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Survey of Wild Trees and Shrubs in Eastern Region of Libya and Their Economical Value

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ABSTRACT

The aim of the present study was to identify the wild trees and shrubs among the diverse flora of Eastern region ecosystem that are used economically and therapeutically. Current data revealed that the total number of wild trees and shrubs surveyed in the region was 88 species, belonging to 31 families and 62 genera. Retama monosperma (L.) Boiss. subsp. bovei (Spach) Maire has been collected for the first time and it forms a new record for Libya, with the presenece of three endemic taxa Arbutus pavarii Pamp., Cupressus sempervirens L. var. horizontalis (Mill.) Gordon. and Capparis spinosa var. krugeriana. The species collected were traditionally used for medicinal and non-medicinal purposes. More than 80 medicinal uses were recorded for 46 species mentioned in the present study and 10 non-medicinal uses were also mentioned

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INTRODUCTION

Libya is considered rich in arboreal species which are used in many uses, especially Cyrenaica (Aljabal Akhder region), which contains most of the total arboreal species recorded in Libya [1]. The Green Mountains (Aljabal Akhder) were considered to be one of the most important topographical phenomena in Libya [2], which also included desert, wadis and prairies. Al-Idrissi reported that the main forest type in Libya was found to be the natural forest occurring in Gebel Akhder region [3]. The total area of the forest was about 500,000 hectares, of which 35% has been converted to agriculture. Thus, the actual area of these natural forests is now about 32,000 hectares. The same authors studied plant genetic resources in Libya, and found an imminent danger of genetic erosion of all wild species, especially in Gebel Akhder, because of the heavy grazing, human use and drought hazards which occur more frequently in the country. The vegetation of Libya is studied by Ranck, he noted that the Cyrenaica plateau consisted of a variety of arborescent species, grasses and other herbaceous plants [4]. Most of the canyons and broad slopes of the plateau were covered with dense chaparral consisting of several genera of tree like forms. These genera included primarily Quercus, Viburnum and Juniperus. Some of the larger wadis, such as Wadi El-Kuf, supported occasional stands of Pinus and Cupressus [5]. Additionally, Johnson in his publication Jabal al-Akhdar, Cyrenaica, reported that the steppe was formed of a number of separate communities [6]. The first band of the steppe was dominated by Mediterranean biota characterized by such species as Ziziphus lotus, and Sacropoterium spinosum. Asker noted that the vegetation of Gebel Akhder is characterized by Maquis [7]. It largely consists of open scrub, with thickets of tall shrub and small trees. It is a jumble of Arbutus pavarii, Ceratonia siliqua, Juniperus phoenicea, Olea europaea, Viburnum tinus, Quercus coccifera and Rhus tripartita. Johnson in his study on the vegetation of Gebel Akhder noted that the Bedouins recognized that numerous plants are valuable for their medicinal properties [6]. Among these was Rosmarinus officinalis, Thymus capitatus and Arbutus pavarii.

Boulos, mentioned that Aljabal Akhder is considered the richest area in vegetation with the highest number of species were about 50% of the total plant species of the Libyan flora are confined to this region [8,9]. Recently, there is an imminent danger of genetic erosion of the vegetation in Eastern region because of heavy grazing, collection of medicinal and woody plants for local use and trading, over cultivation, recurrent drought conditions and hazards [10].

Studies available regarding the economic and medicinal importance of wild trees and shrubs in Libya are very rare. The main objective of the present work is to collect and identify the wild trees and shrubs among the diverse flora of Eastern region of Libya ecosystem that are used economically and therapeutically. These will provide valuable information for the future conservation and management strategies of these natural resources in Libya.

