

Full Length Research Paper

Medicinal plants in the high mountains of northern Jordan

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Receive 10 April, 2014; Accepted 24 April, 2014

The status of medicinal plants in the high mountains of northern Jordan was evaluated. A total of 227 plant species belonging to 54 genera and 60 families were recorded. The survey is based on field trips conducted in the areas that include Salt, Jarash, Balka, Amman and Irbid governorates. Line transect method was used; collection of plant species was done and voucher specimens were deposited. A map for the target area was provided; the location of the study area grids in relation to their governorate was included.

Key words: Medicinal plants, high mountains of northern Jordan, folk medicine.

INTRODUCTION

Human beings have always made use of their native flora, not just as a source of nutrition, but also for fuel, medicines, clothing, dwelling and chemical production. Traditional knowledge of plants and their properties has always been transmitted from generation to generation through the natural course of everyday life (Kargioğlu et al., 2008).

Documentation of the indigenous knowledge through ethnobotanical studies is important for the conservation and utilization of biological resources (Muthu et al., 2006). Therefore, establishment of the local names and indigenous uses of plants has significant potential societal benefits (Bağcı, 2000).

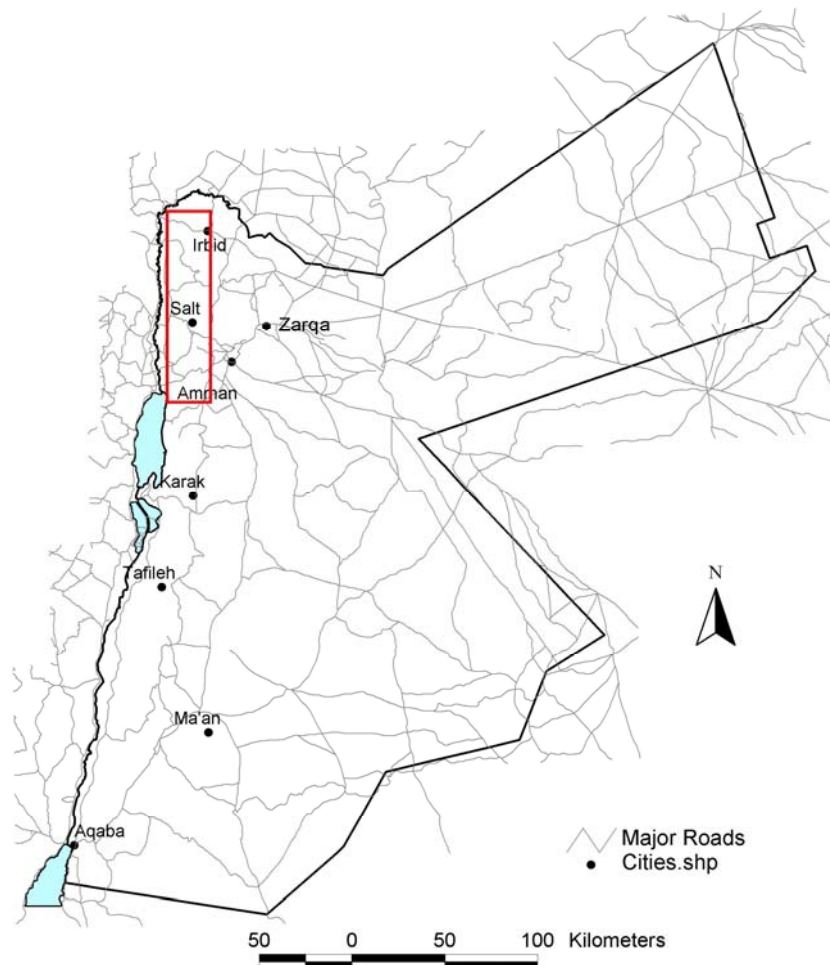
In this study, a total of 227 plant species were recorded in the target areas which includes Salt, Amman, Jarash, Ajloun and Balka which represent Mediterranean phyto-geographical area (Al- Eisawi, 1996) (Map 1). The recorded plant species are reported and identified as medi-

cinal plant out of 670 flowering plant species identified in the same area in Jordan. Recent studies are published on the status of medicinal plants that are used for folk medicine by the local societies (Oran, 2014).

Medicinal plants in Jordan represent 20% of the total flora (Oran et al., 1998). The local Bedouins and villagers know many plant species; 363 species of medicinal vascular plants were recorded in Jordan (Oran et al., 1998).

