



## DIVERSITY OF MEDICINAL PLANTS IN THE FLORA OF SAUDI ARABIA 3: AN INVENTORY OF 15 PLANT FAMILIES AND THEIR CONSERVATION MANAGEMENT

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### Abstract

An inventory of medicinal species diversity in the flora of the Kingdom of Saudi Arabia has been made for 15 angiosperm families, viz., Boraginaceae, Convolvulaceae, Cucurbitaceae, Fabaceae, Molluginaceae, Papavaraceae, Portulacaceae, Ranunculaceae, Rhamnaceae, Rutaceae, Tamaricaceae, Tiliaceae, Urticaceae, Verbenaceae and Vitaceae, and 61 species of medicinal plants are recognized. These families are represented in the flora by a total of 393 species of which 15.52% are medicinal. Among the families, the Fabaceae is found to be represented by 23 medicinal species which is highest and 37.70% of the total species. Of these 61 medicinal species, 72.13% exhibits herbaceous life form while remaining 13.11% and 14.75% exhibit shrubs and trees respectively. An enumeration of these medicinal species is presented, each with current nomenclature, Arabic name, English name, medicinal uses, pharmacological properties and status of occurrence in the flora. The communication is aimed at emphasizing the planning and implementation of national conservation strategies for sustainable management of the medicinal plants of the Kingdom of Saudi Arabia.

Key words: Medicinal plant, diversity, inventory, Saudi Arabia

## Introduction

The flora of Saudi Arabia is one of the richest biodiversity areas in the Arabian Peninsula having a large number of endemic species. This is due to variation in landform, soil, latitude, longitude and isolation from other geographical regions. The components of the flora are the admixture of the elements from Asia, Africa and Mediterranean region. A total of 2,250 species in 142 families are represented in this flora. Of these, 242 species are endemic and 600 species are rare and endangered (Collenette, 1999; Rahman *et al.*, 2004).

Medicinal plant is a valuable component of the biodiversity. But its complete inventory in the Kingdom has not yet been completed. A family wise survey is in progress to complete the inventory under the auspices of Medicinal, Aromatic and Poisonous Plant Research Center and the Department of Pharmacognosy, College of Pharmacy, King Saud University, Riyadh. In the meantime two inventory reports, one with 7 families and another with 8 families, have already been published (Rahman *et al.*, 2004; Yusuf *et al.*, 2014).

Importance of the study on the Saudi medicinal plants, their folk medicinal uses and inventory for conservation management have been stated in Mosa *et al.* (1987, 2000) and Rahman *et al.* (2004).

The present report is the third of the series which deals with 15 families, *viz.*, Boraginaceae, Convolvulaceae, Cucurbitaceae, Fabaceae, Molluginaceae, Papavaraceae, Portulacaceae, Ranunculaceae, Rhamnaceae, Rutaceae, Tamaricaceae, Tiliaceae, Urticaceae, Verbenaceae and Vitaceae. These families are represented in the flora of Saudi Arabia by 393 species, individually by 62, 35, 15, 184, 7, 11, 4, 12, 8, 3, 8, 17, 8, 13 and 6 species respectively which is about 17.5% of the total species (Collenette, 1999; Chaudhary, 1999-2001).

In this study importance has given on the identification and inventorying of medicinal plant taxa, documentation of folk medicinal uses, assessment of conservation status and making recommendations for conservation management of threatened taxa.

## Material and Methods

The present study was conducted as a part of the analysis of the medicinal plant diversity in the flora and to determine their status in the wild for giving conservation priorities. Only 15 families, *viz.*, Boraginaceae, Convolvulaceae, Cucurbitaceae, Fabaceae, Molluginaceae, Papavaraceae, Portulacaceae, Ranunculaceae, Rhamnaceae, Rutaceae, Tamaricaceae, Tiliaceae, Urticaceae, Verbenaceae and Vitaceae were selected for the study.

### *Literature resources*

Relevant floristic literature, such as, Migahid (1996); Collenette (1999); Chaudhary (1999-2001); Al-Jowaid (1999); Rahman *et al.* (2002a, 2002b) and medicinal literature, such as, Nadkarni (1954); Chopra *et al.* (1956, 1982), Watt and Gerdina (1962), Kingsbury (1964); Al-Shanwani (1966); Anonymous (1972); Anonymous (1976); Chopra (1977); Dastur (1977); Hikino *et al.* (1977); Morton (1977); Leucas (1978); Kirtikar and Basu (1981); Smith and Culvenor (1981); Baulos (1983); Ageel *et al.* (1987a and 1987b); Al-Yahya *et al.* (1987, 1990);

Mossa *et al.*, (1987, 2000); Asolkar *et al.* (1992); Muhammad (1992); Shahina and Ghazanfar (1994); Batanouny (1999); Yusuf *et al.* (2009) were surveyed.

