudan) & Mid. East	-	+	-	+
Fabaceae	Alhagi maurorum Medik.	Perennial	M.	KSA, Eg. & India	+	-	+	-
Fabaceae	Anagyris foetida L.	Tree	Bio.	France	+	-	-	-
Fabaceae	Astragalus corrugatus Bertol.	Perennial	M.	None	+	+	-	-
Fabaceae	Indigofera tinctoria L.	Biennial	M.	Asia & Afr.	-	+	-	+
Fabaceae	Melilotus indicus (L.) All	Annual	Ed.	Asia, Eu. & Asia	+	+	+	-
Fabaceae	Trigonella stellata Forssk.	Perennial	M.	W. Asia	+	-	-	+
Geraniaceae	Erodium cicutarium (L.) L'Hér.	Annual	Ed.	Afr. & Asia	+	+	-	-
Geraniaceae	Geranium ocellatum Cambess.	Annual	M.	N. Afr. to E. Asia	+	-	+	+
Lamiaceae	Lavandula pubescens Decne.	Perennial	Orn.	Eg., Er. & Asia	+	+	+	+
Lamiaceae	Mentha longifolia (L.) Huds.	Perennial	M.	Eu., Afr. & Asia	+	+	+	+
Lamiaceae	Rosmarinus officinalis L.	Perennial	M.	Med.	-	-	+	-
Malvaceae	Abutilon fruticosum Guill. & Perr.	Perennial	Orn.	Asia, Afr. & India	+	+	-	-
Malvaceae	Althaea ludwigii L.	Perennial	M.	Asia, Afr. & Eu.	-	-	-	+
Malvaceae	Malva parviflora L.	Annual	Ed.	Afr. & Eu.	+	+	+	-
Malvaceae	Malva verticillata L.	Biennial	Ed.	E. Asia & Ch.	+	-	+	+
Meliaceae	Azadiracchta indica L.	Tree	Bio.	\India, Bur. & Ban.	+	+	+	+
Moraceae	Ficus carica L.	Tree	Ed.	Mid. East & W. Asia	+	+	+	
Moraceae	Ficus cordata Thunb.	Tree	Orn.	Arab. Pen. & Afr.	+	-	+	+
Moraceae	Ficus ingens (Miq.) Miq.	Tree	Ed.	Arab. Pen. & T. Afr.	+	-	+	-
Moraceae	Ficus palmata Forssk.	Tree	Ed.	Arab. Pen. & N. Afr.	+	-	+	+
Moraceae	Ficus salicifolia Vahl.	Tree	Orn.	Arab. Pen. & Afr.	+	+	+	-
Myricaceae	Morella cordifolia (L.) Killick	Shrub	Orn.	S. Africa	+	+	-	-
Myrtaceae	Eucalyptus globulus Labill	Tree	M.	Aus.	+	+	+	+
Oleaceae	Olea europaea L. subsp. africana (Mill.) P. S. Green	Tree	Ed.	Afr., Arab. Pen. & Mas. Is.	+	+	+	+
Oxalidaceae	Oxalis corniculata L.	Perennial	Ed.	None	+	-	+	+
Papaveraceae	Argemone mexicana L	Annual	M.	W. Am. & Mexico	+	+	+	+
Papaveraceae	Argemone ochroleuca Sweet.	Annual	M.	T. Am.	+	+	+	+
Plantaginaceae	Plantago ciliata Desf.	Perennial	M.	Aus., Asia, & Eu.	+	-	+	+
Plantaginaceae	Plantago major L.	Perennial	Orn.	N. & C. Asia	+	+	-	+
Poaceae	Aristida adscensionis L.	Perennial	Bio.	T. Am.	-	+	+	+
Poaceae	Arundo donax L.	Perennial	M.	Med., Arab. Pen. & Calf.	+	-	+	-
Poaceae	Avena fatua L.	Annual	M.	Eurasia	+	+	+	+
Poaceae	Avena sativa L.	Annual	Ed.	Asia, Med. & N. Afr.	+	-	+	-
Poaceae	Cenchrus ciliaris L.	Perennial	Fol.	S. Asia, S. Eu. & Afr.	+	+	+	-
Poaceae	Centropodia fragilis (Guinet & Sauvage) Cope	Perennial	Fol.	T. Asia & Afr.	+	+	-	+
Poaceae	Chloris gayana Kunth	Perennial	Fol.	Afr.	+	+	-	+

