



ISSN (E): 2320-3862  
ISSN (P): 2394-0530  
NAAS Rating: 3.53  
[www.plantsjournal.com](http://www.plantsjournal.com)  
JMPS 2020; 8(4): 104-110  
© 2020 JMPS  
Received: 10-05-2020  
Accepted: 12-06-2020

**Abdulrahman AL Hinai**  
Department of Botany and  
Conservation, Oman Botanic  
Garden, PO Box 808, PC 122,  
Muscat, Sultanate of Oman,  
Oman

**Darach A Lupton**  
Department of Botany and  
Conservation, Oman Botanic  
Garden, PO Box 808, PC 122,  
Muscat, Sultanate of Oman,  
Oman

**Ghudaina Al Issai**  
Department of Botany and  
Conservation, Oman Botanic  
Garden, Oman

**Corresponding Author:**  
**Abdulrahman AL Hinai**  
Department of Botany and  
Conservation, Oman Botanic  
Garden, PO Box 808, PC 122,  
Muscat, Sultanate of Oman,  
Oman

## Indigenous knowledge and folk use of medicinal plants in the Eastern Hajar Mountains, Oman

**Abdulrahman AL Hinai, Darach A Lupton and Ghudaina Al Issai**

### Abstract

The history of traditional plant uses in Oman stretches back over millennia. However, little detail relating to the species and their uses has been documented. Here we focus on documenting medicinal plant species and their applications in the Eastern Hajar Mountains in northern Oman. 107 plant species, belonging to 50 plant families were recorded as having one or more medicinal uses. Gastro-intestinal disorders such as colic, diarrhea, and constipation were the most cited ailments treated using traditional plant-based medicines. Other conditions include eye disorders; cardiovascular and circulatory diseases; dental; dermatological diseases; ENT; fever; headache (diaphoretic); genital and sexual diseases; nerve disorders; respiratory problems; skeletal-muscular problems; snake and scorpion bites, and urinary complaints. *Rhazay stricta* Decne. is the most widely used plant species. Many of the surveyed plants are common, widely distributed throughout the area; 4 plants are endemic to Oman; 9 are regionally endemic, and 3 rare and threatened.

**Keywords:** Oman, medicinal plants, traditional knowledge, Eastern Hajar Mountains

### Introduction

The use of plants for medicinal purposes has been recorded as far back as the first documentation of human history. In the Arabian Peninsula the use of plants goes back to the pre-Islamic civilizations [1]. Today plant extracts make up 25% of the active ingredients in all pharmaceutical products Globally, it is observed that communities living in remote areas, are the most reliant on traditional plant based and that this knowledge held by those communities could be utilized to produce modern medicines [2].

Despite Oman's long history of seafaring and trading, it remained closed and isolated for much of its history, particularly in the remote mountain areas in the north. People in these areas have relied on plants to meet their primary health care needs for centuries. Following the discovery of oil and the subsequent opening up of Oman in 1970, there was a rapid expansion of hospitals and clinics throughout the country; with this came a reliance on pharmaceuticals and a move away from traditional plant based medicine [1].

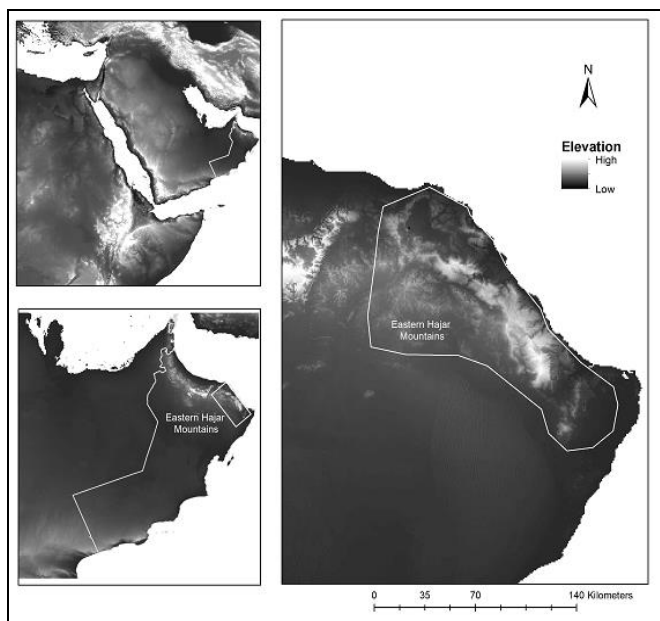
The number of medicinal plants in Oman is estimated to be 448 [3]. Several studies on traditional plants in Oman have been carried out [4-5], however, the Eastern Hajar Mountains have thus far remained understudied. Here we undertake a survey to identify and document plant species used in traditional medicine in the Eastern Hajar Mountains. Species referred to in the past tense are either no longer used or are not widely used today; species in the present tense are still utilized by the inhabitants.

### Study area

The Eastern Hajar Mountains is one of three mountain ranges making up the extensive Hajar mountains system, which extends north-west to the Musandam Mountains at the northern tip of Oman (figure 1). The study area is characterised by a hyper-arid climate, with cold, dry winters and hot summers [6]. Generally, the mountain climate is significantly cooler than lower elevations, with an annual average air temperature of 18.1 °C (a minimum of 3.6 °C and a maximum of about 36 °C). Annual rainfall for the mountains is 120mm. The area is characterized by deep wadi systems, spectacular caves, and peaks. These peaks include Jabal Bani Jabir, Jabal Aswad, Jabal Abyad, Jabal Tayeen and Jabal Qahwan. According to [7], these mountains comprise of 431 plant species (31% of the total country's flora).