#### Herbarium resources

Herbarium specimens of medicinal plants available in the Herbarium of the College of Pharmacy, King Saud University were studied, where voucher specimens of the medicinal plants collected during last two decades are preserved. The distribution and status of occurrence of the medicinal species of each of these families were assessed through field investigations conducted during the period 2010-2013, survey of preserved herbarium specimens and consultation of relevant literature as mentioned above in literature resources.

An enumeration of these 61 medicinal plants is given in Table 2 along with Arabic names, medicinal properties, folk medicinal uses, distribution and status of occurrence in the flora. Families and species under each family are arranged alphabetically with voucher number.

### Results and discussions

A total of 393 species are present in the flora under the following 15 families: Boraginaceae, Convolvulaceae, Cucurbitaceae, Fabaceae, Molluginaceae, Papavaraceae, Portulacaceae, Ranunculaceae, Rhamnaceae, Rutaceae, Tamaricaceae, Tiliaceae, Urticaceae, Verbenaceae and Vitaceae. These are distributed by 62, 35, 15, 184, 7, 11, 4, 12, 8, 3, 8, 17, 8, 13, 6 species respectively (Table 1). Among the families, the Fabaceae is the dominant, represented in the flora by 184 species of which 23 (12.5%) are medicinal. On the other hand, the highest rate of medicinal species diversity within the family is found to be 66.6% in the Rutaceae.

It is observed that about 15.52% of the species are medicinal (Table 1) which is less than the first report 33.86% (Rahman *et al.*, 2004) but higher than the second report 13.8% (Yusuf *et al.*, 2014). It is, therefore, found from the results of these three reports that the 30 families are represented in the flora of Saudi Arabia by a total of 1241 species of which 229 (18.45%) are medicinal.

The study showed that these species are widely used by the local people and herbalists for the treatment of 110 ailments (Table 2). The study also revealed that the life forms of these species were distributed to herbs, shrubs and trees by 44, 8, 9 species, respectively (Table 1).

**Table 1: Status of the medicinal plants in the selected families from the Flora of Saudi Arabia**

Family	Total sp.	Medicinal species	% of Med. Species	Rare & Endangered	Herbs	Shrubs/undershrubs	Trees
Boraginaceae	62	6	9.67	-	6	-	-
Convolvulaceae	35	3	8.57	-	3	-	-
Cucurbitaceae	15	5	33.33	-	5	-	-

Fabaceae	184	23	12.5	3	11	6	6
Molluginaceae	7	3	42.85	-	3	-	-
Papavaraceae	11	2	18.18	1	2	-	-
Portulacaceae	4	2	50	-	2	-	-
Ranunculaceae	12	2	16.66	1	2	-	-
Rhamnaceae	8	2	25	-	-	-	2
Rutaceae	3	2	66.66	-	1	1	-
Tamaricaceae	8	2	25	-	-	1	1
Tiliaceae	17	3	17.64	-	3	-	-
Urticaceae	8	2	25	-	2	-	-
Verbenaceae	13	2	15.38	-	2	-	-
Vitaceae	6	2	33.33	-	2	-	-
Total	393	61	15.52	5	44	8	9

Medicinal plants status, as shown in Table 1 and 2, revealed that 5 species are threatened in the wild. Emphasis has been given on these species for setting up conservation priorities for sustainable management of the medicinal plants of the Saudi flora.

It has been identified that lack of trained taxonomists and conservationists, lack of sufficient data and high risk of conducting field investigations in the desert and stony mountains are the major problems which cause a slow progress of inventory. Inventory project for the production of Red Data Book as of IUCN recommendations (IUCN, 2001) has not been taken yet for the flora of Saudi Arabia.

Priority should be given for complete inventory of rare and threatened medicinal plants and its inclusion in the national policy, along with the documentation of folk medicinal uses through different development projects. Medicinal Plant Conservation Strategy is to be framed and implemented for sustainable management and use of folk medicinal knowledge.