Previous related studies were done on medicinal plant species in Jordan (Afifi et al., 2000; Abu-Irmaileh et al., 2003; Khalil et al., 1995, 2005; Al- Qura'n, 2009). Several studies were done to examine the different medicinal potentials of medicinal plants in Jordan (Al- Khalil, 1995; Oran et al., 1999; Aburjai, 2000; Elbetiha et al., 2000; Abu-Irmaileh et al., 2003; Aburjai et al., 2007; Alzweri et al., 2011; Issa et al., 2011; Bzour et al., 2011; Qunais et al., 2013; Zeidan et al., 2013). Also morphological,

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Map 1. Jordan map showing the study area.

taxonomic and chemical studies has increased in the last few years (Khatun et al., 2011; Erdogan et al., 2012, 2014; Mert Gönenç et al., 2014; Selvi et al., 2014).

In this study, the status of medicinal plants in the high mountains of northern Jordan was evaluated.

MATERIALS AND METHODS

Plant collections

Plant specimens were sampled from the high mountains of 5 governorates (Amman, Irbid, Ajloun, Balka and Jerash) as shown in Map 1.

Plants classifications

Plants were classified by plant taxonomists (Prof. Sawsan Oran and Prof. Dawud Al- Eisawi, University of Jordan).

Voucher specimens were deposited at the herbarium, AMM at the Department of Biological Sciences, University of Jordan, Amman, Jordan.

A list of the medicinal plants recorded in the study area is tabulated.

RESULTS

A list of medicinal plants is provided in Table 1. Rare plant species are reported and indicated in the list prepared. A map for the study area as well as the location of the study area grids in relation to their governorate is included (Figure 1).

DISCUSSION

It is shown from this study that the diversity of medicinal plants in the study area is relatively high; 227 plant species are recorded. The area surveyed is characterized by its high mountains, high altitudes (900 – 1700 m), and the climatic and the phytogeographical area is the characteristics of the Mediterranean area with rich fertile soil and rainfall. In this study, a total of 71 species were recorded as rare species that reflects the difficult situation

Table 1. The total recorded number of medicinal plants in the study area.

S/N	Name	Family	Recorded
1.	<i>Acanthus syriacus</i>	Acanthaceae	
2.	<i>Achillea aleppica</i>	Asteraceae	
3.	<i>Achillea biebersteinii</i>	Asteraceae	
4.	<i>Achillea santolina</i>	Asteraceae	R
5.	<i>Adiantum capillus-veneris</i>	Adiantaceae	
6.	<i>Adonis aestivalis</i>	Ranunculaceae	
7.	<i>Adonis palaestinus</i>	Ranunculaceae	
8.	<i>Ajuga chia</i>	Lamiaceae	R
9.	<i>Ajuga orientalis</i>	Lamiaceae	
10.	<i>Alcea acaulis</i>	Malvaceae	
11.	<i>Alcea setosa</i>	Malvaceae	R
12.	<i>Alkanna orientalis</i>	Boraginaceae	
13.	<i>Alkanna tinctoria</i>	Boraginaceae	
14.	<i>Allium erdelii</i>	Liliaceae	
15.	<i>Allium neapolitanum</i>	Liliaceae	
16.	<i>Allium orientale</i>	Liliaceae	
17.	<i>Allium pallens</i>	Liliaceae	
18.	<i>Allium stamineum</i>	Liliaceae	
19.	<i>Allium truncatum</i>	Liliaceae	
20.	<i>Amygdalus communis</i>	Rosaceae	
21.	<i>Anagallis arvensis</i>	Primulaceae	
22.	<i>Anchusa aegyptiaca</i>	Boraginaceae	
23.	<i>Anchusa italica</i>	Boraginaceae	
24.	<i>Anchusa strigosa</i>	Boraginaceae	R
25.	<i>Anchusa undulata</i>	Boraginaceae	
26.	<i>Androcymbium palaestinum</i>	Liliaceae	
27.	<i>Anemone coronaria</i>	Ranunculaceae	R
28.	<i>Anthemis bornmuelleri</i>	Asteraceae	R
29.	<i>Anthemis palaestina</i>	Asteraceae	R
30.	<i>Apium graveolens</i>	Apiaceae	
31.	<i>Apium nodiflorum</i>	Apiaceae	
32.	<i>Arbutus andrachne</i>	Ericaceae	
33.	<i>Aristolochia billardieri</i>	Aristolochiaceae	
34.	<i>Aristolochia parvifolia</i>	Aristolochiaceae	
35.	<i>Arum hygrophilum</i>	Araceae	
36.	<i>Arum palaestinum</i>	Araceae	R
37.	<i>Arundo donax</i>	Poaceae	
38.	<i>Asparagus aphylla</i>	Liliaceae	R
39.	<i>Asphodelus aestivus</i>	Liliaceae	R
40.	<i>Astragalus annularis</i>	Fabaceae	
41.	<i>Astragalus beershabensis</i>	Fabaceae	
42.	<i>Astragalus bethlehemiticus</i>	Fabaceae	
43.	<i>Astragalus callichrous</i>	Fabaceae	
44.	<i>Astragalus cruciatus</i>	Fabaceae	
45.	<i>Astragalus deinacanthus</i>	Fabaceae	
46.	<i>Astragalus fruticosus</i>	Fabaceae	
47.	<i>Astragalus oocephalus</i>	Fabaceae	
48.	<i>Astragalus palaestinus</i>	Fabaceae	
49.	<i>Astragalus sanctus</i>	Fabaceae	
50.	<i>Ballota undulata</i>	Lamiaceae	R
51.	<i>Bifora testiculata</i>	Apiaceae	R

Table 1. Contd.