METHODS

Subjects

Data and specimens of the wild trees and shrubs in Libya were collected during field trips between 2012 and 2016. Field work consisted of two phases: 1) collecting and studying the trees and shrubs in Eastern region of Libya and 2) interviews with local inhabitants, herbalists and practitioners. Open-ended questionnaires [11] were applied separately for each informant to achieve the second point. The total numbers of interviewed informants were 49 men (more than 50 years old). Specific questions focused on the different ethnobotanical uses traditionally practiced in the area (e.g. food, medicine, construction, fixation of sand dunes, fuel wood, tanning, dying, handicrafts, fodder etc.) were asked for the interviewees. Nevertheless, details for the different medicinal uses were also considered.

Plant specimens were collected during flowering and fruiting stages as much as possible. The date of collection, habitat type, vernacular name, flower colour, locality. Photographs of a large number of plants were taken in their natural habitats. The identification of the specimens was carried out according to the Flora of Libya [12-1]. 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, Alqubbah, Omar El-Mukhtar University.

RESULTS

From the study area, 88 species were collected belonging to 62 genera and 31 families. Gymnosperms are represented by 3 families including 4 genera and 6 species. Angiosperms include 82 plant species belonging to 28 families and 58 genera (Table 1). The largest family is Chenopodiaceae which is represented by 19 species and 10 genera followed by Fabaceae (Leguminosae) with 10 species. The largest genera are Atripelx and Salsola, which includes 4 species. Retama monosperma (L.) Boiss. subsp. bovei (Spach) Maire has been collected for the first time and it forms a new record for Libya, with the presenece of three endemic taxa Arbutus pavarii Pamp., Cupressus sempervirens L. var. Horizontalis (Mill.) Gordon and Capparis spinosa var. krugeriana. The woody species in study area are rich and varied from Mediterranean, desert and salt marshes species.

Table 1. A complete list of the wild trees and shrubs collected from Eastern region of Libya.

Scientific Name	Local Name	Family
Acacia nilotica (L.) Delile. subs***. astringens*** (Schum. & Thoun.) Roberty	Sant	Fabaceae
Alhagi graecorum Boiss.	Agol	Fabaceae
Anabasis articulata (Forssk.) Moq.	Agram	Chenopodiaceae
Anagyris foetida L.	Kharroub El-Klab	Fabaceae
Arbutus pavarii Pamp.	Shmary	Ericaceae
Arthrocnemum fruticosum (L.) Moq.	Ghetham	Chenopodiaceae
Arthrocnemum macrostachyum (Moric) Moris	Balbal jemal	Chenopodiaceae
Arthrocnemum perenne (Mill.) Moss.	Zeetah	Chenopodiaceae
Atripelx coriacea Forssk.	Qataf	Chenopodiaceae
Atripelx halimus L.	Qataf	Chenopodiaceae
Atripelx mollis Desf.	Qataf -Zell	Chenopodiaceae
Atripelx stylosa Viv.	Qataf	Chenopodiaceae
Ballota pseudo-dictamnus (L.) Benth.	Mayla	Lamiaceae
Calicotome spinosa (L.) Link	Gandol	Fabaceae
Calicotome villosa (Poiret) Link	Gandol	Fabaceae
Capparis spinosa L.	Kabbar	Capparaceae