The study has been carried out under a project of inventory of Saudi medicinal plants with documentation of folk medicinal uses, and it is the third report of the series which identifies the threatened medicinal taxa for setting up of Medicinal plant Conservation Strategies in Saudi national policies. It confirms the previous results (Rahman *et al.*, 2004; Yusuf *et al.*, 2014) and provides valuable data for production of Red Data Book of flowering plants of Saudi Arabia following IUCN criteria (IUCN, 2001).

## Conclusion

Indigenous knowledge of medicinal plants is ancient in Saudi Arabia and still exists among the tribal and village peoples and traditional practitioners. A great number of medicinal plant species present in the flora of Saudi Arabia, which is expected to be more than 1200 (over 50%) of the flora (Mossa *et al.*, 2000). It is known from the previous reports (Rahman *et al.*, 2004; Yusuf *et al.*, 2014) that about 24% plants are medicinal in 15 families of which 30.1% are rare or threatened. Including the present report, medicinal species diversity in the flora is found to be 18.45%. Documentation of this medicinal knowledge is meager and the inventory of rare

and threatened plants for Red Data Book of Saudi Arabia has not been made yet. This valuable knowledge is depleting at a faster rate with the advancement of civilization and easy availability of modern medicine and more and more medicinal plants are disappearing from the flora. It is therefore, needed to give priorities on the documentation of the indigenous knowledge and conservation of the medicinal plants in both *in-situ* and *ex-situ* condition through national conservation strategy before disappearance of vulnerable species. The present study gives emphasis on conducting further research on the flora of Saudi Arabia for the identification and inventorying of medicinal as well as threatened plants and documentation of folk medicinal uses for taking appropriate conservation measures.

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**Table 2. Enumeration of Saudi medicinal species diversity in 15 plant families**

[For plant parts: R= root, St= stem, Br=branch, L= leaf, (TL)=tender leaves, Fl= flower, Bk=bark, Fr= fruit, S= seed, Sh= shoot, Tsh=tender shoot, WP= whole plant, O= oil, SO=seed oil, LO=leaf oil, G=gum, Exd= exudates, Lt=latex, W=wood. P=petal, CLt= capsule latex]