Politically the Eastern Hajar Mountains are situated in the Al Sharqiya governorate, south west of Oman's capital city Muscat.

Most of the inhabitants of the Eastern Hajar are pastoralists – relying largely on goats for their income and sustenance. In some locations terraced agriculture - growing grains and root vegetables persists, providing additional income for local people. However, an increasing scarcity of rain in recent decades has meant that this form of agriculture is becoming less pragmatic. Beekeeping and honey production are also an important source of income, although they too have diminished in recent times. Since the 1970s there has been a steady migration of people from the Eastern Hajar Mountains to the cities to take up employment; further impacting the local economy, social fabric, and the preservation of traditional knowledge.



**Fig 1:** Oman located on the south-eastern edge of the Arabian Peninsula. The Eastern Hajar Mountains (right) extend south-east from Oman's capital, Muscat.

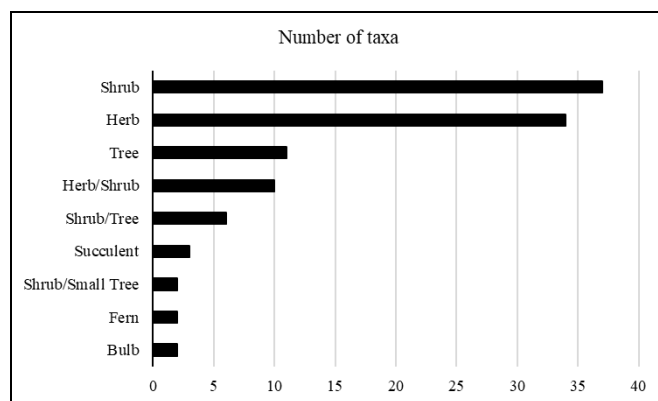
## Methodology

Field work took place from 2015 to 2019. Data relating to the medicinal use of wild plants were gathered from across the Eastern Hajar Mountains, including foothills, and adjacent coastal areas of both Northern and Southern Al Sharqiyah governorates and the eastern part of A' Dhakiliyah governorate. Pre-prepared, semi-structured interview questions (in Arabic) were presented to all interviewees. Interviewee selection gave priority to village elders and local herbalists. Full disclosure, explaining the purpose of the interviews was provided to all interviewees. Interviews started with informal introductory conversations with individuals and groups. Repeated interviews and visits were conducted when required. Answers were recorded in script and audio (Sony ICDUX512). Where permitted video recordings of interviews were made (Canon SX200IS). Identification and documentation of botanical names, including family, genus and species and life form were verified using, [8-12], and voucher specimens from the Oman Botanic Garden herbarium (OM). Local plant names were verified by multiple interviewees prior to documentation; names were transliterated from Arabic to English. All data, including written, audio and video were collated and stored at Oman Botanic Garden. Data including family, scientific name, local name(s), life form, flowering season, parts used, medicinal application, and conservation status were recorded and tabulated.

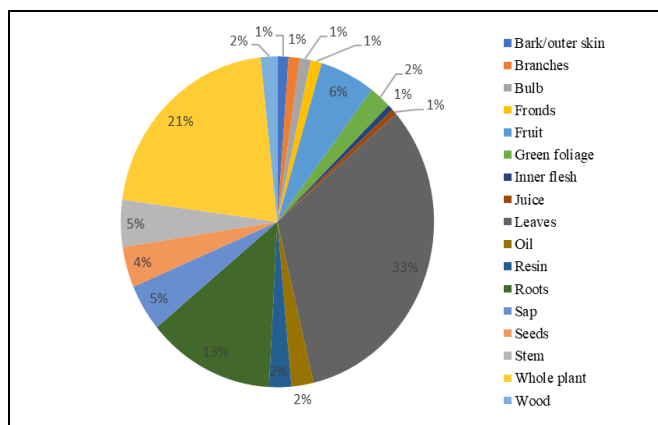
## Results and Discussion

### Plant selection and parts used in folk medicine preparations.

A total 37 villages were visited throughout the Eastern Hajar Mountains; 44 individual and group interviews were carried out. 53 males, ranging in age from 45 to 85 and 4 females, ranging in age from 55 to 90 were interviewed. In some instances, the age was an estimate as many of the interviewees did not know their exact date of birth. 107 plant species belonging to 50 plant families were recorded as having medicinal use in the Eastern Hajar Mountains. 37 (36%) medicinal plants are shrubs, followed by herbs - 36 (32%), tree - 10 (28%), herb/shrub - 10 (%), shrub/tree - 9 (8%), ferns - 2 (4%), bulbs - 2 and succulents - 3 (1%) (Figure 2). With exception of flowers, all plant parts including leaves, fronds, stems, bark, roots, fruits, bulbs, and seeds are used by traditional healers (Figure 3). Choosing appropriate plant parts is dependent on the plant species and the medical condition being treated. For herbs and bulbs, the whole plant is used. Shrubs and trees are usually separated into their constituent parts; leaves are used in 60 (56%) of the 107 documented species; followed by whole plant - 37 (34%) roots - 23 (21%), stems - 14 (13%), fruit - 10 (9%), sap - 8 (7%) and seeds - 7 (6%) (Figure 3). The predominant use of leaves in preparations, according to the interviewees is due to their abundance and availability. The common use of leaves in the preparation of remedies is also reported by [13, 14].



