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-Rahman, 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 Bishah 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 (20°1771’N 0 41°2757’ 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).

Map 1: 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).

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

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          |
|------------------|----------------------------------------------------------|-----------|------|-----------------|--------------------|
| 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 falcata Beccari ex Martelli                     | Tree      | Orn. | KSA, Oman, Yemen & Afr. | - + + - |
| Anacardiaceae    | Pistacia atlantica L.                                    | Tree      | Orn. | KSA             | - - + +            |
| 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.   | - + + +            |
| Family       | Species                                      | Life Form | Distribution                                      | Alt.       |
|--------------|----------------------------------------------|-----------|-------------------------------------------------|------------|
| Asteraceae   | Echinops spinossimus Turra                   | Perennial | S. Eu., N. Afr., & S. Asia                      | + +        |
| Asteraceae   | Flaveria trinervia (Spreng.) C.Moh.          | Annual    | M. Aus.                                          | + - - -    |
| Asteraceae   | Imperata cylindrica (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   | Sonchusoleraceus 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.) J.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 muriicata (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.) Schar.            | Perennial | M. Med & Asia                                    | - - - +    |
| Cupressaceae | Cupressus sempvirens 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.                          | + - + -    |
| Family                | Species                                         | Life Form | Distribution          | Other Information     |
|----------------------|-------------------------------------------------|-----------|-----------------------|-----------------------|
| Euphorbiaceae        | Ricinus communis L.                             | Shrub     | M.                    | Tr. Afr.              |
| Fabaceae             | Acacia ehrenbergiana Hayne.                    | Tree      | Perennial             | Asia                  |
| Fabaceae             | Acacia etbaica Schweinf.                        | Shrub     | E. Afr. & Arab. Pen.  + |
| 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 tintoria L.                          | Biennial  | M.                    | Asia & Afr.           + |
| Fabaceae             | Melilotus indicus (L.) All                      | Annual    | Ed.                   | Asia, Eu. & Asia      + |
| Geraniaceae          | Erodium cicutarium (L.) L'Hér.                  | Annual    | Ed.                   | Afr. & Asia           + |
| Geraniaceae          | Geranium ocellatum Cambess.                     | Annual    | M.                    | N. Afr. to E. Asia    + |
| Lamiaeae             | Lavandula pubescens Deane.                     | 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.         + |
| Malvaceae            | Azadirachta 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. &  Calif.  + |
| 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.                  + |
| Family        | Genus                                      | Lifeform | Ecotype | Region                      |
|---------------|--------------------------------------------|----------|---------|-----------------------------|
| Poaceae       | Cynodon dactylon (L.) Pers.                | Perennial| Orn.    | Mid. East                   |
| Poaceae       | Digitaria ciliaris (Retz.) Koeler          | Annual   | Bio.    | Asia                        |
| Poaceae       | Ergrostis 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       | Polygogon 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       | Themedia triandra Forssk.                 | Perennial| M.     | Afr., Aus., & Pac.          |
| Polygalaceae  | Polygala abyssinica R. Br. ex Frensen.    | 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 hexagayna (Forssk.) M. L. Green  | Annual   | Bio.    | Afr. & India               |
| Resedaceae    | Ochradenus arabicus Chaudhary, Hille, & 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 × sina-cahi Boiss.              | Tree     | Ed.     | Eu., Asia & N. Am.          |
| Rosaceae      | Prunus dulcis (Mill.) D. A. Webb          | Tree     | Ed.     | W. Asia & E. Med.           |
| Salvadoreae   | Salvadoria persica L.                     | Shrub    | Eco.    | T. Afr., Arab. Pen. & India |
| Sapindaceae   | Dodonaea viscosa (L.) Jacq.               | Shrub    | M.     | Afr., Asia, Aus. & Am.      |
| Scrophulariaceae| Verbascum sainaticum Benth                | Biennial | Orn.   | Eu & Asia                   |
| Solanaceae    | Datura inoxia 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    | Solarium forsskalii Dunal                | Shrublet | M.     | T. Asia & Aus.              |
| Solanaceae    | Solarium villosum Miller                 | Annual   | M.     | Eu., W Asia, N.             |
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.

