

Taxonomy and Ethnobotany of Medicinal Plants in Eastern Region of Libya

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Abstract: The present study is an endeavor aimed to collect and identify the medicinal plants grown in Eastern region of Libya, the study is extended to explore the traditional medicine of these plants. The use value (VU), treat value (VT) and Informant consensus factor (ICF) of these plants were calculated and discussed. Current data revealed that the total number of medicinal plants surveyed in the region was 179 species, belonging to 166 genera and 72 families. Ethnobotanical studies of medicinal plants showed that the highest use value are recorded by *Helichrysum stoechas* with 80% of the total number of interviewers, followed by *Juniperus phoenicea* with 74% and *Thymus capitatus* with 72%. *Rosmarinus officinalis* and *Seriphidium herba-album* attained a percentage of about 70% of the total number of interviewers, while the maximum treat value (10.9%) recorded by *Globularia alypum*, *Thymus capitatus* (10.4%), *Peganum harmala* and *Urtica urens* (8.3%) each, and *Rosmarinus officinalis* (7.8%) of the total number of diseases. The highest ICF (0.48) is scored for the digestive system, including ailments like constipation, gastritis, and ulcer. The simple formula is the most dominant herbal formula in the study area.

Medicinal plants are important health and economic components of the floras in the Eastern region of Libya. There is a great need to provide a framework for the conservation and sustainable use of these plants in medicine and other environmental purposes. These will provide valuable information for the future conservation and management strategies of these natural resources.

Keywords: Taxonomy– Flora of Libya - Medicinal plants – Ethnobotany- Cyrenaica.

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I. Introduction

Medicinal plants constitute the base of health care systems in many societies. More than 60% of the world's people and 80% in developing countries depend mainly on plants for their medicines [1]. Medicinal plants are now considered within the global biodiversity strategy. They are termed the "sleeping giant" and will continue to be an important source of drugs because they are manufactured inexpensively and are a source of new products that are seemingly in exhaustive [2].

Drug discovery, ethnobotany, traditional and indigenous medicines have long been based on medicinal plant research. As new uses for medicinal plants have been discovered and popularized, sustainability has become increasingly an issue. Concern over the growth in bio-piracy goes hand in hand with the critical need for conservation of both species and habitat. Traditional knowledge, promoted to make conservation and development more relevant and socially acceptable, is shown to have an important role in identifying critical research needs in desert ecology.

Developing a sustainable production system for this resource will require a clear understanding of how these various natural elements function, separately and synergistically. Traditional knowledge can help fill gaps in our information base and identify promising areas for future research. Both correspondence and gaps in knowledge support the call for a greater role for ethno-biological research and interdisciplinary cooperation, especially between ethnobiologists and ecologists, in developing sustainable management systems for this traditional resource and its natural habitat.

Libya is considered rich in medicinal plants which are used in traditional medicine, especially Cyrenaica, which contains most of the total medicinal plants recorded in Libya [3]. The most famous of medicinal plants which brought great richness to Cyrenaica during remote times was the *Sylphium* of antiquity. This precious plant which yielded a gum-resin, the price of which was estimated by an equal weight of silver was known in Cyrene (Shahat) and exported to neighboring countries because of its mysterious power in curing many diseases. It is obvious that the continuous over-exploitation of *Sylphium* for several centuries led to its scarcity and finally to its disappearance about the fifth century A.D [4]. Gebel Akhder is an upland region which lies at the northernmost part of Libya (Cyrenaica). This area is characterized by a wide physiographic variation distinguished by many habitats such as coastal saline sand flats, sand dunes, sand flats hills and an inland

plateau with terraces and wadis [5]. These habitats are under great stress due to the destructive effect of man and his animals on vegetation [6]. Boulos [7] mentioned that Gebel Akhder is considered the richest area in vegetation with the highest number of species (about 50% of the total plant species of the Libyan flora are confined to this region). Recently, there is an imminent danger of genetic erosion of the medicinal species in Gebel Akhder because of heavy grazing, collection of medicinal and woody plants for local use and trading, over cultivation, recurrent drought conditions and hazards [8].

The main objective of the present work is to collect and identify the medicinal plants grown in Eastern region of Libya, the study is extended to explore the traditional medicine of these plants. The use and treat values of these plants were calculated and discussed. These will provide valuable information for the future conservation and management strategies of these natural resources.

II. Materials And Methods

Data were collected during years 2014- 2017 from different locations distributed along the north eastern region of Libya. The following established techniques were applied for data collection in the present study:

Floristic composition

Plant specimens were collected during flowering and fruiting stages as much as possible. The date of collection, habitat type, vernacular name, and flower color were recorded. Photographs of a large number of plants were taken in their natural habitats. The identification of the specimens was carried out according to Ali and Jafri [9], Jafri and El-Gadi [10] and El-Gadi [11] wherever possible, identification was confirmed by comparing with the authentically identified specimens in the herbarium. The voucher specimens have been deposited in the Kelieda Herbarium, Botany Department, Alqubah, Omer Al-Mokhtar University.