**Fig 2:** Breakdown of plant forms used in the preparation of herbal medicines.



**Fig 3:** Plant parts used in the preparation of herbal medicines.

### Medical conditions treated with traditional folk medicine.

A total of 50 species are used to treat gastro-intestinal disorders such as colic, flatulence, diarrhea, constipation and stomach ulcers; 49 - species are used for the treatment of wounds, cuts, anticancer, goiter, and a general tonic; 37 -

species are used to treat skeletal-muscular problems such as rheumatism, backache and general muscle pain; 37 - species are used to treat cardiovascular complaints and circulatory diseases including diabetes and blood pressure; 35 - for dermatological diseases; 27 - to treat fever, headaches and excessive sweating; 26 - for snake and scorpion bites; 22 - for nerve disorders; 20 - for eye disorders; 15 - for respiratory ailments like asthma and coughing; 15 - for ear, nose and throat (ENT) complaints; 11 - for urinary complaints including dysuria and kidney stones; 11 - for genital and sexual diseases, and 10 - species for dental problems (Table 1).

*Rhazya stricta* is the most widely used plant, treating 30 ailments, covering 12 medical categories. Fabaceae is the

most cited plant family - 14 plant species are used for herbal medicines; followed by Apocynaceae and Lamiaceae with 9 and 7 species respectively (Table 2). Most documented plants have multiple medicinal uses; it is rare for a plant to have a single use. A variety of substances purchased in local markets are frequently blended with plant materials to produce a medicinal preparation, including water, salt, goat's milk, sulfur, animal hair, rose water, saffron, ghee, dried sardines, red sandalwood, wolf gallbladder, crow gallbladder, egg white, honey and squid ink. 75 (70%) of the cited plants are common and widely distributed throughout the Eastern Hajar Mountains; 14 (13%) are not common; 4 (4%) are endemic to Oman; 9 (8%) regionally endemic, and 3 (3%) rare and threatened plant (Table 3).