Poaceae	Cynodon dactylon (L.) Pers.	Perennial	Orn.	Mid. East	+	+	+	+
Poaceae	Digitaria ciliaris (Retz.) Koeler	Annual	Bio.	Asia	+	-	+	-
Poaceae	Eragrostis minor Host.	Annual	Bio.	None	+	-	-	-
Poaceae	Hordeum murinum L. ssp. glaucum (Steud.) Tzvelev	Annual	Fol.	Eu.,N Afr. &T. Asia	+	+	+	-
Poaceae	Hyparrhenia hirta (L.) Stapf	Perennial	Fol.	Afr. & Eurasia	-	+	-	-
Poaceae	Imperata cylindrica (L.) Raeus.	Perennial	Eco.	E.S. Asia, India, Aus. E & S. Afr.	+	+	+	+
Poaceae	Lolium multiflorum Lam.	Biennial	Bio.	C., S. Eu. ,W. Afr. & S. Asia	-	+	-	+
Poaceae	Lolium rigidum Gaud.	Annual	Fol.	S. Eu., N. Afr., Mid. East & India	+	+	+	+
Poaceae	Panicum turgidum Forssk.	Perennial	Eco.	Afr. & Asia	+	+	+	+
Poaceae	Pennisetum setaceum (Forssk.) Chiov.	Annual	Orn.	E.,T. Afr. ,Mid. East & S. Asia	+	+	+	+
Poaceae	Polypogon monspeliensis (L.) Desf.	Annual	M.	S. Eu.	+	+	+	-
Poaceae	Schismus arabicus Nees	Annual	Fol.	S. Asia	+	-	+	+
Poaceae	Setaria viridis (L.) P. Beauv.	Annual	M.	Eurasia	+	+	+	+
Poaceae	Sorghum halepense (L.) Pers.	Perennial	M.	Med. & W. Asia	+	+	-	-
Poaceae	Themeda triandra Forssk.	Perennial	M.	Afr., Aus., & Pac.	+	+	+	-
Polygalaceae	Polygala abyssinica R. Br. ex Fresen.	Shrub	Orn.	Afr. & Afg.	+	-	-	-
Polygonaceae	Emex spinosa (L.) Campd.	Annual	Bio.	Asia, Eu. & N. Am.	+	+	-	+
Polygonaceae	Rumex vesicarius L.	Annual	Ed.	S. Eu. & N. Afr.	+	+	+	+
Portulacaceae	Portulaca oleracea L.	Annual	Ed.	N. Afr., S. Eu., Mid. East & India	+	+	+	-
Primulaceae	Anagallis arvensis L.	Annual	Orn.	Eu., W. Asia & N. Afr.	-	-	+	+
Resedaceae	Caylusea hexagyna (Forssk.) M. L. Green	Annual	Bio.	Afr. & India	+	+	-	-
Resedaceae	Ochradenus arabicus Chaudhary, Hillc. & A.G.Mill.	Shrub	M.	Arab. Pen. & S .Asia	+	-	+	+
Resedaceae	Ochradenus baccatus Delile	Shrub	M.	Arab. Pen.	+	+	-	+
Rhamnaceae	Rhamnus lycioides L.	Shrub	Ed.	E. Asia & N. Am.	-	+	+	-
Rhamnaceae	Sageretia thea (Osbeck) M.C.Johnst.	Shrub	Ed.	N. Afr. & Arab. Pen.	+	+	+	+
Rhamnaceae	Ziziphus spina-christi (L.) Desf.	Tree	Ed.	N.,T. Afr. &, S., W. Asia	-	+	-	+
Rosaceae	Crataegus × sinaica Boiss.	Tree	Ed.	Eu., Asia & N. Am.	+	-	+	-
Rosaceae	Prunus dulcis (Mill.) D. A. Webb	Tree	Ed.	W. Asia & E. Med.	+	+	-	+
Salvadoraceae	Salvadora persica L.	Shrub	Eco.	T. Afr., Arab. Pen. & India	+	-	+	-
Sapindaceae	Dodonaea viscosa (L.) Jacq.	Shrub	M.	Afr. , Asia, Aus. & Am.	+	+	+	+
Scrophulariaceae	Verbascum sinaiticum Benth	biennial	Orn.	Eu. & Asia	+	+	-	-
Solanaceae	Datura innoxia Mill.	Perennial	M.	S. Am.	+	-	+	+
Solanaceae	Datura stramonium L.	Annual	M.	N. Am.	-	+	-	+
Solanaceae	Lycium shawii Roem. & Schult	Shrub	M.	Aus.	+	-	-	-
Solanaceae	Nicotiana glauca Graham	Shrub	Eco.	S. Am.	+	+	+	+
Solanaceae	Solanum forsskalii Dunal	Shrublet	M.	T. Asia & Aus.	+	+	+	+
Solanaceae	Solanum villosum Miller	Annual	M.	Eu., W Asia, N.	+	+	+	-