Data collection

Data set of the present study was collected in field trips from 2014 to 2017. Open-ended questionnaires [12] were applied separately for each interviewee (informant). The interviewees were more than 45 years old. Specific questions focused on the different ethnobotanical uses traditionally practiced in the area were asked for the interviewees.

Data analysis

Data analysis included calculation of Use Value of plants by using the formula proposed by Phillips [13] as follows:

$VU = \sum u/n$, where:

VU = use value of an ethnospecies.

u = number of quotations per ethnospecies.

n = number of informants.

Another alternative formula named Treat Value suggested by El-Darier [14] was also applied as follows:

$VT = \sum T/n$ where:

VT = treat value of an ethnospecies.

T = number of diseases treated by an ethnospecies.

n = number of diseases mentioned by informants.

Informants consensus factor (ICF) of the species cited was calculated according to Heinrich [15] and Gazzaneo [16].

For data analysis, informant consensus factor (ICF) was employed to indicate how homogenous the information is. All citations were placed into ailment categories for which the plant was claimed to be used. ICF values will be low (near 0) if plants are chosen randomly, or if informants do not exchange information about their use. Values will be high (near 1) if there is a well-defined selection criterion in the community and/or if information is exchanged between informants.

The ICF is calculated as in the following formula:

$$ICF = \frac{Nur - Nt}{Nur - 1}$$

Where Nur is the number of use citations in each category and

Nt is the number of species used.

III. Results And Discussion

Current data revealed that the total number of medicinal plants surveyed in the study area was 179 species, belonging to 166 genera and 72 families. Pteridophytes are represented by 1 family, 1 genus and 1 species. Gymnosperms are represented by 3 families including 5 genera and 5 species. Angiosperms include 173

plant species belonging to 68 families and 160 genera, of which Dicotyledons are represented by 55 families, 138 genera and 149 species. Monocotyledons are represented by 13 families, 22 genera and 24 species.

In the Eastern region, 61 informants (all men) were completed using an opened-ended questionnaire. Scientific and local names with different types of ailments treated by each species mentioned by informants in the study area are listed in Table 1. The total number of the species was 179, belonging to 72 families and 166 genera, traditionally used for human health care. Of these, some 143 species (79.89%) are wild, while the remaining 36 (20.11%) are cultivated. It is noteworthy that family Asteraceae was the largest (17 species), followed by Lamiaceae with (14 species), then Fabaceae (12 species), which constitute about 9.5%, 7.8%, and 6.7% of the total number of species respectively. However, 39 (54.2%) of the mentioned families include only one species.

The simple formula (one plant species is used to treat a certain disease) is the most dominant herbal formula in the Eastern region. Mixtures from plant species (complex herbal formula) were also used. Several techniques are used by traditional herbalists to obtain the beneficial phytochemical components from the selected species. The majority of botanically based remedies are consumed orally in the form of teas.

Table 1: A list of plant species collected from Eastern region, Libya (*: Cultivated) with different types of ailments treated by each species mentioned by informants during the periods from 2014-2017.