Medicinal taxa; Habit; Voucher number	Arabic names	Pharmacological Properties with plant parts & references	Folk medicinal uses with references	Status of occurrence; Distribution
<b>1. Boraginaceae</b>				
1. <i>Anchusa milleri</i> Willd. Herb; 15989 (HCP)	Harrah	CNS stimulant & neuromuscular blocker. [Al-Yahya, 1983a]. Diuretic (WP) [Ageel, 1987a]	Used for the treatment of fever, cough & syphilis (WP) [Ageel, 1987a]	Northern region & Najd (common)
2. <i>Heliotropium digynum</i> (Forssk.) Asch. ex Christ. Shrublet; 16162 (HCP)	Karee		Used for the treatment of dog bite & skin diseases (WP) [Al-Yahya, 1990]	North, on red sands (common)
3. <i>Heliotropium europaeum</i> L. var. <i>lasiocarpum</i> (Fisch. & Mey.) Kazmi. Herb; 12809 (HCP)	Ekrar	Emetic [Nadkarni, 54]. Hepatotoxic (WP) [Kingsbury, 1964].	Used for the treatment of snake bite (WP) [Nadkarni, 1954].	All region (common)
4. <i>Heliotropium longiflorum</i> (Hocht. & Steud. ex DC.) Jaub. & Spach. Herb; 12598 (HCP)	Raqraq	Possesses antibacterial activity (WP) [Al-Yahya, 1983b].	Used for eye & skin infections (WP) [Shahina, 1994]	Southern hills (common)
5. <i>Heliotropium strigosum</i> Willd. Herb; 10525 (HCP)	Ronram	Laxative & diuretic (WP) [Nadkarni, 1954].	Used for sore eyes & sores; stings of nettles, insects & snake bite (WP) [Nadkarni, 1954].	Western & Southern region (common)
6. <i>Trichodesma africanum</i> (L.) R. Br. Herb; 15850 (HCP)	Humhum	Emollient, alterative & diuretic (WP) [Nadkarni, 1954].	Toxic due to the presence of pyrrolizidine alkaloids (WP) [Smith, 1981]	Northern region (common)
<b>2. Convolvulaceae</b>				
1. <i>Convolvulus arvensis</i> L. Twining herb; 14239 (HCP)	Ollaiq,	Purgative & antihemorrhagic (WP) [Watt and Gerdina, 1962; Chopra <i>et al.</i> , 1982]	Used to stop bleeding (WP) [Watt and Gerdina, 1962; Chopra <i>et al.</i> , 1982]	Almost all region (common)
2. <i>Cressa cretica</i> L. Herb; 11506 (HCP)	Nadewah	Tonic, aphrodisiac, expectorant & antibilious (WP) [Anonymous, 1976]	Used as tonic & in sexual debility (WP) [Anonymous, 1976]	On salt flats inland & near sea (common)
3. <i>Ipomoea eriocarpa</i> R. Br. Twining herb;	Hub Nil		Used for rheumatism, headache, epilepsy, leprosy & ulcers (WP) [Chopra <i>et al.</i> , 1956]	South-West region (rare)
<b>3. Cucurbitaceae</b>				
1. <i>Citrullus colocynthis</i> (L.) Schrader. Prostrate vine; 11737 (HCP)	Sharee, Handhal	Hydrogogue, cathartic, diuretic, emetic, gastrointestinal irritant, expectorant & alterative (Fr) [Nadkarni, 1954].	Used in jaundice, ascites, urinary diseases, rheumatism, abdominal enlargement, cough & asthma (R) [Nadkarni, 1954].	Almost all region (common)
2. <i>Cucumis prohetarum</i> L. Prostrate herb; 16155 (HCP)	Sharee Aldheeb, Masheetal Dheeb	Emetic & purgative. Fruit mild purgative & causes nausea (WP) [Chopra <i>et al.</i> , 1956]	Used in constipation.	Widespread (common)
3. <i>Melothria maderaspatana</i> L. Prostrate or climbing herb.	Melothria	Aperients (Sh); Sudorific (S) [Chopra <i>et al.</i> , 1956]	Used for vertigo & biliousness (Sh); flatulence & toothache (R); applied on strained backs (S); [Chopra <i>et al.</i> , 1956]	South Hijaz (rare)