**Table 1:** Medical conditions and the plant species used to treat them in the Eastern Hajar Mountains

Category	Taxa	Number of taxa
Dental	<i>Acacia nilotica</i> subsp. <i>indica</i> , <i>Valchellia tortilis</i> , <i>Capparis spinosa</i> , <i>Commiphora kua</i> , <i>Commiphora wightii</i> , <i>Cucumis prophetarum</i> , <i>Ficus cordata</i> subsp. <i>salicifolia</i> , <i>Lycium shawii</i> , <i>Rhazya stricta</i> , <i>Solanum incanum</i>	10
Genital and sexual diseases	<i>Anastatica hierochuntica</i> , <i>Caesalpinia bonduc</i> , <i>Calotropis procera</i> , <i>Chrozophora oblongifolia</i> , <i>Launaea intybacea</i> , <i>Pluchea arabica</i> , <i>Ruta chalepensis</i> , <i>Salvadora persica</i> , <i>Senna holosericea</i> , <i>Vitex agnus-castus</i> , <i>Ziziphus spina-christi</i>	11
Urinary complaints	<i>Acridocarpus orientalis</i> , <i>Aloe vera</i> , <i>Asphodelus tenuifolius</i> , <i>Blepharis ciliaris</i> , <i>Convolvulus virgatus</i> , <i>Cymbopogon schoenanthus</i> , <i>Ephedra pachyclada</i> , <i>Fagonia indica</i> , <i>Pluchea arabica</i> , <i>Pycnocycla aucheriana</i> var. <i>aucheriana</i> , <i>Rhazya stricta</i>	11
Ear, Nose, Throat (ENT)	<i>Acacia nilotica</i> subsp. <i>indica</i> , <i>Asphodelus tenuifolius</i> , <i>Capparis spinosa</i> , <i>Chrozophora oblongifolia</i> , <i>Corchorus depressus</i> , <i>Crinum x powellii</i> , <i>Dipcadi erythraeum</i> , <i>Ecbolium viride</i> , <i>Euphorbia larica</i> , <i>Launaea intybacea</i> , <i>Maerua crassifolia</i> , <i>Olea europaea</i> , <i>Pulicaria glutinosa</i> , <i>Rhazya stricta</i> , <i>Salvia aegyptiaca</i>	15
Respiratory problems	<i>Abutilon pannosum</i> , <i>Aloe vera</i> , <i>Blepharis ciliaris</i> , <i>Commiphora wightii</i> , <i>Crotalaria aegyptiaca</i> , <i>Cymbopogon schoenanthus</i> , <i>Dipcadi erythraeum</i> , <i>Dyerophytum indicum</i> , <i>Haplophyllum tuberculatum</i> , <i>Lycium shawii</i> , <i>Periploca</i> sp. nov., <i>Rhazya stricta</i> , <i>Salvadora persica</i> , <i>Zataria multiflora</i> , <i>Ziziphus spina-christi</i>	15
Eye disorders	<i>Acacia nilotica</i> subsp. <i>indica</i> , <i>Acridocarpus orientalis</i> , <i>Aloe vera</i> , <i>Astragalus fasciculifolius</i> subsp. <i>arbusculus</i> , <i>Ceratonia oreothauma</i> subsp. <i>Oreothauma</i> , <i>Chrozophora oblongifolia</i> , <i>Cleome fimbriata</i> , <i>Cocculus pendulus</i> , <i>Crinum x powellii</i> , <i>Ephedra foliata</i> , <i>Lycium shawii</i> , <i>Maerua crassifolia</i> , <i>Olea europaea</i> , <i>Pentatropis nivalis</i> , <i>Prosopis cineraria</i> , <i>Rhazya stricta</i> , <i>Salvadora persica</i> , <i>Solanum americanum</i> , <i>Tephrosia apollinea</i> , <i>Zataria multiflora</i>	20
Nerve disorders (hysteria, epilepsy, sedative)	<i>Acridocarpus orientalis</i> , <i>Aerva javanica</i> , <i>Anastatica hierochuntica</i> , <i>Asphodelus tenuifolius</i> , <i>Calotropis procera</i> , <i>Citrullus colocynthis</i> , <i>Convolvulus virgatus</i> , <i>Cymbopogon schoenanthus</i> , <i>Daphne mucronata</i> , <i>Ephedra pachyclada</i> , <i>Ficus cordata</i> subsp. <i>salicifolia</i> , <i>Moringa peregrina</i> , <i>Physorhynchus chamaerapistrum</i> , <i>Plocama aucheri</i> , <i>Pluchea arabica</i> , <i>Rhazya stricta</i> , <i>Ricinus communis</i> , <i>Ruta chalepensis</i> , <i>Salvia aegyptiaca</i> , <i>Searsia aucheri</i> , <i>Tephrosia nubica</i> , <i>Withania coagulans</i>	22
Snake and Scorpion bites	<i>Adiantum capillus-veneris</i> , <i>Aerva javanica</i> , <i>Andrachne aspera</i> , <i>Aristolochia bracteolata</i> , <i>Caesalpinia bonduc</i> , <i>Calotropis procera</i> , <i>Capparis cartilaginea</i> , <i>Capparis spinosa</i> , <i>Chrozophora oblongifolia</i> , <i>Citrullus colocynthis</i> , <i>Cleome brachycarpa</i> , <i>Corchorus depressus</i> , <i>Cucumis prophetarum</i> , <i>Daphne mucronata</i> , <i>Euphorbia larica</i> , <i>Euryops arabicus</i> , <i>Heliotropium europaeum</i> , <i>Maerua crassifolia</i> , <i>Nerium oleander</i> , <i>Olea europaea</i> , <i>Physorhynchus chamaerapistrum</i> , <i>Polygala erioptera</i> , <i>Rhazya stricta</i> , <i>Telephium sphaerospermum</i> , <i>Tephrosia apollinea</i> , <i>Tetraena qatariensis</i>	22
Fever, headache (diaphoretic)	<i>Aerva javanica</i> , <i>Aloe vera</i> , <i>Anastatica hierochuntica</i> , <i>Asphodelus tenuifolius</i> , <i>Capparis cartilaginea</i> , <i>Cleome brachycarpa</i> , <i>Commiphora kua</i> , <i>Commiphora wightii</i> , <i>Crinum x powellii</i> , <i>Daphne mucronata</i> , <i>Dipcadi erythraeum</i> , <i>Dipterygium glaucum</i> , <i>Fagonia indica</i> , <i>Lantana petitiata</i> , <i>Maerua crassifolia</i> , <i>Nerium oleander</i> , <i>Phyla nodiflora</i> , <i>Plocama aucheri</i> , <i>Prosopis cineraria</i> , <i>Pteris vittata</i> , <i>Rhazya stricta</i> , <i>Ruta chalepensis</i> , <i>Salvia aegyptiaca</i> , <i>Senna holosericea</i> , <i>Solanum incanum</i> , <i>Tephrosia apollinea</i> , <i>Teucrium stocksianum</i>	27
Dermatological and topical diseases	<i>Acacia nilotica</i> subsp. <i>indica</i> , <i>Valchellia tortilis</i> , <i>Acridocarpus orientalis</i> , <i>Aloe vera</i> , <i>Calotropis procera</i> , <i>Capparis cartilaginea</i> , <i>Capparis spinosa</i> , <i>Chrozophora oblongifolia</i> , <i>Citrullus colocynthis</i> , <i>Corchorus depressus</i> , <i>Cucumis prophetarum</i> , <i>Cymbopogon schoenanthus</i> , <i>Daphne mucronata</i> , <i>Datura metel</i> , <i>Dodonaea viscosa</i> , <i>Ephedra pachyclada</i> , <i>Euphorbia larica</i> , <i>Farsetia linearis</i> , <i>Ficus cordata</i> subsp. <i>salicifolia</i> , <i>Grewia erythraea</i> , <i>Indigofera tinctoria</i> , <i>Iphiona aucheri</i> , <i>Lycium shawii</i> , <i>Moringa peregrina</i> , <i>Nerium oleander</i> , <i>Physorhynchus chamaerapistrum</i> , <i>Prosopis cineraria</i> , <i>Pulicaria glutinosa</i> , <i>Rhazya stricta</i> , <i>Ricinus communis</i> , <i>Solanum americanum</i> , <i>Solanum incanum</i> , <i>Tamarix aphylla</i> , <i>Tetraena qatariensis</i> , <i>Zataria multiflora</i>	35
Cardio vascular and circulatory diseases	<i>Aloe vera</i> , <i>Anastatica hierochuntica</i> , <i>Asphodelus tenuifolius</i> , <i>Blepharis ciliaris</i> , <i>Caesalpinia bonduc</i> , <i>Calotropis procera</i> , <i>Capparis cartilaginea</i> , <i>Capparis spinosa</i> , <i>Caudanthera edulis</i> , <i>Chrozophora oblongifolia</i> , <i>Citrullus colocynthis</i> , <i>Corchorus depressus</i> , <i>Crinum x powellii</i> , <i>Cucumis prophetarum</i> , <i>Ephedra pachyclada</i> , <i>Cymbopogon schoenanthus</i> , <i>Datura metel</i> ,	37