Scientific and Local Name	Family	Ailment
* <i>Acacia cyanophylla</i> Lindley (Sant -Talh)	Fabaceae	Toothache, Abscess, Constipation, Hot feet, Cracks of feet and hands
<i>Achillea santolina</i> L. (Zefra)	Asteraceae	Eczema, Toothache
<i>Adiantum capillus-veneris</i> L. (Kuzbart El-Bir)	Adiantaceae	Diuretic, Expectorant, Lactagogue, Root hair stimulant, Bronchitis, Renal stones, Urinary tract infection
<i>Ajuga iva</i> (L.) Schreb. (Shandaqora)	Lamiaceae	Diabetes, Diarrhea, Gastritis, Ulcer, Indigestion, Vermicide, Emetic, Dyspepsia
<i>Alhagi graecorum</i> Boiss. (Aqoul)	Fabaceae	Hepatitis
* <i>Allium cepa</i> L. (Basal)	Alliaceae	Diabetes, Arteriosclerosis, Common cold
<i>Allium roseum</i> L. (Gassol)	Alliaceae	Hypertension, Common cold, Influenza, Fever, Clear blocked nose
* <i>Allium sativum</i> L. (Thoum)	Alliaceae	Anticoagulant, Cardiac stimulant, Hypertension, Hair-fall, Anticancer, Renal colic, Vermicide, Strengthen immune system, Vitiligo
* <i>Aloe vera</i> L. (Subbar)	Liliaceae	Piles, Wounds, Abscess, Constipation, Jaundice, Diabetes
<i>Ammi majus</i> L. (Khillia)	Apiaceae	Stroke
* <i>Amygdalus communis</i> L. (Louz)	Rosaceae	Diabetes, Anemia, Whooping cough, Diuretic, Sciatica, Expectorant
<i>Anagyris foetida</i> L. (Kharroub El-Klab)	Fabaceae	Dermatitis, Eczema
<i>Anastatica hierochuntica</i> L. (Kaff mariam)	Asteraceae	Labour pain, Oxytocic
* <i>Anethum graveolens</i> L. (Shibit)	Apiaceae	Colic, Flatulence, Lactagogue
<i>Arbutus pavarii</i> Pamp. (Shmary)	Ericaceae	Gastritis, Vermicide, Laxative, Urinary tract infection, Epigastritis, Renal colic, Aphrodisiac, Premature Ejrection, Increase sperm, Constipation
<i>Arum cyrenaicum</i> Hruby. (Renish)	Araceae	Dermatitis, Psoriasis, Corn, Bone spur
<i>Asparagus stipularis</i> Forssk. (Jafaraz)	Asparagaceae	Allergy, Prostatitis, Abscess, Acne
<i>Asphodelus aestivus</i> Brot. (Onsol)	Asphodelaceae	Herpes, Dermatitis, Wounds, Abscess, Rheumatic, Fungal skin diseases, Hair-fall, Arthritis, Vitiligo, Vaginitis, Warts, Skin allergy, Ovulation
<i>Asteriscus spinosus</i> (L.) Sch.Bip. (Serat El-Kabesh)	Asteraceae	Cardiac stimulant, Cardiac diseases
<i>Astragalus spinosus</i> (Forssk.) Muschl. (Qataf)	Fabaceae	Piles, Vermicide, Anticancer
<i>Atractylis serratuloides</i> Sieb .ex Cass. (Shobrom)	Asteraceae	Rheumatic
<i>Atriplex halimus</i> L. (Qataf)	Chenopodiaceae	Chloasma
<i>Avena barbata</i> Pott ex Link (Khafour)	Poaceae	Eczema, Dermatitis
<i>Balanitis aegyptiaca</i> (L.) Delile (Heglig)	Zygophyllaceae	Liver diseases, Diabetes
<i>Ballota pseudodictamnus</i> (L.) Benth.	Lamiaceae	Gastritis, Hair parasite, Urinary tract infection,

(Mayla) Beta vulgaris L. (Selaq) Borago officinalis L. (Harsha)	Chenopodiaceae	Colitis Constipation
Brassica tournefortii Gouan. (Aslouz) Calicotome villosa (Poir.) link (Qandol) Calotropis procera (Ait.) Ait.f. (Barambekh) Capparis spinosa L. (Kabbar)	Boraginaceae Brassicaceae Fabaceae Asclepiadaceae Capparaceae Asclepiadaceae	Cough, Constipation, Bronchitis, Eczema, Tranquilizing for nerves, Antidepressant, Respiratory diseases Anticancer, Ulcer, Menstruation, Herpes, Vitiligo, Regulate menses Piles, Fistula, Epigastritis Abscess, Rheumatic Anticancer, Diuretic, Lactagogue, Sciatica, Wounds, Diabetes, Gastritis, Corn, Rheumatic, Sun stroke, Womb and stomach tumors Diabetes, Hair-fall
Caralluma europaea (Guss.) N.E.Br. (Adghamus) * Cassia alexandrina Mill. (Senna mekki) Ceratonia siliqua L. (Kharroub)	Fabaceae Fabaceae Chenopodiaceae	Constipation, Diabetes, Blood purification Acidity, Indigestion, Ovary stimulant, Constipation, Dyspepsia, Diuretic, Laxative, Sperm stimulant, Sterility Fever, Flatulence, Vermicide
Chenopodium murale L. (Effena) Cichorium endivia L. (Shikoria)	Asteraceae Asteraceae	Jaundice, Liver diseases, Liver stimulant, Gall bladder stones, Cholagogue, Reinforcement and activation, Dandruff
Cichorium spinosum L. (Lihyat El-Sheikh) Cicatanche violacea (Desf.) Beck (Halouk) Cistus parviflorus Lam. (Birbish) Cistus salvifolius L. (Birbish) Citrullus colocynthis (L.) Schrad. (Handal) Conium maculatum L. (Shawkaran) Convolvulus arvensis L. (Olleiq) * Coriandrum sativum L. (Kesbour) * Cucumis sativus L. (Khiyar) Cupressus sempervirens L. var. horizontalis (Mill.) Gordon (Srow) Cuscuta planiflora Ten. (Hmoul) Cyclamen rohlfsianum Asch. (Rakaf) Cymbopogon schoenanthus (L.) Spreng. (Halfa-Barr)	Orobanchaceae Cistaceae Cistaceae Cucurbitaceae Apiaceae Convolvulaceae Apiaceae Cucurbitaceae Cupressaceae Convolvulaceae Primulaceae Poaceae Asteraceae Poaceae Balanophoraceae Cyperaceae Solanaceae Solanaceae Ranunculaceae Apiaceae Cucurbitaceae	Dermatitis, Skin ulcer, Diuretic, Renal stones, Wounds, Bruises, Diarrhea Urinary tract infection, Epigastric, Gastritis, Widening of intestines Gastritis, Epigastric, Eczema, Vermicide, Widening of intestines Rheumatic, Constipation, Arthritis, Corns, Bone spur Breast firming and pushing up, Gout Varicose veins, Angina, Gingivitis, Dermatitis, Cough, Rheumatic, Renal stones Flatulence, Lactagogue, Cardiac stimulant, Tranquilizing for nerves Headache Asthma, Respiration straits, Piles, Nervous seizure, Gingivitis, Toothache, Varicose veins Constipation Diabetes, Anemia, Abscess Diabetes, Influenza, Toothache, Gastritis, Headache, Menstruation, Colic, Prostatitis, Renal colic, Cough, Urinary tract infection, Allergy, Reducing cholesterol Anemia, Ulcer, Gastritis, Colic, Arteriosclerosis, Burns, Metritis, Ovulation Gastritis, Ulcer, Urinary tract infection, Hypertension, Fever, Prostatitis, Abscess, Rash, Cystitis, Diuretic Aphrodisiac, Gastritis, Jaundice, Piles, Gastritis, Impotence, Increase sperm, Cholagogue Gastritis, Preventing undesired hair growth Asthma, Respiration straits, Haemostatic Asthma Sterility Hypertension, Constipation, Bites Jaundice, Liver diseases, Hair stimulant, Cancer,
Cynarium cardunculus L. (Qahmoul) Cynodon dactylon (L.) Pers. (Negeila)		
Cynomorium coccineum L. (Tartout) Cyperus rotundus L. (Seed) Datura innoxia Mill. (Fadda) Datura stramonium L. (Fadda) Delphinium ambiguum L. (Umm El-Owlad) Deverra tortuosa (Desf.) DC. (Qazzah) Ecballium elaterium (L.) A.Rich.		