Ceratonia siliqua L.	Kharroub	Fabaceae
Cistus incans L.	Birbish	Cistaceae
Cistus parviflorus Lam.	Birbish	Cistaceae
Cistus salvifolius L.	Birbish	Cistaceae
Clematis cirrhosa L.	Clematish	Ranunculaceae
Cornulaca monacantha Del.	Hadd	Chenopodiaceae
Cupressus sempervirens L. var. ***horizontalis*** (Mill.) Gordon	Srow – Qiliz	Cupressaceae
Ephedera alata Decne.	Alendi	Ephederaceae
Ephedera altissima Desf.	Alendi	Ephederaceae
Erica multiflora L.	Hamraya	Ericaceae
Erica sicula Guss.	Hamra	Ericaceae
Euphorbia dendroides L.	Halablab	Euphorbiacaeae
Farsetia aegyptia Turra	Farsetia	Brssicaceae
Genista acanthoclada DC.	Lihyat Alsheikh	Fabaceae
Halimione portulacoides (L.) Allen	Halimon	Chenopodiaceae
Halocnemum strobilaceum (Pall.) M. Bieb.	Shenin	Chenopodiaceae
Halogeton alopecuroides (Delile) Moq.	Tashash	Chenopodiaceae
Haloxylon scoparium Pomel	Rimth	Chenopodiaceae
Juniperus oxyceddrus L**.**	Arar Suky	Cupressaceae
Juniperus phoenicea L.	Shaara - Arar	Cupressaceae
Laurus nobilis L.	Ghar - Rand	Lauraceae
Limoniastrum monopetalum (L.) Boiss	Zaita	Plumbaginaceae
Lonicera etrusca Santi	Jummet Fata	Caprifoliaceae
Lonicera nummularifolia Santi	Jummet Fata	Caprifoliaceae
Lycium europaeum L.	Awsaj	Solanaceae
Lycium schweinfurthii Dammer	Awsaj	Solanaceae
Lycium shawii Roemer & Schultes	Awsaj	Solanaceae
Myrtus communis L.	Mersin.	Myrtaceae
Nerium oleander L.	Defla	Apocynaceae
Nicotiana glauca R.C.Graham	Akkuz Musa	Solanaceae
Nitraria retusa L.	Ghardaq	Nitrariaceae
Olea europaea L. subs. ***europaea*** var. ***sylvestris*** (Mill.) Lehr	Zaitoun	Oleaceae
Opuntia ficus-indica (L.) Mill.	Hindi	Cactaceae
Pergularia tomentosa L.	Tham Nesser	Asclepiadaceae
Periploca angustifolia Labill.	Helaab	Asclepiadaceae
Philyrea angustifolia L.	Sakhab	Oleaceae
Philyrea latifolia L.	Sakhab	Oleaceae
Phlomis floccosa D. Don.	Zeheira	Lamiaceae
Pinus halepensis Mill.	Senouber	Pinaceae
Pistachia atlantica Desf.	Battoum	Anacardiaceae
Pistachia lentiscus L.	Battoum	Anacardiaceae
Prasium majus L.	Anab eddib	Lamiaceae
Quercus coccifera L.	Ballout	Fagaceae
Retama monosperma (L.) Boiss. subsp. ***bovei*** (Spach) Maire	Ratam	Fabaceae

Retama raetam (Forssk.) Weeb& Berthel.	Ratam	Fabaceae
Rhamnus alaternus L subsp. ***pendulus*** (Pamp.) Jafri.	Sellouf	Rhamnaceae
Rhamnus lycioides L.	Sellouf	Rhamnaceae
Rhamnus oleoides L.	Sellouf	Rhamnaceae
Rhus tripartita (Ucria) Grande	Gdari	Anacardiaceae
Ricinus communis L.	Kherwa	Euphorbiaceae
Rosmarinus officinalis L.	Iklil	Lamiaceae
Rubus sanctus Schreb.	Olleiq	Rosaceae
Sacropoterium spinosum (L.) Spach	Shobroq	Rosaceae
Salix subserrata Willd.	Safsaaf	Salicaceae
Salsola baryosma (Roem.& Schult.) Dandy	Ressal - Talizza	Chenopodiaceae
Salsola longifolia Forssk.	Shadida	Chenopodiaceae
Salsola tetrandra Forssk.	Gel - Feres	Chenopodiaceae
Salsola tetragona Delile	Gel	Chenopodiaceae
Smilax aspera L.	Rough	Smilacaceae
Spartium junceum L.	El-Wazal	Fabaceae
Suaeda vera Forssk. ex J.F.Gmel.	Sabta	Chenopodiaceae
Suaeda vermiculata Forssk.	Sabta	Chenopodiaceae
Tamarix aphylla L.	Athel	Tamaricaceae
Tamarix nilotica (Ehrenb.) Bunge.	Tarfa	Tamaricaceae
Teucrium brevifolium Schreber	Jaada	Lamiaceae
Thymelea hirsuta (L.) Endl.	Mithnan	Thymelaeaceae
Viburnum tinus L.	Mernakh	Caprifoliaceae
Withania somnifera (L.) Dunal	Foul El-Kelab	Solanaceae
Ziziphus lotus (L.) Lam.	Sidr -Nabq	Rhamnaceae
Ziziphus spina-christi (L.) Willd.	Sidr -Nabq	Rhamnaceae
Zygophylium album L.	Balbal - Rotreit	Zygophyllaceae
Zygophylium geslinii Coss.	Balbal	Zygophyllaceae