4. <i>Momordica balsamina</i> L. Climber; 10610 (HCP)	Maahooda Beslasaam	Tonic, stomachic, stimulant, emetic, antibilious, laxative & alterative (Fr); galactogogue (L); astringent (R) [Nadkarni, 1954].	Used for gout, rheumatism, diabetes & disorders of liver & spleen (Fr); for piles (R) [Nadkarni, 1954].	Southern region (common)
5. <i>Coccinea grandis</i> (L.) Voigt. Climber; 12844 (HCP)	Moghad; Tandhab	Possesses hypoglycaemic activity (R,L) [Asolker, 1992]	Used in diabetes, anorexia, epilepsy, asthma, fever, dropsy, catarrh, gonorrhoea & skin eruptions (L) [Yusuf <i>et al.</i> , 2009]	Widespread in South-West heights (common)
<b>4. Fabaceae</b>				
1. <i>Abrus precatorius</i>	Shaklam, Sous, Ain-al-Afreet	Purgative, emetic, tonic, aphrodisiac & abotifacient (S). Emetic, alexiteric & diuretic (R) [Yusuf <i>et al.</i> , 2009]	Useful in diarrhea, dysentery, sciatica, paralysis & stiffness of shoulder joint. Poisonous in large doses (S); in obstinate cough, sore throat (R) [Yusuf <i>et al.</i> , 2009].	South-western mountains (rare)
2. <i>Acacia farnesiana</i> (L.) Willd. Small tree; 12790 (HCP)	Anbar	Astringent, anthelmintic, antidyenteric (Bk). Stimulant, antispasmodic, aphrodisiac & insecticidal (Fl). [Mossa, <i>et al.</i> , 1987; Yusuf <i>et al.</i> , 2009]	Used in stomatitis, bronchitis, leucoderma & ulcers (Bk); in gonorrhoea (TL); in diarrhea (Fr); in spermatorrhoea (O). [Mossa <i>et al.</i> , 1987; Yusuf <i>et al.</i> , 2009]	Cultivated & self-sown in almost all region (common)
3. <i>Acacia nilotica</i> (L.) Willd. ssp. <i>indica</i> (Benth) Brenan. Tree;	Talh; Sant	Astringent, anthelmintic, demulcent (Bk). Expectorant, astringent, antipyretic, antidyenteric & styptic (G) [Yusuf <i>et al.</i> , 2009]	Used in cough, bronchitis, diarrhea, dysentery, piles & leucoderma (Bk); useful in diarrhea, dysentery, diabetes mellitus & sexual debility (G) [Yusuf <i>et al.</i> , 2009]	Cultivated in many places (common)
4. <i>Acacia seyal</i> Del. Tree;	Seyal; Talh	Emollient & astringent (G) [Watt and Gerdina, 1962]	Used for colds, ophthalmia, diarrhea, haemorrhage (G); for leprosy (Bk). [Watt and Gerdina, 1962]	Southern region (rare)
5. <i>Albizia lebbek</i> (L.) Benth. Tree; 12789 (HCP)	Labakh	Astringent, alexiteric, cooling (Bk). Astringent (R). Cooling, aphrodisiac, emollient (Fl). [Dastur, 1977; Yusuf <i>et al.</i> , 2009]	Used in skin diseases, piles, bronchitis, diarrhea (Bk); in hemicranias, ophthalmia (R); in asthma (Fl) [Yusuf <i>et al.</i> , 2009]	Widely cultivated tree (common)
6. <i>Alhagi graecorum</i> Boiss. Herb; 15963 (HCP)	Aaqool	Laxative, diuretic, expectorant (WP). Restorative, aphrodisiac, diuretic, expectorant (Exd) [Chopra <i>et al.</i> , 1956; Dastur, 1977]	Used for rheumatism (O); piles (Fl); juice for opacity of cornea (L). [Chopra <i>et al.</i> , 1956; Dastur, 1977]	East & central region (common)
7. <i>Clitoria tenatea</i> L. Vine; 13092 (HCP)	Hareejah	Cathartic, diuretic, demulcent, vermifuge (R). Cathartic & aperients (S). [Dastur, 1977]	Used for gonorrhoea, irritation of the bladder & urethra (R); for bronchitis & ulcers (L); for constipation, ascites & enlarged abdominal viscera (S) [Dastur, 1977]	Cultivated & wild (common)
8. <i>Crotalaria retusa</i> L. Herb	Qalqal		Used in scabies, impetigo (WP); for colic (R); for fever	SW region