(Buzzate) Emex spinosus (L.) Compd. (Dirs El-Agouz) Ephedera alata Decne. (Alendi) *Eriobotrya japonica (Thunb.) Lindl. (Nasboli) Eruca sativa Mill. (Gargeer) *Eucalyptus gomphocephala DC. (Kafour)	Polygonaceae Ephederaceae Rosaceae Brassicaceae Myrtaceae Euphorbiaceae Euphorbiaceae Zygophyllaceae Apiaceae Moraceae Fumariaceae Papaveraceae Asteraceae Globulariaceae Chenopodiaceae Rutaceae Asteraceae Poaceae Solanaceae Solanaceae Iridaceae Juglandaceae Cupressaceae Asteraceae Lauraceae Lamiaceae Lytharaceae Brassicaceae Brassicaceae Poaceae Caprifoliaceae Fabaceae Solanaceae	Piles, Acne. Renal stones, Urinary tract infection, Ulcer, Gastritis, Asthma, Influenza, Sinusitis, Chest allergy, Expectorant Cough, Renal stones, Urinary tract infection, Emetic, Diabetes, Ureterostenosis, Renal colic Hair-fall, Scalp inflammation, Blood purification, Diabetes, Diuretic, Jaundice, Menstruation Cough, Common cold, Bronchitis, Burns, Toothache, Rheumatic, Dysentery, Blocked nose, Respiratory inflammation Gastritis, Constipation, Wounds, Herpes, Warts Rheumatic, Herpes, Dermatitis Jaundice Breathless, Sycological and spiritual therapy Wounds, Constipation, Jaundice, Warts Urinary retention, Sclerosing Menstrual problems Hypertension, Vermicide, Renal stones, Urinary tract infection Diuretic, Gastritis, Hypertension, Abortion miscarriage, Metritis, Ovary stimulant, Stroke, Vaginal diseases, Diarrhea, Ulcer, Colic, Eczema, Psoriasis, Dermatitis, Vaginitis, Haemostatic, Premenstrual syndrome, Delayed menses, Abortion Epigastritis Flatulence, Constipation, Lacticemia, Prostatitis, Rheumatic, Vitiligo, Tranquilizing for nerves, Common cold Renal stones, Urinary tract infection, Ureterolith, Jaundice, Renal colic, Gastritis Renal stones, Diarrhea, Urinary tract infection, Colitis, Cystitis Eczema, Antidepressant, Insomnia Aphrodisiac, Insomnia, Epilepsy, Anguish Influenza, Teething, Deodorant Diabetes, Toot-bleching, Gingivitis, Corns, Diarrhea Gastritis, Oxytocic, Lactagogue, Vermicide, Cystitis, Slimming, Ulcer, Flatulence, Colic, Varicose veins, Colitis Liver diseases, Lactagogue Rheumatic, Indigestion Diuretic, Menstruation, Antinsect, Colic, Dysmenorrhaea, Varicose veins Fungal skin diseases, Fever, Antiseptic, Diabetes Cough, Expectorant, Respiration straits, Anemia, Renal stones Herpes Varicose veins Anticancer Gastritis, Colitis Rheumatic, Constipation, Wounds, Dermatitis
Euphorbia dendroides L. (Halablab) Euphorbia paralias L. (Libbeina) Fagonia cretica L. (Taleha) Ferula assa-foetida L. (Heltit) *Ficus carica L. (Karmus) Fumaria judaica Boiss. (Sfinari El-Hamer) Glaucium flavum Cranz (Qarn Jedyan) Glebionis coronaria (L.) Tzvelev (Oqhowan) Globularia alypum L. (Zerreiga)		
Haloxylon scoparium Pomel (Rimth) Haplophyllum tuberculatum (Forsk.) Juss. (Shagaret El-Reeh) Helichrysum stoechas (L.) Moench (Eshbet Larnab) *Hordeum vulgare L. (Shaer) Hyoscyamus albus L. (Sakaran) Hyoscyamus muticus L. (Sakaran) Iris germanica L. (Kaib El-Teeb) *Juglans regia L. (Louz Khazainy) Juniperus phoenicea L. (Arar)		
Launaea resedifdia (L.) O.Kuntze (Adeeda) Laurus nobilis L. (Ghar) Lavandula multifida L. (Khozama) *Lawsonia inermis L. (Henna) *Lepidium sativum L. (Habb Rashad) Lobularia libyca (Viv.) C.F.W.Meissn. (Awent El-Hanesh) Lolium rigidum Gaudin (Sammah) Lonicera etrusca Santi (Jummet Fata) Lotus tetragonolobus L. (Garambush) Lycium europaeum L. (Awsaj)		