Data in Table 2 indicated that 46 species were used for medicinal purposes, 12 species as food, 14 species for honey production, 14 species as fodder, 16 species as ornament, and 25 species for industry. On the other hand, one may notice that same species may have more than one purpose (e.g., *Arbutus pavarii* for medicine, honey production, food, industry and in construction; *Rosmarinus officinalis* for medicine, honey production and ornament; *Ceratonia siliqua* for medicine, honey production, food, industry, fodder and in construction and *Ziziphus lotus* for medicine, honey production and food). It is interesting to note that more than 20 species out of 88 were not mentioned by the informants to have any economic value.

Table 2: The economic value of the trees and shrubs in Eastern region of Libya.

Economic Parameter	Species
1. Medicinal uses	*Anagyris foetida, Arbutus pavarii*, *Atriplex halimus*, *Ballota pseudodictamnus, Calicotome villosa, Capparis spinosa*, *Ceratonia siliqua*, *Cistus parviflorus, Cistus salvifolius*, *Cupressus sempervirens, Ephedera alata*, *Ephedera altissima*, *Euphorbia dendroides*, *Haloxylon scoparium, Juniperus phoenicea*, *Laurus nobilis, Lonicera etrusca*, *Lycium europaeum*, *Myrtus communis*, *Nerium oleander*, *Nicotiana glauca, Nitraria retusa, Olea europaea*, *Periploca angustifolia*, *Phillyrea angustifolia*,*Phlomis floccose, Pinus halepensis, Pistachia lentiscus, Quercus coccifera*, *Retama raetam, Rhamnus lycioides,*