			(L) [Watt and Gerdina, 1962; Nadkarni, 1954].	(rare)
9. <i>Hematoxylon campechianum</i> L. Tree	Baqam Aswad	Decoction is astringent, tonic & anti-inflammatory (W) [Chopra <i>et al.</i> , 1956; Chopra, 1977; Hikino <i>et al.</i> , 1977].	Useful in chronic diarrhea, dyspepsia & leucorrhoea (W) [Chopra <i>et al.</i> , 1956; Chopra, 1977; Hikino <i>et al.</i> , 1977].	Eastern Najd & eastern region (Cult, rare)
10. <i>Indigofera spinosa</i> Forssk. Shrublet; 15794 (HCP)	Qataf, Hil, Qasar	Showed carditonic & hypotensive effect in rabbit & CNS stimulation on rat (WP) [Morton, 1977]	Used as digestive & for diabetes (WP) [Morton, 1977]	South & West (common)
11. <i>Medicago sativa</i> L. Herb; 15784 (HCP)	Barseem	Diuretic (L, S); abortifacient (S) [Watt and Gerdina, 1962; Leucas, 1978].	Used as digestive, appetizer, for peptic ulcer, inflammation of the stomach lining (WP). Cause Lathyrism in Horse & death in poultry (S) [Watt and Gerdina, 1962; Leucas, 1978].	cultivated fodder (common)
12. <i>Melilotus albus</i> Medik. Herb; 12785 (HCP)	Atrah	Astringent & narcotic (WP). Ripen plant can cause colic to milch cattle. [Watt and Gerdina, 1962].		An escape from cultivation (rare)
13. <i>Melilotus indicus</i> (L.) All. Herb; 13124 (HCP)	Handaqoq	Discutient, emollient & stimulant (WP) [Watt and Gerdina, 1962; Chopra <i>et al.</i> , 1956].	Used in swellings (WP); bowel complaints & infantile diarrhea (S) [Watt and Gerdina, 1962; Chopra <i>et al.</i> , 1956].	Southern mountains & east (common)
14. <i>Prosopis cineraria</i> (L.) Druce. Tree	Ghaf	Astringent (Fr) [Nadkarni, 1954; Chopra <i>et al.</i> , 1956].	Used for rheumatism & Scorpion sting (Bk); against miscarriage (Fl) [Nadkarni, 1954; Chopra <i>et al.</i> , 1956].	Northern & Eastern region (cult. rare)
15. <i>Psoralea plicata</i> Del. Herb; 10796 (HCP)	Shajrat al Na'am		Used for respiratory & intestinal ailments (L); gastric ulcers (Fr) [Baulos, 1983].	Eastern region & South Hijaz (common)
16. <i>Retama raetam</i> (Forssk.) Webb. & Berthel. Shrub; 15827 (HCP)	Ratam	Febrifuge, emetic, purgative, vermifuge, abortive (Br) [Batanouny, 1999].	Used for wound & making eye wash (Br); for diarrhea (R) [Batanouny, 1999].	Northern areas (common)
17. <i>Rhynchosia minima</i> (L.) DC. Vine; 11182 (HCP)		Abortifacient (L) [Chopra <i>et al.</i> , 1956].		Southwestern region (common)
18. <i>Senna alexandrina</i> Miller Shrublet; 15591 (HCP)	Sana makki,	Purgative (L) [Batanouny, 1999]	Used for constipation (L) [Batanouny, 1999]	Western & Southern region. (common)
19. <i>Senna italica</i> Miller Shrublet; 16118 (HCP)	Ishriq	Purgative (L) [Batanouny, 1999]	Same as <i>S. alexandrina</i> [Batanouny, 1999]	Widespread (common)
20. <i>Senna occidentalis</i> (L.) Link. Shrublet; 15009 (HCP)	Kalkool	Leaves alexiteric, antiperiodic, depurant & antipyretic (L); Tonic, febrifuge, diuretic & mild purgative (S) [Yusuf <i>et al.</i> , 2009].	Leaves used for cough, hiccup, asthma, fever (L); for fever, ringworms, dropsy, neuralgia (R) [Yusuf <i>et al.</i> , 2009].	Southern region (fairly common)
21. <i>Taverniera lappacea</i> (Forssk.) DC. Herb; 10699 (HCP)	Labaseya		Used as a tranquilizer in neurological disorders (WP) [Mossa <i>et al.</i> , 1984; Al-Yahya <i>et al.</i> , 1987].	South Hijaz (occasional)
22. <i>Tephrosia purpurea</i> (L.) Pers. Herb; 14283 (HCP)	Purpura	Tonic, laxative, deobstruent, diuretic, anthelmintic, antipyretic & alterative (WP); diaphoretic, diuretic (R) [Dastur, 1977].	Used in bronchitis, gonorrhoea, asthma, tumors, ulcers, piles, diseases of heart, spleen & liver (WP); dyspepsia, chronic diarrhea, bronchitis, asthma, boils & pimples (R); seed in eczema (O) [Dastur, 1977].	South & western region (common)