* <i>Lycopersicon esculentum</i> Mill. (Tamam)	Solanaceae	Burns
<i>Lygeum spartum</i> Loefl.ex L. (Halfa)	Poaceae	Wounds
<i>Malva aegyptia</i> L. (Khobbeiza)	Malvaceae	Anemia, Gastroenteritis, Gingivitis, Renal stones, Hair-fall, Angina, Laryngitis, Abscess
<i>Marrubium alysson</i> L. (Roubiya)	Lamiaceae	Diabetes, Common cold, Rheumatic, Blood purification, Gangrene
<i>Marrubium vulgare</i> L. (Roubiya)	Lamiaceae	Diabetes, Arthritis, Cough, Blood purification, Arthritis, Rheumatic, Common cold, Gangrene, Anticancer, Dermatitis
<i>Matricaria aurea</i> (Loefl.) Sch.Bip. (Qomialah)	Asteraceae	Gastritis, Menstruation, Dysmenorrhoea, Colic, Expectorant, Dermatitis, Indigestion, Urinary tract infection, Laryngitis, Sinusitis, Diuretic, Flatulence, Urinary retention, Cracks of feet and hands, Asthma, Antibacterial, Tranquilizing for nerves, Conjunction
<i>Matthiola fruticulosa</i> (L.) Maire (Shaqara)	Brassicaceae	Renal stones, Piles
<i>Melilotus indicus</i> (L.) All. (Qort)	Fabaceae	Urinary retention, Piles, Arteriosclerosis, Rheumatic
* <i>Mentha spicata</i> L. (Nanah)	Lamiaceae	Dermatitis, Ozostomia, Angina, Colic, Menstruation, Flatulence, Slimming, Metritis, Tranquilizing for nerves, Headache, Cystitis, Bruise, Anguish, Reinforcement and activation
* <i>Mirabilis jalapa</i> L. (Nowar Ashiya)	Nyctaginaceae	Diuretic, Gonorrhea
* <i>Morus alba</i> L. (Tout)	Moraceae	Diabetes, Constipation
<i>Myrtus communis</i> L. (Mersin)	Myrtaceae	Diabetes, Gingivitis, Rheumatic, Common cold, Acne, Liver diseases, Ozostomia, Respiratory inflammation, Gastritis, Vaginitis
* <i>Narcissus tazetta</i> L. (Nargis)	Amaryllidaceae	Menstruation
<i>Nerium oleander</i> L. (Defla)	Apocynaceae	Psoriasis, Eczema, Abscess, Dermatitis, Psoriasis, Acne
<i>Nicotiana glauca</i> R.C.Graham (Akkuz Musa)	Solanaceae	Haemostatic, Abscess
<i>Nitraria retusa</i> (Forssk.) Asch. (Ghardaq)	Nitrariaceae	Dermatitis, Abscess, Acne
* <i>Ocimum basilicum</i> L. (Habaq)	Lamiaceae	Flatulence, Gastritis, Stomach stimulant, Tranquilizing for nerves
<i>Olea europaea</i> L.subsp. <i>europaea</i> var. <i>sylvestris</i> (Mill.) L'He'r (Zaitoun)	Oleaceae	Gingivitis, Dyspepsia, Eczema, Constipation, Earache
<i>Onopordum cyrenaicum</i> Maire & Weiller (Shouk El-Gamal)	Asteraceae	Hepatitis, Anticancer, Epigastritis
<i>Opuntia ficus-indica</i> (L.) Mill. (Hendi)	Cactaceae	Piles, Diarrhea, Anticancer, Rheumatic, Breathless, Renal colic, Arthritis, Asthma, Allergy
* <i>Origanum majorana</i> L. (Bardaqousha)	Lamiaceae	Flatulence, Metritis, Cough, Menstruation, Loss of appetite, Heliantholic colic, Tranquilizing for nerves, Hypertension, Premenstrual syndrome, Labour pains
<i>Oxalis pes-caprae</i> L. (Hommeida)	Oxalidaceae	Gingivitis, Constipation, Jaundice, Stimulate bile secretion
<i>Pancratium maritimum</i> L. (Nowar El-Klab)	Amaryllidaceae	Gout
<i>Papaver rhoeas</i> L. (Bouqaroun)	Papaveraceae	Nervous seizure, Insomnia, Tranquilizing for nerves
<i>Paronychia arabia</i> (L.) DC. (Ghofat El-Abed)	Caryophyllaceae	Renal stones, Aphrodisiac
<i>Peganum harmala</i> L. (Harmal)	Peganaceae	Vermicide, Rheumatic, Hair-fall, Aphrodisiac, Sperm stimulant, Headache, Nervous seizure, Blood purification, Hepatitis, Sycological and spiritual therapy, Antibacterial, Eczema, Pruritus, Gangrene, Tranquilizing for nerves, Sterility
* <i>Pelargonium odoratissimum</i> (L.) Soland (Atr Arabi)	Geraniaceae	Tooth bleaching, Diabetes, Refrigerant, Arteriosclerosis, Cardiac stimulant, Cardiac diseases, Tranquilizing for nerves
<i>Periploca angustifolia</i> Labill. (Helaab)	Asclepiadaceae	Anguish
<i>Phagnalon rupestre</i> (L.) DC. (Taam El-Arnab)	Asteraceae	Renal stones, Urinary tract infection