				Afr.,& N. Am.				
Solanaceae	Withania somnifera (L.) Dunal	Perennial	M.	N. Afr., W., S. Asia, S. Eu., Med. & Can. Is	+	-	+	-
Tamaricaceae	Tamarix aphylla (L.) Karst.	Tree	M.	Afr., Mid. East,& W. S. Asia	+	+	+	+
Typhaceae	Typha elephantine Roxb	Perennial	M.	Asia & Afr.	+	-	-	-
Urticaceae	Forsskaolea tenacissima L.	Annual	Eco.	N. Afr., S. Eu. & W. Asia	+	+	-	+
Urticaceae	Parietaria alsinifolia Delile	Annual	M.	Eurasia & Afr.	+	+	-	-
Urticaceae	Urtica dioica L.	Perennial	M.	Eu., Asia, N. Afr. & N. Am.	-	+	+	+
Zygophyllaceae	Fagonia boveana (Hadidi) Hadidi & Graf	Shrublet	M.	India & Eg.	+	+	-	-
Zygophyllaceae	Fagonia indica Burm. f.	Perennial	M.	India & Afr.	+	+	+	-
Zygophyllaceae	Peganum harmala L.	Perennial	M.	S. Asia & Mid. East	+	-	+	-
Zygophyllaceae	Seetzenia lanata (Willd.) Bullock	Annual	Orn.	Asia, Afr. & Aus.	+	-	+	-
Zygophyllaceae	Tribulus arabicus Hosn.	Perennial	Orn.	T. Asia & S. Afr.	+	+	+	-
Zygophyllaceae	Tribulus terrestris L.	Annual	Orn.	S. Asia, S. Eu. & Afr.	+	-	+	+
(Total No.): 52	160	8	6	31	123	102	103	84

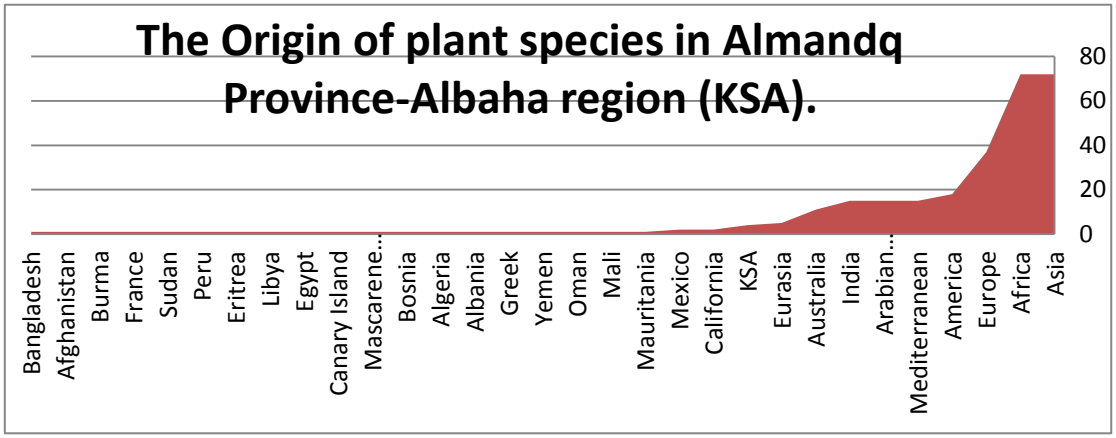
Most of the recorded plant species have at least one aspect of potential or actual economic uses (Table 2: Appendix).