23. <i>Trigonella foenum-graecum</i> L. Herb; 13178 (HCP)	Halba	Demulcent, diuretic, tonic, carminative, emmenagogue, astringent, emollient & aphrodisiac (S); cooling & mild aperients (L). [Watt and Gerdina, 1962].	Used for smallpox, dysentery [Watt & Gerdina 1962]; irritation of the bladder, gas & inflammation of the stomach & intestine (S) [Leucas, 1978].	Cultivated & escape (common)
<b>5. Molluginaceae</b>				
1. <i>Glinus lotoides</i> L. Herb; 15567 (HCN)	Em-Tofaa, Ghobaira	Purgative & tonic (WP) [Chopra <i>et al.</i> , 1956].	Used in diarrhea, boils, bilious attacks, wounds & pains in the limbs (WP) [Chopra <i>et al.</i> , 1956].	Widespread in damp slightly saline soil (common)
2. <i>Mollugo cerviana</i> (L.) Seringe Herb; 15647 (HCN)	Mollugo	Stomachic, aperients, uterine stimulant, antiseptic & febrifuge (WP) [Nadkarni, 1954]	Promotes lochial discharge (WP); used in gouty & rheumatic complaints (R); in fever (Fl, Tsh) . [Nadkarni, 1954]	Scattered localities in the south (common)
<b>6. Papavaraceae</b>				
1. <i>Argemone maxicana</i> L. Herb; 12843 (HCP)	Argemonia, Teshimizing	Diuretic, alterative & hypnotic (WP); laxative, nauseant, emetic, expectorant & demulcent (S); strong purgative (SO) [Nadkarni, 1954; Mossa <i>et al.</i> , 1984].	Heal ulcers & blisters; useful for malaria, scabies (Lt); good for skin diseases & expelling tape worm (R) [Nadkarni, 1954; Mossa <i>et al.</i> , 1984].	Southern foot hills (common)
2. <i>Papaver rhoeas</i> L. Herb; 12674 (HCN)	Shaqaiq al numaan	Narcotic & slightly sedative (CLT); tonic (L, S); sudorific & high sedative (P). [Chopra <i>et al.</i> , 1956].	Used in low fevers (L, S). [Chopra <i>et al.</i> , 1956].	Southern mountains (rare)
<b>7. Portulacaceae</b>				
1. <i>Portulaca oleracea</i> L. Herb; 12704 (HCP)	Rijla, Baqla	Diuretic, refrigerant, astringent & alterative (WP); demulcent, mild astringent, & diuretic (S) [Dastur, 1977].	Useful in scurvy, liver complaints, haemoptysis, dysuria, burns, skin diseases, diseases of the bladder, kidney & lungs [Dastur, 1977].	Southern region (common)
2. <i>Portulaca quadrifida</i> L. Herb; 10893 (HCP)	Mortah	Antiseptic (WP); vermifuge (S). [Chopra <i>et al.</i> , 1956; Chopra <i>et al.</i> , 1982].	Used in skin diseases, diseases of the bladder, kidney & lungs, erysipelas & dysuria (WP) [Chopra <i>et al.</i> , 1956; Chopra <i>et al.</i> , 1982].	Southern region (common)
<b>8. Ranunculaceae</b>				
1. <i>Adonis dentata</i> Del. Herb;	Zaghlil, Nabel-gamal, Odenees	Diuretic, aphrodisiac, heart stimulant, neurosedative & toxic (WP) [Batanouny, 1999].	Prevents heart failure, oedema & enlargement of the spleen. Used in carditonic & cough mixtures (WP) [Batanouny, 1999].	Northern areas & Asir (common)
2. <i>Nigella sativa</i> L. Herb; 12952 (HCP)	Habbatal Barka, Habbatal Sooda	Digestive, stimulant, carminative, diuretic, diaphoretic, stomachic, anthelmintic & emmenagogue (S) [Nadkarni, 1954].	Used for indigestion, loss of appetite, diarrhea, dropsy, fever & for uterine contraction after delivery (S) [Nadkarni, 1954].	Cultivated in North Hijaz (common)
<b>9. Rhamnaceae</b>				
1. <i>Ziziphus nummularia</i> Lam. Tree; 15947 (HCP)	Sidr		Used for scabies & boils (S); for bilious affections (Fr); for joint pain, sore throat & bleeding gums (Bk) [Shah, 1990].	Northern region (common)
2. <i>Ziziphus spina-christi</i> (L.) Willd. Tree; 14996 (HCP)	Sidr, Nabq	Astringent, antidiarrhoric, anthelmintic, stomachic, demulcent & anodyne (L). Febrifuge, laxative & emollient (Fr) [Baulos, 1983].	Used for abscesses, furuncles, tooth aches, sores, wounds & skin diseases (L); used for measles, bronchitis, cough & tuberculosis (Fr); used for	Southern region (common)