52.	<i>Blepharis ciliaris</i>	Acanthaceae	
53.	<i>Bongardia chrysogonum</i>	Berberidaceae	R
54.	<i>Bryonia cretica</i>	Cucurbitaceae	
55.	<i>Bryonia syriaca</i>	Cucurbitaceae	
56.	<i>Calamintha incana</i>	Lamiaceae	
57.	<i>Calendula palaestina</i>	Asteraceae	
58.	<i>Calendula tripterocarpa</i>	Asteraceae	
59.	<i>Calycotome villosa</i>	Fabaceae	R
60.	<i>Capparis spinosa</i>	Capparaceae	R
61.	<i>Capsella bursa-pastoris</i>	Brassicaceae	
62.	<i>Centaurea iberica</i>	Asteraceae	R
63.	<i>Ceratonia siliqua</i>	Fabaceae	R
64.	<i>Chrysanthemum coronarium</i>	Asteraceae	R
65.	<i>Chrysanthemum segetum</i>	Asteraceae	
66.	<i>Cichorium pumilum</i>	Asteraceae	R
67.	<i>Cistus creticus</i>	Cistaceae	R
68.	<i>Cistus salvifolius</i>	Cistaceae	R
69.	<i>Clematis cirrhosa</i>	Ranunculaceae	
70.	<i>Consolida scleroclada</i>	Ranunculaceae	
71.	<i>Convolvulus scammonia</i>	Convolvulaceae	
72.	<i>Coronilla scorpioides</i>	Fabaceae	
73.	<i>Crataegus aronia</i>	Rosaceae	
74.	<i>Crocus hyemalis</i>	Iridaceae	
75.	<i>Cupressus sempervirens</i>	Cupressaceae	
76.	<i>Cyclamen persicum</i>	Primulaceae	R
77.	<i>Cynodon dactylon</i>	Poaceae	
78.	<i>Cynoglossum creticum</i>	Boraginaceae	
79.	<i>Cyperus longifolium</i>	Cyperaceae	
80.	<i>Daucus carota</i> subsp. <i>maximus</i>	Apiaceae	
81.	<i>Delphinium peregrinum</i>	Ranunculaceae	
82.	<i>Ecballium elaterium</i>	Cucurbitaceae	R
83.	<i>Echinops polyceras</i>	Asteraceae	
84.	<i>Eminium spiculatum</i>	Araceae	R
85.	<i>Ephedra alte</i>	Ephedraceae	R
86.	<i>Ephedra campylopoda</i>	Ephedraceae	R
87.	<i>Epilobium hirsutum</i>	Onagraceae	
88.	<i>Eremostachys laciniata</i>	Lamiaceae	
89.	<i>Erodium acaule</i>	Geraniaceae	
90.	<i>Erodium malacoides</i>	Geraniaceae	
91.	<i>Erodium moschatum</i>	Geraniaceae	
92.	<i>Eruca sativa</i>	Brassicaceae	
93.	<i>Eryngium creticum</i>	Apiaceae	
94.	<i>Eryngium glomeratum</i>	Apiaceae	
95.	<i>Erysimum crassipes</i>	Brassicaceae	
96.	<i>Euphorbia aleppica</i>	Euphorbiaceae	
97.	<i>Euphorbia helioscopia</i>	Euphorbiaceae	
98.	<i>Euphorbia hierosolymitana</i>	Euphorbiaceae	R
99.	<i>Euphorbia macroclada</i>	Euphorbiaceae	
100.	<i>Euphorbia oxyodonta</i>	Euphorbiaceae	
101.	<i>Euphorbia peplis</i>	Euphorbiaceae	
102.	<i>Ficus carica</i>	Moraceae	R
103.	<i>Foeniculum vulgare</i>	Apiaceae	R

Table 1. Contd.