	<i>Desmidorchis arabica</i> , <i>Desmidorchis flava</i> , <i>Dipcadi erythraeum</i> , <i>Dodonaea viscosa</i> , <i>Euryops arabicus</i> , <i>Fagonia indica</i> , <i>Ficus cordata</i> subsp. <i>salicifolia</i> , <i>Ficus johannis</i> , <i>Lantana petitiiana</i> , <i>Plocama aucheri</i> , <i>Pluchea arabica</i> , <i>Portulaca oleracea</i> , <i>Prosopis cineraria</i> , <i>Prunus arabica</i> , <i>Pulicaria glutinosa</i> , <i>Rhazya stricta</i> , <i>Taverniera cuneifolia</i> , <i>Teucrium stocksianum</i> , <i>Withania coagulans</i> , <i>Ziziphus spina-christi</i>	
Skeletal-muscular problems	<i>Acacia nilotica</i> subsp. <i>indica</i> , <i>Acridocarpus orientalis</i> , <i>Anastatica hierochuntica</i> , <i>Blepharis ciliaris</i> , <i>Calotropis procera</i> , <i>Capparis cartilaginea</i> , <i>Capparis spinosa</i> , <i>Cleome brachycarpa</i> , <i>Commiphora kua</i> , <i>Commiphora wightii</i> , <i>Daphne mucronata</i> , <i>Dipterygium glaucum</i> , <i>Dodonaea viscosa</i> , <i>Ephedra foliata</i> , <i>Ephedra pachyclada</i> , <i>Fagonia indica</i> , <i>Ficus cordata</i> subsp. <i>salicifolia</i> , <i>Ficus johannis</i> , <i>Forsskaolea tenacissima</i> , <i>Haplophyllum tuberculatum</i> , <i>Indigofera tinctoria</i> , <i>Maerua crassifolia</i> , <i>Moringa peregrina</i> , <i>Nerium oleander</i> , <i>Pentatropis nivalis</i> , <i>Pergularia tomentosa</i> , <i>Physorhynchus chamaerapistrum</i> , <i>Pluchea arabica</i> , <i>Ricinus communis</i> , <i>Salvadora persica</i> , <i>Solanum americanum</i> , <i>Solanum incanum</i> , <i>Tamarix aphylla</i> , <i>Tephrosia apollinea</i> , <i>Tetraena qatariensis</i> , <i>Trichodesma africanum</i> , <i>Ziziphus spina-christi</i>	37
Others (wounds, cuts, narcotic, tonic, anticancer and goiter)	<i>Abutilon pannosum</i> , <i>Acacia ehrenbergiana</i> , <i>Acacia nilotica</i> subsp. <i>indica</i> , <i>Valchellia tortilis</i> , <i>Achyranthes aspera</i> , <i>Adiantum capillus-veneris</i> , <i>Aloe vera</i> , <i>Calotropis procera</i> , <i>Capparis cartilaginea</i> , <i>Capparis spinosa</i> , <i>Chrozophora oblongifolia</i> , <i>Citrullus colocynthis</i> , <i>Cleome fimbriata</i> , <i>Commiphora kua</i> , <i>Commiphora wightii</i> , <i>Convolvulus virgatus</i> , <i>Corchorus depressus</i> , <i>Cucumis prophetarum</i> , <i>Daphne mucronata</i> , <i>Dipterygium glaucum</i> , <i>Ephedra pachyclada</i> , <i>Euphorbia granulata</i> , <i>Euphorbia larica</i> , <i>Fagonia indica</i> , <i>Ficus cordata</i> subsp. <i>salicifolia</i> , <i>Indigofera tinctoria</i> , <i>Iphiona aucheri</i> , <i>Launaea intybacea</i> , <i>Lavandula subnuda</i> , <i>Maerua crassifolia</i> , <i>Moringa peregrina</i> , <i>Nerium oleander</i> , <i>Ocimum forskoelii</i> , <i>Pergularia tomentosa</i> , <i>Physorhynchus chamaerapistrum</i> , <i>Polygala eriopetra</i> , <i>Prosopis cineraria</i> , <i>Pteris vittata</i> , <i>Pulicaria glutinosa</i> , <i>Rhazya stricta</i> , <i>Solanum incanum</i> , <i>Tamarix aphylla</i> , <i>Telephium sphaerospermum</i> , <i>Tephrosia apollinea</i> , <i>Tetraena qatariensis</i> , <i>Teucrium stocksianum</i> , <i>Verbascum sinaiticum</i> , <i>Zataria multiflora</i> , <i>Ziziphus spina-christi</i>	49
Gastrointestinal disorders	<i>Abutilon pannosum</i> , <i>Acacia gerrardii</i> subsp. <i>negevensis</i> , <i>Acacia nilotica</i> subsp. <i>indica</i> , <i>Acridocarpus orientalis</i> , <i>Aerva javanica</i> , <i>Aizoon canariense</i> , <i>Anastatica hierochuntica</i> , <i>Asphodelus tenuifolius</i> , <i>Blepharis ciliaris</i> , <i>Capparis cartilaginea</i> , <i>Capparis spinosa</i> , <i>Citrullus colocynthis</i> , <i>Cleome brachycarpa</i> , <i>Cleome fimbriata</i> , <i>Commiphora kua</i> , <i>Commiphora wightii</i> , <i>Convolvulus virgatus</i> , <i>Cucumis prophetarum</i> , <i>Cymbopogon schoenanthus</i> , <i>Dipterygium glaucum</i> , <i>Dodonaea viscosa</i> , <i>Ducrosia anethifolia</i> , <i>Ephedra pachyclada</i> , <i>Euryops arabicus</i> , <i>Fagonia indica</i> , <i>Ficus cordata</i> subsp. <i>salicifolia</i> , <i>Haplophyllum tuberculatum</i> , <i>Lantana petitiiana</i> , <i>Launaea intybacea</i> , <i>Lycium shawii</i> , <i>Maerua crassifolia</i> , <i>Moringa peregrina</i> , <i>Periploca sp. nov.</i> , <i>Plocama aucheri</i> , <i>Pluchea arabica</i> , <i>Prosopis cineraria</i> , <i>Pulicaria glutinosa</i> , <i>Pycnocycla aucheriana</i> var. <i>aucheriana</i> , <i>Rhazya stricta</i> , <i>Ricinus communis</i> , <i>Ruta chalepensis</i> , <i>Ruta macilenta</i> , <i>Searsia aucheri</i> , <i>Senna holosericea</i> , <i>Solanum americanum</i> , <i>Tephrosia apollinea</i> , <i>Tetraena qatariensis</i> , <i>Teucrium stocksianum</i> , <i>Zataria multiflora</i> , <i>Ziziphus spina-christi</i>	50