### Table 2: Economic Uses of Selected Plant Species

| Family           | Species                        | Life Form | Region                      | Economic Uses |
|------------------|--------------------------------|-----------|-----------------------------|---------------|
| Solanaceae       | Withania somnifera (L.) Dunal   | Perennial | N. Afr., W., S. Asia, S. Eu., Med. & Can. Is | +  -  +  -  |
| Tamaricaceae     | Tamarix aphylla (L.) Karst.     | Tree      | Afr., Mid. East, & W. S. Asia | +  +  +  +  |
| Typhaceae        | Typha elephantine Roxb          | Perennial | Asia & Afr.                 | +  -  -  -  |
| Urticaceae       | Forsskaolea tenacissima L.      | Annual    | N. Afr., S. Eu., & W. Asia  | +  +  -  +  |
| Urticaceae       | Parietaria alsinifolia Delile   | Annual    | Eurasia & Afr.              | +  +  -  -  |
| Urticaceae       | Urtica dioica L.                | Perennial | Eu., Asia, N. Afr. & N. Am. | -  +  +  +  |
| Zygophyllaceae   | Fagonia boveana (Hadidi) Hadidi & Graf | Shrublet | India & Eg.                 | +  +  -  -  |
| Zygophyllaceae   | Fagonia indica Burn. f.         | Perennial | India & Afr.                | +  +  +  -  |
| Zygophyllaceae   | Peganum harmala L.              | Perennial | S. Asia & Mid. East         | +  -  +  -  |
| Zygophyllaceae   | Seetzenia lanata (Willd.) Bullock | Annual  | Asia, Afr. & Aus.           | +  -  +  -  |
| Zygophyllaceae   | Tribulus arabicus Hosn.         | Perennial | T. Asia & S. Afr.           | +  +  +  -  |
| (Total No.)      | Tribulus terrestris L.          | Annual    | S. Asia, S. Eu., & Afr.     | +  -  +  +  |

(Total No.): 52

160
8 6
31 123 102 103 84
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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دراسة مقارنة الفلورة العربية السعودية والنباتات الطبية بمحافظة المندق منطقة الباحة

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البريد الإلكتروني للباحث الرئيسي:

الملخص:

تعتبر النباتات الطبية والعطرية من المصادر الهامة لإنتاج العديد من المركبات الدوائية مثل المضادات الحيوية. تهدف الدراسة المقدمة إلى حصر وتسجيل الأنواع النباتية الطبية المختلفة في محافظة المندق. منطقة الباحة. المملكة العربية السعودية بعد من المواقع المستهدفة مثل أودية مشينة وضيّر والقلب وسدود مدهاس وضيّر في عامي 2018 و2019. تم حصر وتسجيل 116 نوعاً من النباتات الورقية التي تنتمي إلى 52 فصيلة نباتية. اثبتت الدراسة أن فصيلة النجيلية هي أكثر الفصائل احتراماً للأنواع النباتية (22 نوعاً - 13.7 %) بليها الفصيلة المركبة (19 نوعاً - 11.8 %) ثم فصيلة القرنية (11 نوعاً - 6.8 %). وفقاً لأشكال الحياة، تمثل الحوليات النباتية النسبية الأعلى بين النباتات المجلة (56 نوعاً - 35 %) تليها الأشجار المعمرة (48 نوعاً - 30 %) ثم الشجيرات (26 نوعاً - 16.25 %) وكانت أقل الالوان المنحلة هو ثانية الحول (6 أنواع - 3.12 %) والشجير والصبار (نوع واحد - 0.6 %). تمثل النتائج والأحصائيات المسجلة قاعد بيانات للمحتوى القنور في منطقة الدراسة، كما تقدم معلومات هامة للنباتات المسجلة واستخداماتها في مجالات الأغذية والزيتية والتطبيقات البيولوجية.

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