Phillyrea angustifolia L. (Sakhab)	Oleaceae	Gingivitis, Hypertension
Phlomis floccosa D.Don (Zeheira)	Lamiaceae	Metritis
*Phoenix dactylifera L. (Nakhl)	Arecaceae	Sterility, Aphrodisiac, Headache, Ovary stimulant, Ovulation, For fertility
Pinus halepensis Mill. (Senouber)	Pinaceae	Liver diseases, Respiratory diseases
Pistachia lentiscus L. (Battoum)	Anacardiaceae	Colic, Gastritis, Skin cracks, Ulcer, Gingivitis, Psoriasis, Dermatitis, Rash, Piles, Colitis, Cracks of hands and feet
Plantago albicans L. (Anem)	Plantaginaceae	Herpes, Burns, Urinary tract infection, Renal colic
Plantago major L. (Lisan El-Jadi)	Plantaginaceae	Abscess, Varicose veins
Plantago ovata Forssk. (Anem)	Plantaginaceae	Gastritis, Anemia, Blood purification
Polygonum equisetiforme Sm. (Qordaab)	Polygonaceae	Rheumatic, Diabetes, Gastritis, Emetic, Psychological and spiritual therapy, Wounds, Antibacterial, Antifungal, Antidepressant, Renal stones, Vomiting
Polygonum maritimum L. (Qordaab El-Bahr)	Polygonaceae	Diuretic, Renal stones
Portulaca oleracea L. (Bleibsha)	Portulacaceae	Headache, Migraine, Revulsant, Vermicide
Posidonia oceanica (L.) Delile (Tifun)	Posidoniaceae	Colitis
*Psidium guajava L. (Gauafa)	Myrtaceae	Bronchitis, Respiratory inflammation, Chest inflammation, Cough, Pneumonia, Respiratory diseases
*Punica granatum L. (Romman)	Punicaceae	Ulcer, Diarrhea, Vermicide, Gingivitis, Cardiac stimulant, Anemia, Jaundice, Gastritis, Liver stimulant, Widening of intestines
Quercus coccifera L. (Ballout)	Fagaceae	Enuresis, Metritis, Gingivitis, Dermatitis, Diarrhea, Vaginal diseases, Prostatitis, Cough, Hypertension, Ulcer, Cystitis, Vaginitis
Reaumuria hirtella Jaup. & Spach (Umm El-Nada)	Tamaricaceae	Sterility, Herpes, Bites, Acne, Freckles, Dermatitis, Diabetes
Retama raetam (Forssk.) Webb & Berthel. (Ratam)	Fabaceae	Diabetes, Sinusitis
Rhamnus lycioides L. (Sellouf)	Rhamnaceae	Vitiligo
Rhus tripartita (Ucria) Grande (Gdari)	Anacardiaceae	Gastritis, Toothache, Ulcer, Hair-change, Piles, Eczema, Cracks of hands and feet, Cystitis, Athlete's foot
Ricinus communis L. (Kherwa)	Euphorbiaceae	Chest allergy, Hair-fall, Constipation, Cough, Colic, Common cold, Abscess, Headache, Rheumatic, Arthritis, Contraceptive
*Rosa gallica L. (Ward)	Rosaceae	Nervous Seizure, Antibiotic, Tranquilizing for nerves, Diarrhea, Urinary tract infection, Anguish
Rosmarinus officinalis L. (Ikliil)	Lamiaceae	Headache, Rheumatic, Flatulence, Loss of appetite, Womb and stomach tumors, Memory loss, Menstruation, Strengthen blood vessels, Tranquilizing for nerves, Slimming, Liver diseases, Gallbladder stones, Menopause, Dizziness
Rubus sanctus Schreb. (Olleiq)	Rosaceae	Gingivitis, Diarrhea, Colic
Rumex crispus L. (Hommeid)	Polygonaceae	Jaundice
*Ruta chalepensis L. (Fidjel)	Rutaceae	Earache, Menstruation, Ringing ears, Expectorant, Cough, Colic, Vermicide, Flatulence, Headache, Dermatitis, Epilepsia, Validated women
Sacropoterium spinosum (L.) Spach (Shobroq)	Rosaceae	Piles, Gastritis
Salix subserata Willd. (Safsaaf)	Salicaceae	Anticancer, Fever, Diabetes, Enuresis, Gastritis
*Salvia officinalis L. (Teffah El-Shahi)	Lamiaceae	Dizziness, Common cold, Flatulence, Tranquilizing for nerves, Sinusitis, Metritis, Gingivitis, Diuretic, Anguish
Satureja thymbra L. (Zaatar Hamer)	Lamiaceae	Arteriosclerosis, Cough, Abortion miscarriage
Scorzonera undulata Vahl (Ghees)	Asteraceae	Broken cilia
Scrophularia canina L. (Shagaret El-hesan)	Scrophulariaceae	Sterility, Rheumatic