**Table 2:** Summary of plant families, taxa, local names, parts used and medical applications

Plant family	Botanical name:	Local name:	Parts used	Medical uses
Acanthaceae	<i>Blepharis ciliaris</i>	Kinub; Neja	Whole plant	Kidney stones; blood pressure; intestinal gas.
	<i>Ecbolium viride</i>	Thwaimah	Leaves	Earache
Adiantaceae	<i>Adiantum capillus-veneris</i>	Genah Al Ghrab	FronDS	Snake bites; abrasions.
Aizoaceae	<i>Aizoon canariense</i>	Mesh haim; Mesh haima	Leaves	Adrenal, pituitary, and thyroid gland.
Amaranthaceae	<i>Achyranthes aspera</i>	Menaksah; Saif Al Jinn	Whole plant	Healing cuts and abrasions
	<i>Aerva javanica</i>	Ra; Ara; Rala; Rai; Lira	Root	Snake bites; headaches; dysuria
Amarylidaceae	<i>Crinum x powelii</i>	Susal	Bulb, leaves	Conjunctivitis; cataracts and diabetes.
Anacardiaceae	<i>Searsia aucheri</i>	Qutf	Leaves	Colic; diarrhea
Apiaceae	<i>Ducrosia anethifolia</i>	Bisbas; Kishat Abeed.	Whole plant	Reducing stomach gas
	<i>Pycnocycla aucheriana</i>	Shakhas; Meshakhas	Whole plant	Dysuria; kidney stones
Apocynaceae	<i>Calotropis procera</i>	Shakhar; A'shkhhar	Sap, Roots, Leaves	Reduce inflammation; scorpion bites.
	<i>Caudanthera edulis</i>	Daghabees; Da'abees	Stems	Diabetes; high blood pressure
	<i>Desmidorchis arabica</i>	Deja	Stems	Diabetes; high blood pressure
	<i>Desmidorchis arabica</i>	Deja	Stems	Diabetes; high blood pressure
	<i>Nerium oleander</i>	Haban	Sap, Leaves, Stems	Skin eruptions; headaches; snakebites.
	<i>Pentatropis nivalis</i>	Fashagh; Melwiah	Whole plant	Sore eyes; reducing labour pains in animals
	<i>Pergularia tomentosa</i>	Ghalqah; Shajarat Al Julud	Sap	The sap is used to expel thorns from feet
	<i>Periplocasp.</i>	Kilkil	Sap (Latex), Stems	Relief from dry cough.
	<i>Rhazya stricta</i>	Harmal	Leaves, Roots, Fruit	Diabetes
Aristolochiaceae	<i>Aristolochia bracteolata</i>	Mekhisa	Leaves	Snake and scorpion bites
Asparagaceae	<i>Dipcadi erythraeum</i>	Hanseleet; Basal Al Hesini	Bulb	Whooping cough; flu; diabetes
Asteraceae	<i>Euryops arabicus</i>	Henqlan; Mehnqlan'	Leaves	Snake bites; burning chest pain.
	<i>Iphiona aucheri</i>	Khiza	Whole plant	Bruising because of a fall.
	<i>Launaea intybacea</i>	Huwah	Leaves	Stomach ulcers; menstrual cramps; diarrhea.
	<i>Pluchea arabica</i>	Ansfout; Asfut; Zafout	Leaves	Colic; constipation; intestinal gas.
	<i>Pulicaria glutinosa</i>	Al Mihtedi; Mehdedi.	Whole plant, Leaves	Colic; stomach acidity and intestinal