	Rhus tripartita, *Ricinus communis, Rosmarinus officinalis*, *Rubus sanctus, Sacropoterium spinosum*, *Salix subserrata*, *Smliax aspera, Spartium junceum*, *Suaeda vera, Tamarix arborea, Thymelaea hirsuta, Viburnum tinus, Withania somnifera, Ziziphus lotus, Zygophyllum album*
2. Food	*Arbutus pavarii*, *Capparis spinosa, Ceratonia siliqua, Juniperus phoenicea*, *Myrtus communis*, *Nicotiana glauca*, *Nitraria retusa, Olea europaea, Opuntia ficus-indica, Pistachia lentiscus*, *Ziziphus lotus*, *Rhus tripartita.*
3. Honey production	*Arbutus pavarii* (Hanon), *Ballota pseudodictamnus* (Maila), *Capparis spinosa* (Rebeh), *Ceratonia siliqua* (Shbro), *Cistus parviflorus* (Rebeh), *Cistus salvifolius* (Rebeh), *Juniperus phoenicea* (Rebeh), *Myrtus communis* (Rebeh), *Pinus halepensis* (Rebeh), *Phlomis floccosa*(Rebeh),*Rosmarinus officinalis* (Eklil),*Spartium junceum* (Rebeh),*Viburnum tinus* (Rebeh),, *Ziziphus lotus* (Seder)
4. Fodder	*Agathophora alopecuroides, Atripelx mollis*, *Atripelx stylosa*, *Ceratonia siliqua, Halocnemum strobilaceum, Haloxylon scoparium, Olea europaea, Opuntia ficus-indica*, *Periploca angustifolia*, *Quercus coccifera*, *Retama raetam*, *Salsola tetrandra,*. *Ziziphus lotus, Ziziphus spina-christi*.
5. Ornaments	*Arbutus pavarii*, *Calicotome villosa*,*Capparis spinosa*,*Ceratonia siliqua*,*Cistus parviflorus*,*Cistus salvifolius,Lonicera etrusca, Myrtus communis*, *Nerium oleander*,*Pinus halepensis,Pistachia lentiscus, Ricinus communis*,*Rosmarinus officinalis*,*Salix subserrata,Spartium junceum*, *Viburnum tinus*.
6. Construction	*Arbutus pavarii*, *Ceratonia siliqua*, *Cupressus sempervirens*, *Pinus halepensis*, *Olea europaea*, *Laurus nobilis*, *Quercus coccifera*, *Tamarix arborea.*
7. Dune stabilizer	*Nitraria retusa, Retama raetam, Ricinus communis,Tamarix aphylla, Thymelaea hirsuta.*
8. Industry	*Acacia nilotica*,*Arbutus pavarii, Juniperus phoenicea, Pistachia lentiscus, Rhus tripartita,Quercus coccifera* (tanning), *Cupressus sempervirens, Myrtus communis, Olea europaea, Ricinus communis, Rosmarinus officinalis*, *Laurus nobilis, Pistachia lentiscus*,*Laurus nobilis, Rosmarinus officinalis* (spices),*Acacia nilotica,*, *Ceratonia siliqua* (juice), *Laurus nobilis,Pistachia lentiscus* (soap making), *Pistachia lentiscus*, *Pistachia atlantica* (resin mastic),*Thymelaea hirsuta,*(rope making), *Myrtus communis* (perfume), *Pistachia atlantica,Nerium oleander* (insecticides).
9. Stock	*Olea europaea*, *Pistachia atlantica.*
10. Charcoal	*Laurus nobilis, Tamarix arborea, Juniperus phoenicea, Arbutus pavarii.*
11. Wind breaking and Hedging purposes	*Atripelx halimus, Cupressus sempervirens, Opuntia ficus-indica, Pinus halepensis,Tamarix aphylla.*

Specifically, the trees and shrubs with the medicinal value are used to treat a considerable number of ailments (Table 3). Such ailments include those of the skin (e.g. *Anagyris foetida, Cistus salvifolius*, *Nerium oleander*, *Nitraria retusa*, *Quercus coccifera* and *Smilax aspera*), diabetes (e.g. *Balanitis aegyptiaca*, *Myrtus communis*, *Zygophyllum album*), and to treat general and specific problems associated with the respiratory (e.g. *Cupressus sempervirens, Ephedera alata*, *Ephedera altissima*, *Myrtus communis, Pinus halepensis*), circulatory (e.g. *Cupressus sempervirens*, *Phillyrea angustifolia, Quercus coccifera, Rosmarinus officinalis*, *Zygophyllum album*), digestive (e.g. *Arbutus pavarii, Ballota pseudodictamnus*, *Capparis spinosa*, *Ceratonia siliqua, Cistus parviflorus*, *Cistus salvifolius, Euphorbia dendroides*, *Haloxylon scoparium, Juniperus phoenicea*, *Laurus nobilis, Ricinus communis, Viburnum tinus, Ziziphus lotus*) and reproductive system (e.g. *Ceratonia siliqua, Myrtus communis*, *Quercus coccifera*, *Rhus tripartita*). Some species are used to treat common ailments (e.g. cold, fever, flatulence and vermicide) while, others are only occasionally used to treat specific and unusual ailment such as those used for treating cancer (e.g. *Capparis spinosa, Lonicera etrusca*). Generally, the method of administration and parts used differed with the species and disease.

Table 3: A list of the medicinal trees and shrubs with its parts used and treated diseases surveyed in Eastern region of Libya.