			venereal diseases (Bk). [Baulos, 1983; Batanouny, 1999]	
<b>10. Rutaceae</b>				
1. <i>Haplophyllum tuberculatum</i> (Forssk.) A.Juss. Herb; 16163 (HCP)	Musaikah, Ifni	Diuretic [Muhammad 1992]. Aphrodisiac (WP) [Batanouny, 1999].	Used for nausea, constipation, malarial fever, rheumatic pain & gastric [Muhammad 1992]; intestinal worms, ear troubles (WP) [Batanouny 1999]; for scorpion stings (L) [Watt and Gerdina, 1962].	Widespread (common)
2. <i>Ruta chalepensis</i> L. Shrublet; 12873 (HCP)	Shadhab	Antispasmodic, sudorific & nerve stimulant (WP); anthelmintic, antispasmodic, antiseptic, rubefacient & emmenagogue (LO) [Anonymous, 1972].	Used for fever, convulsions & infant catarrh (WP) [Anonymous, 1972].	Asir & south Hijaz (common)
<b>11. Tamaricaceae</b>				
1. <i>Tamarix aphylla</i> (L.) Karst. Tree; 16129 (HCP)	Athel	Bitter, astringent & tonic (Bk) [Nadkarni, 1954].	Used for eczema capitis (Bk) [Nadkarni, 1954].	Widely distributed (common)
2. <i>Tamarix nilotica</i> (Ehrenb.) Bunge. Shrub; 15597 (HCP)	Tarfa		Used for diarrhea, stomatitis, arthritis & wounds (L) [Shahina, 1994; Ageel <i>et al.</i> , 1987].	Widely distributed (common)
<b>12. Tiliaceae</b>				
1. <i>Corchorus olitorius</i> L. Herb; 10894 (HCP)	Malukhia	Demulcent, febrifuge, diuretic & tonic (L); purgative (S) [Watt and Gerdina, 1962; Chopra <i>et al.</i> , 1956].	Useful in chronic cystitis, gonorrhea & dysuria; as a galactagogue in abdominal diseases (L) [Watt and Gerdina, 1962; Chopra <i>et al.</i> , 1956].	Cultivated & wild (common)
2. <i>Corchorus trilocularis</i> L. Herb; 15636 (HCP)	Malukhia	Demulcent (WP) [Chopra <i>et al.</i> , 1956].	Used in fever & obstruction of the abdominal viscera (S) [Chopra <i>et al.</i> , 1956].	Southern region (common)
3. <i>Grewia tenax</i> (Forssk.) Fiori Shrub; 15595 (HCP)	Khaddar, Shohat		Decoction is used for cough & pains (L) [Kirtikar and Basu, 1981]	Southern region (common)
<b>13. Urticaceae</b>				
1. <i>Urtica pilulifera</i> L. Herb; 14070 (HCP)	Hareeq	Diuretic & depurative (WP); diuretic & aphrodisiac (S). [Batanouny, 1999]	Used for rheumatism, sore joints, hemorrhage (WP); for renal stones & inflammation of the bladder (S) [Batanouny, 1999]	Southwestern heights (common)
2. <i>Urtica urens</i> L. Herb; 16054 (HCP)	Haraqa	Diuretic & aphrodisiac (WP) [Batanouny, 1999]	Used for rheumatism, eczema, haemorrhage, kidney troubles, dysmanorrhoea [Batanouny, 1999]; for catarrh, bladder pain, whooping cough & nose bleeding (WP) [Watt and Gerdina, 1962]	Asir (common)
<b>14. Verbenaceae</b>				
1. <i>Phyla nodiflora</i> (L.) Greene Herb; 15600 (HCP)	Nomos, Plekha	Diuretic, stomachic, febrifuge, astringent to the bowels & maturant for boils (WP) [Yusuf <i>et al.</i> , 2009].	Good for ulcers, wounds, asthma, bronchitis, knee-joint pain & indigestion (WP) [Yusuf <i>et al.</i> , 2009].	Southern region (common)
2. <i>Verbena officinalis</i> L. Herb; 11329 (HCP)	Rajel alhamam	Tonic, febrifuge, depurative, aphrodisiac & rubefacient (WP) [Watt and Gerdina, 1962; Chopra <i>et al.</i> , 1956].	Used in fever, anemia, dropsy, amenorrhoea, rheumatism, pleurisy, scrofula, diseases of the joints & nerve (WP) [Watt and Gerdina, 1962; Chopra <i>et al.</i> , 1956].	South & South-west region, in scattered localities (common)
<b>15. Vitaceae</b>				
1. <i>Cissus quadrangularis</i> L. Herbaceous vine; 12489 (HCP)	Salah	Laxative, stomachic, tonic & analgesic (St) [Yusuf <i>et al.</i> , 2009]; powerful alterative (L,Sh) [Watt and Gerdina, 1962].	Stem used in piles, tumours, loss of appetite, constipation, otorrhoea, epistaxis, scurvy, asthma & as a plaster for broken limbs (St) [Yusuf <i>et al.</i> , 2009].	Southwestern region (common)
2. <i>Cissus rotundifolia</i> (Forssk.) Vahl, Herbaceous vine; 12488 (HCP)	Halqa		Used for muscular rheumatism & earache (R) [Watt and Gerdina, 1962]; for wounds & ulcers (WP)	Southern region (common)