				gas.
Boraginaceae	<i>Heliotropium europaeum</i>	Shajarat; Limboshah	Whole plant	Spider bites.
	<i>Trichodesma africanum</i>	Tamrat	Whole plant	Relieving painful joints.
Brassicaceae	<i>Anastatica hierochuntica</i>	Kaf Mariam; Mekfaif.	Whole plant	Colic and fever in children
	<i>Farsetia linearis</i>	Meshria	Whole plant	Treating skin allergies.
	<i>Physorhynchus chamaerapistrum</i>	Khefij; Khefi	Leaves, Roots	Contusions and swollen joints.
Burseraceae	<i>Commiphora kua</i>	Dhej	Resin	Fever and toothache.
	<i>Commiphora wightii</i>	Meqel	Resin	Bone fractures and headaches.
Capparaceae	<i>Capparis cartilaginea</i>	Qanfar	Leaves, Roots	Diabetes; snakebites; stomach cramps.
	<i>Capparis spinosa</i>	Lisaf; Melusaf; Safi	Leaves, Roots	Heart conditions; painful muscles and limbs.
	<i>Maerua crassifolia</i>	Sarah	Leaves	Colic; earache; scorpion stings.
Caryophyllaceae	<i>Telephium sphaerospermum</i>	Sinaisla; Dheniat Far.	Whole plant	Wasp stings.
Cleomaceae	<i>Cleome brachycarpa</i>	Khizima Al Dhabi.	Whole plant	Wasp; and scorpion stings; headaches.
	<i>Cleome fimbriata</i>	Meqablout A'Shams.	Whole plant	Colic; conjunctivitis.
	<i>Dipterygium glaucum</i>	Alqa; Kabsha; A'Shajara	Roots, Leaves	Treatment for stomach cancer.
Convolvulaceae	<i>Convolvulus virgatus</i>	Bu Risha; Al Risha.	Roots, Whole plant	Kidney stones and dysuria
Cucurbitaceae	<i>Citrullus colocynthis</i>	Handhal	Leaves, Fruit, Roots	Hemorrhoids.
	<i>Cucumis prophetarum</i>	Lumat Al Housh.	Fruit, Seeds, Roots	Bites and stings- rarely snake bites.
Ephedraceae	<i>Ephedra foliata</i>	Ketel; Melawai.	Whole plant	Cataracts; conjunctivitis.
	<i>Ephedra pachyclada</i>	Ansab; Ensbeet.	Whole plant	Exorcising evil spirits (Jinn).
Euphorbiaceae	<i>Chrozophora oblongifolia</i>	Meshriah; Sherween	Leaves, Roots, Fruit	Earache.
	<i>Euphorbia granulata</i>	Halab; Halableebah.	Sap (latex)	Cleaning fresh wounds.
	<i>Euphorbia larica</i>	Isbuq	Sap (Latex), Stems	Earache.
	<i>Ricinus communis</i>	Arash	Oil, Leaves	Paralysis; exorcising evil spirits (Jinn).
Fabaceae	<i>Acacia ehrenbergiana</i>	Salam	Wood, Leaves	Burns; cuts and abrasions
	<i>Acacia gerrardii</i>	Talh; Naghal	Leaves	Stomachache; colic
	<i>Acacia nilotica</i>	Qarat; Qarut	Seeds	Stomach ulcers; contusions.
	<i>Valchellia tortilis</i>	Samur	Wood, Leaves	Bruising; stomach cramps and toothpaste.
	<i>Astragalus fasciculifolius</i>	Enteris; Ma enteris.	Resin	Cataracts.
	<i>Caesalpinia bonduc</i>	Meghilan	Leaves, Roots, Seeds	Male sterility; diabetes; snake bites.
	<i>Ceratonia oreothauma</i>	Tew	Leaves	A bruised eye.
	<i>Crotalaria aegyptiaca</i>	Niza; Meneza; Qudhub	Leaves; Stems	Treating asthma.
	<i>Indigofera tinctoria</i>	Adhlam	Leaves	Cleaning and treating wounds.
	<i>Prosopis cineraria</i>	Ghaf; Oud	Leaves	Diarrhea.
	<i>Taverniera cuneifolia</i>	Esmut; Suhel Al Ra ai.	Stems	Treatment of arteriosclerosis.
	<i>Tephrosia apollinea</i>	Dhafra	Whole plant, Leaves	Trauma and muscle ache.
	<i>Tephrosia nubica</i>	Aytiman; Aqman	Leaves	Treatment of epilepsy or possession by evil spirits.
	<i>Senna holosericea</i>	Ishruq; Inshruq; Ishrej.	Leaves, Roots	Constipation; easing labour pains during childbirth.
Lamiaceae	<i>Lavandula subnuda</i>	Hairuq; Haruq; Sumar.	Leaves	Used to reduce bleeding from a fresh wound.
	<i>Ocimum forskoalii</i>	Rihan; Rihan Barie	Leaves	Used to reduce bleeding from a fresh wound.
	<i>Salvia aegyptiaca</i>	Berahoo; Ra el.	Whole plant	Fever; flu and the evil eye.
	<i>Salvia macilenta</i>	Riah; Qudhub	Whole plant	Relieving intestinal gas.
	<i>Teucrium stocksianum</i>	Jada	Whole plant	Fever; blood pressure; colic; stomach cramps.
	<i>Vitex agnus-castus</i>	Selikhah; Zelikhah	Leaves	Abortion agent.
	<i>Zataria multiflora</i>	Zatar	Leaves	Colic; strong coughs.
Malvaceae	<i>Abutilon pannosum</i>	Qarqa; Meqarqa; Meqrku.	Leaves	Diarrhea; stomach cramps.
Malpighiaceae	<i>Acridocarpus orientalis</i>	Qafas; Qfas	Leaves, Stems, Seeds	Muscle relaxant; exorcising evil spirits (Jinn)
Menispermaceae	<i>Cocculus pendulus</i>	Resras; Mersras; Meshras.	Leaves, Stems	Conjunctivitis; sore eyes.
Moraceae	<i>Ficus cordata</i>	Lathab; Lithab	Leaves, Sap	Used to reduce bleeding on a fresh wound.
	<i>Ficus johannis</i>	Suqub; Suqubt	Fruit, Sap	Treatment of red blood cell deficiency.
Moringaceae	<i>Moringa peregrina</i>	Shua; Eklil al malik	Leaves, Stems, Seeds	Muscle relaxant; colic; stomach cramps.
Oleaceae	<i>Olea europaea</i>	Itm	Fruit, Oil, Resin	Scorpion stings; earache; conjunctivitis.
Phyllanthaceae	<i>Andrachne aspera</i>	Shajarat Al Aqrab	Whole plant, Root	Scorpion stings
Plumbaginaceae	<i>Dyerophytum indicum</i>	Melihlah; Lihlah Melihlah.	Leaves	Persistent cough.
Poaceae	<i>Cymbopogon schoenanthus</i>	Sakhbar	Leaves, Roots	Skin allergies; shortness of breath.
Polygalaceae	<i>Polygala erioptera</i>	Mesamnah	Whole plant	Scorpion stings
Portulacaceae	<i>Portulaca oleracea</i>	Ghelinbah; Ragla	Whole plant	Blood cleansing
Pteridaceae	<i>Pteris vittata</i>	Ginah Al Ghurab..	Fronds	Headaches; blood coagulant
Rhamnaceae	<i>Ziziphus spina-christi</i>	Sider; Sidrat Al Nabq.	Leaves, Roots	Bone fractures; shortness of breath; general tonic.
Rosaceae	<i>Prunus arabica</i>	Mezj; Mez	Fruit	Diabetes.