Species	Part (s) used	Treated diseases
Anagyris foetida	Leaves	Dermatitis, Eczema.
Arbutus pavarii	Leaves, Fruits	Gastritis, Vermicide, Laxative, Urinary tract infection, Epigastritis, Renal colic, Constipation.
Atriplex halimus	Shoots	Chloasma.
Ballota pseudodictamnus	Leaves	Gastritis, Hair parasite, Urinary tract infection, Colitis.
Calicotome villosa	Roots, Flowers	Piles, Fistula, Epigastritis.
Capparis spinosa	Leaves, Flowers	Diuretic, Sciatica, Wounds, Diabetes, Gastritis, Rheumatic, Sun stroke, Womb and stomach tumors.
Ceratonia siliqua	Legume, Leaves, Seeds	Acidity, Indigestion, Constipation, Dyspepsia, Diuretic, Laxative, Sterility.
Cistus parviflorus	Leaves	Urinary tract infection, Epigastric, Gastritis.
Cistus salvifolius	Leaves	Gastritis, Epigastric, Eczema, Vermicide.
Cupressus sempervirens	Leaves, Cones	Asthma, Respiration straits, Piles, Gingivitis, Toothache, Varicose veins.
Ephedera alata	Shoots	Asthma, Influenza, Sinusitis, Chest allergy, Expectorant.
Ephedera altissima	Shoots	Asthma, Chest allergy.
Euphorbia dendroides	Shoots, Leaves	Gastritis, Constipation, Wounds, Herpes, Warts.
Haloxylon scoparium	Shoots	Epigastritis.
Juniperus phoenicea	Leaves, Fruits	Gastritis, Oxytocic, Vermicide, Cystitis, Ulcer, Flatulence, Colic, Colitis.
Laurus nobilis	Leaves	Rheumatic, Indigestion.
Lonicera etrusca	Leaves	Anticancer.
Lycium europaeum	Roots	Rheumatic, Constipation, Wounds, Dermatitis.
Myrtus communis	Leaves, Fruits	Diabetes, Gingivitis, Rheumatic, Common cold, Acne, Liver diseases, Ozostomia, Respiratory inflammation, Gastritis, Vaginitis.
Nerium oleander	Leaves	Psoriasis, Eczema, Abscess, Dermatitis, Acne.
Nicotiana glauca	Leaves	Hemostaic, Abscess.
Nitraria retusa	Shoots, Leaves	Dermatitis, Abscess, Acne.
Olea europaea	Leaves, Fruits	Gingivitis, Dyspepsia, Eczema, Constipation, Earache.
Periploca angustifolia	Shoots	Anguish.
Phillyrea angustifolia	Leaves	Gingivitis, Hypertension.
Phlomis floccosa	Leaves	Metritis.
Pinus halepensis	Cones	Liver diseases, respiratory diseases.
Pistachia lentiscus	Leaves, Fruits	Colic, Gastritis, Skin cracks, Ulcer, Gingivitis, Psoriasis, Dermatitis, Rash, Piles, Colitis, Cracks of hands and feet.
Quercus coccifera	Bark, fruits, Leaves	Enuresis, Metritis, Gingivitis, Dermatitis, Diarrhea, Vaginal diseases, Prostatis, Cough, Hypertension, Ulcer, Cystitis, Vaginitis.
Retama raetam	Shoots	Diabetes, Sinusitis.
Rhamnus lycioides	Shoots, Leaves	Vitiligo.
Rhus tripartita	Bark, Fruits, Leaves	Gastritis, Toothache, Ulcer, Piles, Eczema, Cracks of hands and feet, Cystitis, Athlete's foot.
Ricinus communis	Leaves, Seeds	Chest allergy, Hair-fall, Constipation, Cough, Colic, Common cold, Abscess, Headache, Rheumatic, Arthritis, Contraceptive.