Abbreviations:

Afghanistan = Afg. Africa = Afr. Albania = Albn., Algeria = Alg. America = Am. Arabian Peninsula = Arab. Pen. Australia = Aus. Bangladesh = Bangl. Biological = Bio Bosnia = Bosn. Burma = Bur. California = Calif. Canary = Canr. Central = C. China = Ch., Common Uses = C.U. East = E. Edible = Ed. Economic = Eco. Egypt = Egy. Eritrea = Eri. Ethiopic = Eth. Europe = Eu. France = Fra. Foliage = Fol. Kingdom Saudi Arabia = K. S. A. Libya = Lib. Mascarene Islands = Mas. Is. Mauritania and Mali = Maur. & Mali. Medicinal = M. Mediterranean = Med. Middle = Mid. Mountains = Mou. North = N. Ornamental = Orn. , Pacific = Pac. South = S. Regions = Regns. Tropic = Tr. West = W. (-) = Absent and (+) = Present.

Unfortunately; the standard reference, Migahid's Flora of Saudi Arabia, gives no indication of the origins of the species it contains, and a number, including, for example, *Azadirachta indica, Cupressus sempervirens, Eucalyptus camaldulensis, Morus nigra, Gossypium arboreum, Ricinus communis, Clitoria ternatea, Cynodon dactylon, Arundo donax* and *Phragmites australis;* seem certainlly to be introduced from neighbouring regions in the historic or very recent past (Colleqette, 1985). Indeed, some species recently introduced, such as *Prosopis juliflora*, are so well adapted to local conditions that it must be only a matter of time before they spontaneously spread into suitable natural locations throughout the country, (Mandaville, 1990). Figure 4: showing the origin of different plant species in Almandq region, Al-Baha, KSA.

Figure 4: Distribution according to the origin of the recorded plant species in Almandq Province, Al-Baha region, (KSA).



To conserve the different habitats in KSA make a sketch of the required area to be conserved noting all existing plants, animals, building, utilities, and pathways. Some trees be planted too close to buildings or have grown much larger than the previous owner envisioned. Some species may be of little wildlife value and may not be particularly attractive. Once we have identified existing plants to saved, exploring options for plants that work well these species can be started (Allen & Gabrielle 2004).

One of steps to conserve our habitats, adding trees, shrubs, flowers, and ground covers to our plan. Not all the planting needs to be done at once. If money or time is limited, consider it a work in progress (Schultz & Whitney, 1986). Therefore, to protect useful plants and ensure availability, the public should be educated to the importance of the plants and all possible avenues used to encourage the public to become acquainted with their medicinal uses and to cultivate the plants on the farms and in gardens and flowers pots for therapeutic uses. The use of the plants would undoubtedly minimize the cost of treatment and limit side or toxic effects of orthodox medicines that are currently being used (Sangwan, 2011). It is an open database of floristic composition with a broad-spectrum attributes and may be useful for the scientific community for getting quick information about the medicinal, edible, ornamental, foliage, economic, and biological plants in Al-Baha region (KSA).

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REFERENCES

Abdul-Razzaq, H. (2001) . "Social Functions of Weekly Markets in Al-Baha."Journal of the Social Sciences. ISSN 0253-1097. Published by Academic Publication Council - Kuwait University. Volume 29 (2).

Alfarhan A., Chaudhary S., Thomas J. (1998) . Notes on the flora of Saudi Arabia (Third edition). J. King Saud Univ., 10(1):31-40.

Allen D. & Gabrielle H. (2004) : Medicinal Plants in Folk Tradition. An Ethnobotany of Britain & Ireland. Portland / Cambridge, Timber Press.

Anonymous, (2000) . The ladybird discovery encyclopedia of the natural world.Ladybird Book limited MCMXCVII. Singapore, pp. 116-132.

Babaloa, O.(1988). Antibacterial properties of crude extracts of the sap and bark of Pycanthus angulata. Nigerian J. Microbial, 8: 4-11.

Boulos L., (1983). Medicinal Plants of North Africa. Reference Publication, Inc., Algonas Michigan.

Boulos L., (1995). Flora of Egypt. Vol. 1, Al-Hadara Publishing, Cairo, Egypt.