Seriphidium herba-album (Asso.) Sojak (Shih)	Asteraceae	Vermicide, Menstruation, Leucoderma, Flatulence, Gastritis, Renal stones, Urinary tract infection, Root hair stimulant, Common cold, Constipation, Antinsect, Eye diseases, Conjunctivitis, Vitiligo, Bowl legs
Silybum marianum (L.) Gaertn. (Shouk En-nasara)	Asteraceae	Liver diseases
Smilax aspera L. (Rough)	Smilacaceae	Dermatitis, Blood purification
* Solanum melongena L. (Bazenjan)	Solanaceae	Burns, Angina, Piles, Vitiligo
Solanum nigrum L. (Enab El-Deeb)	Solanaceae	Liver diseases, Diuretic, Constipation, Dermatitis, Arthritis, Rheumatic, Hypertension
Solanum sodomium L. (Teffah El-Qoula)	Solanaceae	Dermatitis, Herpes, Acne
Sonchus oleraceus L. (Teffaf)	Asteraceae	Lactagogue, Diuretic, Vermicide, Liver diseases, Arteriosclerosis, Anemia, Anticancer, Reducing cholesterol, Vitamin C deficiency
Spartium junceum L. (Retema)	Fabaceae	Laxative
* Spinacia oleracea L. (Spanaka)	Chenopodiaceae	Anemia, Constipation, Piles, Gastritis, Wounds, Burns
Stipa tenacissima L.	Poaceae	Gastritis, Ulcer, Urinary tract infection, Kidney failure
Suaeda vera Forssk. ex J.F.Gmel. (Sabta)	Chenopodiaceae	Scabies, Herpes, Dermatitis
Tamarix arborea (Sieb.ex Ehrenb.) Bunge. (Athel)	Tamaricaceae	Colic, Diarrhea, Indigestion, Toothache
Teucrium polium L. (Gaada)	Lamiaceae	Diabetes, Gastritis, Thyroiditis, Anemia, Common cold, Hypertension, Renal stones
Thapsia garganica L. (Derias)	Apiaceae	Arthritis, Herpes, Hair-fall, Hypertension, Rheumatic, Scabies
* Thuja orientalis L. (Afas)	Cupressaceae	Diarrhea, Hair growth stimulant, Skin ulcer
Thymelaea hirsuta (L.) Endl. (Mithnan)	Thymelaeaceae	Hair-fall, Constipation, Vermicide, Warts, Herpes, Sterility, Dermatitis, Psoriasis
Thymus capitatus (L.) Link (Zaatar)	Lamiaceae	Common cold, Cough, Flatulence, Dermatitis, Indigestion, Cough, Vermicide, Rheumatic, Respiration inflammation, Influenza, Gastritis, Antiseptic, Breathless, Anticancer, Strengthen immune system, Pneumonia, Respiration straits, Asthma, Expectorant, Diabetes
Tribulus terrestris L. (Kutrab)	Zygophyllaceae	Dizziness, Gingivitis, Diuretic
* Trigonella foenum-graecum L. (Helba)	Fabaceae	Lactagogue, Constipation, Piles, Angina, Expectorant, Obesity, Blood purification, Menstruation, Blood diseases, Anemia
* Tritium aestivum L. (Qamh)	Poaceae	Indigestion, Weight Increase
Urginea maritima (L.) Baker (Faron)	Hyacinthaceae	Vulnerary, Anticancer, Expectorant, Cardiac stimulant, Herpes, Wounds, Dermatitis, Eczema, Back pain, Rheumatic, Bone spur
Urtica urens L. (Horreiq)	Urticaceae	Rheumatic, Diuretic, Anticancer, Anemia, Piles, Common cold, Arthritis, Blood purification, Haemostatic, Eczema, Hair-fall, Urinary tract infection, Hair stimulant, Renal colic, Constipation, Revulsant
Viburnum tinus L. (Mernakh)	Caprifoliaceae	Gastritis
Withania somnifera (L.) Dunal (Foul El-Kelab)	Solanaceae	Vermicide, Diuretic
* Zea mays L. (Spoul)	Poaceae	Diuretic, Renal colic, Dandruff, Asthma, Urinary tract infection, Cough, Bronchitis, Renal stones
Zilla spinosa (L.) Prantl (Shabrom)	Brassicaceae	Renal stones
Ziziphus lotus (L.) Lam. (Sidr)	Rhamnaceae	Constipation, Hair parasites, Gastritis, Sciatica, Abscess, Piles, Reinforcement and activation, Hepatitis, Psychological and spiritual therapy
Zygophyllum album L. (Balbal)	Zygophyllaceae	Diabetes, Hypertension, Flatulence