Rubiaceae	<i>Plocama aucheri</i>	Khirman; Mekhirman.	Leaves, Roots	Colic; cholesterol; dizziness.
Rutaceae	<i>Haplophyllum tuberculatum</i>	Tafer tays; Tafer A'tays.	Leaves, Whole plant	Fractured and dislocated bones.
	<i>Ruta chalepensis</i>	Sidab; Sithab; Khidf.	Leaves, Roots	Colic; fever in children; sexual potency.
Salvadoraceae	<i>Salvadora persica</i>	Rak	Wood, Leaves, Roots	Painful eyes; coughs; painful joints.
Sapindaceae	<i>Dodonaea viscosa</i>	Shahs	Leaves	Fractured bones; severe flatulence.
Scrophulariaceae	<i>Verbascum sinaiticum</i>	Lisan Al Kalb; Maitah	Leaves	Used to reduce bleeding on a fresh wound.
Solanaceae	<i>Datura metel</i>	Meranha	Fruit, Leaves	Treating skin sores and eruptions.
	<i>Lycium shawii</i>	Qasad; Awsag	Leaves, Roots, Stems	Colic; flatulence; burns; toothache.
	<i>Solanum americanum</i>	Mejaj; Qadmi A'Sheta.	Leaves, Fruit	Stomach ulcers; cataracts.
	<i>Solanum incanum</i>	Shirbjan; Meshribjan.	Fruit, Roots, Seeds	Headaches; cleaning wounds; dislocated joints.
	<i>Withania coagulans</i>	Shajarat Al Khutf; Mekhisa.	Whole plant	Paralysis; epilepsy.
Tamaricaceae	<i>Tamarix aphylla</i>	Athal; Lathal	Outer bark, Leaves	Burns and painful joints
Thymelaeaceae	<i>Daphne mucronata</i>	Bakhteet; Sharakh.	Outer bark, Leaves	Broken bones; muscle spasms; snakebites.
Tiliaceae	<i>Corchorus depressus</i>	Latia; Shehimat A'Dhab	Whole plant	Scorpion stings; contusions; nose bleeds.
	<i>Grewia erythraea</i>	Sharham	Leaves, Roots	Scabies
Urticaceae	<i>Forsskaolea tenacissima</i>	Metabaq	Whole plant	Broken bones.
Verbenaceae	<i>Lantana petitiata</i>	Sufuf	Leaves, Stems	Stomach gas; heartburn; headaches.
	<i>Phyla nodiflora</i>	Zanzalah	Leaves	Fever in children.
Xanthorrhoeaceae	<i>Aloe vera</i>	Sikel; Saber	Inner Flesh, Juice	Cataracts; blood pressure; shortness of breath.
	<i>Asphodelus tenuifolius</i>	Besail; Mubsail.	Whole plant, Leaves	Heartburn; kidney stones; laxative.
Zygophyllaceae	<i>Fagonia indica</i>	Sheka; Mesheka	Whole plant, Roots	Constipation; fever.
	<i>Tetraena qatarensis</i>	Tharmad; Harm	Leaves, Whole plant	Chickenpox; laxative; snake bites.

**Table 3:** Conservation status of the medicinal plants in the Eastern Hajar mountains.

Conservation Status	Count of species
Common	75
Endemic	4
Near Endemic	1
Not Common	15
Rare & Threatened	3
Regional Endemic	9
Total	107

## Conclusion

Out of 433 plant species recorded from the Eastern Hajar Mountains, 237 have some economic value to the inhabitants<sup>15</sup>; of these 107 species are used in the preparation of plant-based medicines. Knowledge relating to traditional folk medicine in the Eastern Hajar Mountains is abundant, however it lies predominately in the minds of elderly inhabitants. No one we spoke to below the age of 40 had knowledge relating to plant-based medicine; all relied on modern pharmaceuticals to treat medical complaints. Unfortunately, traditional plant knowledge is rapidly vanishing due to, modernization, the ever-present lure of the cities for the mountain's younger inhabitants and the unfortunate passing of many of the elderly inhabitants – custodians of the knowledge. Our findings provide a general overview of the existing knowledge relating to the historic and contemporary use of plants for traditional folk medicine and represents the first comprehensive investigation of its kind in this region of Oman. We recommend that measures be put in place to support the continued research of medicinal plants in the Eastern Hajar Mountains, through field based studies – data collection, written, audio and video documentation of local knowledge; evaluation of the chemical composition of indigenous plants; protection of rare and threatened medicinal plants and their habitats, and the exploration of local commercial opportunities potentially arising from the production of natural remedies – a potential financial benefit for local inhabitants.

## Acknowledgements

The authors are grateful to Oman Botanic Garden, Diwan Royal Court for providing financial support. We extend sincere appreciation to the local respondents for sharing their in-depth knowledge, to our field assistants: Fathi Al Hisni, Mohammed Al Balushi, Nasser Al Rashdi, Omar Al Amri, Raid Al Mamari and Salim Al Rahbi for their dedication and great effort during field work; to Ghudaina Al Issai and Dr Laila Al Harthi for their technical help and to Dr. Annette Patzelt for her continual support.

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