Rosmarinus officinalis	Shoots, Leaves	Headache, Rheumatic, Flatulence, Womb and stomach tumors, Memory loss, Menstruation, strengthen blood vessels, Tranquilizing for nerves, Liver diseases, Gallbladder stones, Dizziness.
Rubus sanctus	Leaves	Gingivitis, Diarrhea, Colic.
Sacropoterium spinosum	Roots	Piles, Gastritis.
Salix subserrata	Leaves	Anticancer, Fever, Diabetes, Enuresis.
Smliax aspera	Leaves, Fruits	Dermatitis, Blood purification.
Spartium junceum	Shoots	Laxative.
Suaeda vera	Shoots	Scabies, Herpes.
Tamarix arborea	Shoots, Bark	Diarrhea, Indigestion.
Thymelaea hirsuta	Leaves, Shoots	Hair-fall, Vermicide, Warts, Herpes, Dermatitis.
Viburnum tinus	Shoots, Leaves	Gastritis, Dropsy.
Withania somnifera	Leaves	Vermicide, Diuretic.
Ziziphus lotus	Leaves, Fruit, Roots, Bark	Constipation, Hair parasites, Gastritis, Sciatica, Abscess, Piles, Hepatitis.
Zygophyllum album	Leaves	Diabetes, Hypertension.

DISCUSSION

In this study it is difficult to state which plants are most economically important to the inhabitants of the regions. As Grenand has noted, the term "useful species" does not have the same meaning for all cultures and probably not for all individuals within a society]15]. in fact, the inhabitants of Eastern region stated that not all the plants in the area are useful. In consistence with this, more than 20 species of the recorded species in the area were not mentioned by them to have any economic value. We are precisely unable to explain this point, but one may suggest that this may be ascribed to the lack of awareness of the inhabitants for the economic values of these species, or it may be due to inexperienced trials in ailment treatment]16].

As a final point, the sustainable management of Eastern region resources and the importance of its medicinal plants definitely propose advantages to the present generation and to meet the needs and aspirations of futures generations. Conservation activities involving medicinal plant gardens maintained by herbalists, herbaria and various arboreta are necessary. Specials programs must be started and utilized all the conventional methods of conservation (in situ and ex situ conservation, gene banks, biotechnology, etc.). Education of the rural dwellers, particularly the herbalists and the herb sellers in conservation awareness is important for an effective approach to the sustainable utilization of the natural resources in the region. [17,18].

The flora of Libya still needs extensive studies as it is far from being fairly known. Both floristic and monographic studies should go parallel to each other in order to achieve a reasonable level of knowledge of that flora within a reasonable time.

The wild trees and shrubs in Eastern region of Libya suffered extreme degradation mainly through the mismanagement by the people making fire wood, excessive grazing, cutting of trees and shrubs for charcoal and brushwood, clearing the vegetation for cultivating the ground to be abandoned later (what is known as shifting cultivation) is carried out in many parts of the area, drought hazards, diseases, insect and lichens. Similarly, Awada noted that]19]. As a result of these factors, many species as Arbutus pavarii, Quercus coccifera, Juniperus oxyceddrus, Laurus nobilis, Myrtus communis, Phillyrea angustifolia, Rhus tripartite have become threatened by extinction. There is urgent need for international assistance to collect the endangered plants and to conserve the genetic resources.

CONCLUSION

Considering that the Eastern region of Libya has a high diversity of medicinal plants that are still poorly studied, more phytochemical and pharmacological studies are necessary in order to test popular indications and search for new pharmaceuticals Additional studies are also necessary to identify possible links between a plant`s chemical composition and its habitat and life strategy and to determine how human populations Eastern region select and use plants.

Participation of public and private associations in management and utilization of medicinal plants in sustainable approach is indispensable to contest human pressures on these valuable natural resources.

Disclaimer
The article has not been previously presented or published, and is not part of a thesis project.

Conflict of Interest
There are no financial, personal, or professional conflicts of interest to declare.

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