Eastern region had the largest number (179 species) of the surveyed medicinal plant species compared to the other region in Libya. The total number of interviewed persons was sixty-one. About 81% of the total

number of interviewers acknowledged the use of *Helichrysum stoechas* to treat many different diseases, followed by *Juniperus phoenicea* with 74% and *Thymus capitatus* with 72%. *Rosmarinus officinalis* and *Seriphidium herba-album* attained a percentage of about 70% of the total number of interviewers.

The treat value (VT) of ailments indicates the importance of some specific ailments for the humans in different rural communities of the Eastern region shows the highest treat value attained by *Globularia alypum* is used to treat about 10.9% of the total number of diseases, *Thymus capitatus* of 10.4%, *Peganum harmala* and *Urtica urens* of 8.3% each, and *Rosmarinus officinalis* of 7.8%. Concurrently, a certain species (32 species) could be used in the treatment of only one specific disease.

Informants consensus factor (ICF) values obtained for the categorized ailments. Fifteen ailment categories are reported. ICF values obtained for the reported categories indicate the degree of shared knowledge for the treatment of the ailment by medicinal herbs. The highest ICF (0.48) is scored for the digestive system, including ailments like constipation, gastritis, and ulcer. The respiratory system, which includes the relief of ailments such as cough, bronchitis and breathless recorded the second highest ICF value (0.47). Forty-four species, representing 23.40% of the total plant species listed in this survey, are used for the treatment of the respiratory system. Dermatological problems were cited as the category with the third highest ICF (0.45), with 79 species representing 42.02% of the total plant species listed in this survey. The fourth level of ICF values (0.44) is recorded for the nervous system. The reproductive system is ranked as the fifth ailment with an ICF value of 0.41. An ICF value of 0.36 is recorded for circulatory system. All plant parts reported to be used as remedies for these ailments and plant species used represent around 40.96% of the total plant species cited in this study. The last citation of this ranking is reported for plants used to treat tumor diseases, with an ICF value of 0.07. These categories recorded a lower ICF, which may be attributed to the civilization trend of the society and the tendency of the people to follow orthodox medicine.

Eastern region of Libya has a high diversity of medicinal plants that remain to be poorly studied, more phytochemical pharmacological studies are necessary in order to test popular indications and to search for new pharmaceuticals. Additional studies are also necessary to identify possible links between the chemical composition of plants and its relation to habit and life strategy, and to determine how human populations in Eastern region select and use these plants. The region may be considered as one of the richest regions of medicinal and aromatic plants, which are used in folkloric medicine and in the spice business. Commercialization of medicinal and aromatic plants has become a source of income for the local community in the study area and distributed on the level of shops and local markets and whole sale business.

Many medicinal plants all over the study area are threatened. In the present study, ecological awareness is suggested for local inhabitants to manage their rationale use of the neighboring plants and to bear in their minds that the most overexploited species (high use and treat value) with low importance value (IV) must be substituted by others characterized with low use and treat value, but which have a high importance value to relieve the stress on these species.

Encouragement of the farmers in the study area to cultivate the medicinal plants especially, endemic and rare plants to satisfy the demand of the market. Formation of an extensive program for propagation of endangered species is necessary. The decision makers and land-users showed participate in the planning and execution of the activities along these lines, and extension services and incentives should be ensured in order to encourage their participation.

There is an imminent danger of genetic erosion of all wild species because of the heavy grazing, human use and drought hazards which occur more frequently in the study area. There is an urgent need for international assistance to collect the endangered plants and to conserve the genetic resources.

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