Colleqette, S., (1985) . An Illustrated Guide to the Flowers of Saudi Arabia, M.E. P.A./Scorpion, London.

Gilani and Atta-ur-Rhaman, (2005) . Trends in ethno pharmacology. J. Ethnopharmacol., 100:43-49.

Mandaville, J., (1990) . The Flora of Eastern Saudi Arabia. Kegan Paul, London & N.C. W.C. D., Riyadh.

Miller AG, Nyberg JA. (1991). Patterns of endemism in Arabia. Flora et Vegetatio Mundi, 9 263-279

Rowinsky, E. K., N. Onetto, R. M. Canetta and R. M. Arbuck. (1992) . Taxolthe 1st of the texanes, an important new class of anti-tumor agents. Semin Oncol. 19: 646-62.

Sangwan F., (2011) . Mucilages and their Pharmaceutical Applications: an Overview. Pharmacology Online 2: 1265-1271.

Schultz, E. & Whitney, J. (1986) . Vegetation in north-central Saudi Arabia, Jour. Arid Environ. 10: 175-288.

Shaltout, K. (1997) . Current situation of flora and vegetation of south-west Egypt. In: Integrated Land Development of Southern Egypt: Available Resources and Alternative Options. Eds. Abdel-Ghaffar, A.S., S.M. Marei and H.M. Gaber. ICDR, Canada.

Shoeb M. Anticancer agents from medicinal plants. Bangladesh J Pharmacol. 2006. 1: 35-41 Siddiqui S. and Siddiqui, R.H. (1931) . Chemical examination of root of Rouwoifia serpentina. Jour.md. Chem Soc.; 8: 667.

Tackhlom, V., (1974) . Student's Flora of Egypt. Cairo University Press, Cairo, Egypt.

Yassin, M., Salih, A., & Hosny, A., (2013) . Medicinal Plants in Saudi Arabia: I. Sarrwat Mountains at Taif, KSA, Academic Journal of Plant Sciences 6(4): 134-145.

Yuan, X.; Chapman, R.L.; Wu, Z. (2011) . Analytical methods for heavy metals in herbal medicines. Phytochem. Anal. 22, 189–198.

http://www.citiestips.com/city/AlBahaSaudiArabia.

دراسة مقارنة الفلورة العربية السعودية والنباتات الطبية بمحافظة المندق منطقة الباحة

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الملخص :

تعتبر النباتات الطبية والعطرية من المصادر الهامة لانتاج العديد من المركبات الدوائية مثل المضادت الحيوية. تهدف الدراسة المقدمة الى حصر وتسجيل الانواع النباتية الطبية المختلفة فى محافظة المندق- منطقه الباحة- المملكة العربية السعودية بعدد من المواقع المستهدفة مثل اودية مشنية وضرك والخلب وسدود مدهاس وضرك فى عامى ٢٠١٨ و ٢٠١٩. تم حصر وتسجيل ١٦٠ نوعا من النباتات الوعائية التى تنتمى الى ٥٢ فصيلة نباتية. اثبتت الدراسة ان الفصيلة النجيلية هى اكثر الفصائل احتواءا للانواع النباتية (٢٢ نوعا- 13.7 %) يليها الفصيلة المركبة (١٩ نوعا- 11.8 %) ثم الفصيلة القرنية (١١ نوعا- 6.8 %). وفقا لاشكال الحياة ، تمثل الحوليات النباتية النسبة الاعلى بين النباتات المسجلة (56 نوعا- 35 %) تليها الاعشاب المعمرة (48 نوعا- 30 %) ثم الشجيرات (26 نوعا- 16.25 %) وكانت اقل الانواع المسجلة هى ثنائية الحول(٥ انواع- 3.12 %)، والنخيل والصبار (نوع واحد- 0.6 %).تمثل النتائج والاحصائيات المسجلة قاعده بيانات للمحتوى الفلورى فى منطقة الدراسة كما تقدم معلومات هامة للنباتات المسجلة واستخداماتها فى مجالات الاغذية والزينة والتطبيقات البيولوجي.

الكلمات المفتاحية: نباتات طبية ، فلورا ، فلورا حضري ، المملكة العربية السعودية ، استخدامات اقتصادية ، منطقة الباحة.