104.	<i>Fumaria densiflora</i>	Fumariaceae	R
105.	<i>Fumaria parviflora</i>	Fumariaceae	R
106.	<i>Galium aparine</i>	Rubiaceae	
107.	<i>Geranium dissectum</i>	Geraniaceae	
108.	<i>Geranium molle</i>	Geraniaceae	
109.	<i>Geranium tuberosum</i>	Geraniaceae	
110.	<i>Glaucium arabicum</i>	Papaveraceae	
111.	<i>Gundelia tournefortii</i>	Asteraceae	
112.	<i>Helichrysum sanguineum</i>	Asteraceae	
113.	<i>Heliotropium europaeum</i>	Boraginaceae	
114.	<i>Herniaria hirsute</i>	Caryophyllaceae	
115.	<i>Hyoscyamus aureus</i>	Solanaceae	
116.	<i>Hypecoum imberbe</i>	Fumariaceae	
117.	<i>Hypericum triquetrifolium</i>	Hypericaceae	
118.	<i>Inula viscosa (Dittrichia viscosa)</i>	Asteraceae	R
119.	<i>Lactuca serriola</i>	Asteraceae	
120.	<i>Lactuca tuberosa</i>	Asteraceae	
121.	<i>Lagoecia cuminoides</i>	Apiaceae	
122.	<i>Lamium amplexicaule</i>	Lamiaceae	
123.	<i>Lamium moschatum</i>	Lamiaceae	
124.	<i>Leontice leontopetalum</i>	Berberidaceae	R
125.	<i>Lonicera etrusca</i>	Caprifoliaceae	R
126.	<i>Mandragora autumnalis</i>	Solanaceae	R
127.	<i>Marrubium vulgare</i>	Lamiaceae	
128.	<i>Matricaria aurea</i>	Asteraceae	R
129.	<i>Medicago sativa</i>	Fabaceae	R
130.	<i>Melilotus indicus</i>	Fabaceae	
131.	<i>Mentha longifolia</i>	Lamiaceae	R
132.	<i>Mercurialis annua</i>	Euphorbiaceae	
133.	<i>Micromeria nervosa</i>	Lamiaceae	R
134.	<i>Myosotis uncatata</i>	Boraginaceae	
135.	<i>Nasturtium officinale</i>	Brassicaceae	
136.	<i>Nepeta curviflora</i>	Lamiaceae	
137.	<i>Nerium oleander</i>	Apocynaceae	R
138.	<i>Neslia apiculata</i>	Brassicaceae	
139.	<i>Nigella ciliaris</i>	Ranunculaceae	
140.	<i>Olea europaea</i>	Oleaceae	R
141.	<i>Ononis natrix</i>	Fabaceae	R
142.	<i>Ononis spinosa subsp. Antiquorum</i>	Fabaceae	
143.	<i>Onopordum alexandrinum</i>	Asteraceae	
144.	<i>Onopordum cynarocephalum</i>	Asteraceae	
145.	<i>Onopordum macrocephalum</i>	Asteraceae	
146.	<i>Ophrys carmeli</i>	Orchidaceae	
147.	<i>Orchis anatolica</i>	Orchidaceae	
148.	<i>Origanum syriacum</i>	Lamiaceae	R
149.	<i>Osyris alba</i>	Santalaceae	
150.	<i>Papaver subpiriforme</i>	Papaveraceae	R
151.	<i>Papaver syriaca</i>	Papaveraceae	
152.	<i>Paronychia argentea</i>	Caryophyllaceae	R
153.	<i>Paronychia sinaica</i>	Caryophyllaceae	
154.	<i>Phagnalon rupestre</i>	Asteraceae	R
155.	<i>Phoenix dactylifera</i>	Palmae	

Table 1. Contd.

156.	<i>Phragmites australis</i>	Poaceae	
157.	<i>Pimpinella cretica</i>	Apiaceae	
158.	<i>Pimpinella eriocarpa</i>	Apiaceae	
159.	<i>Pimpinella olivieri</i>	Apiaceae	
160.	<i>Pimpinella peregrine</i>	Apiaceae	
161.	<i>Pinus halepensis</i>	Pinaceae	
162.	<i>Pistacia atlantica</i>	Anacardiaceae	R
163.	<i>Pistacia palaestina</i>	Anacardiaceae	R
164.	<i>Plantago afra</i>	Plantaginaceae	
165.	<i>Plantago lanceolata</i>	Plantaginaceae	
166.	<i>Plantago major</i>	Plantaginaceae	
167.	<i>Plantago ovata</i>	Plantaginaceae	
168.	<i>Plumbago europaea</i>	Plumbaginaceae	R
169.	<i>Polygonum equisetiforme</i>	Polygonaceae	
170.	<i>Psoralea bituminosa</i>	Fabaceae	
171.	<i>Punica granatum</i>	Punicaceae	R
172.	<i>Quercus coccifera</i>	Fagaceae	R
173.	<i>Ranunculus asiaticus</i>	Ranunculaceae	
174.	<i>Reseda lutea</i>	Resedaceae	R
175.	<i>Retama raetam</i>	Fabaceae	R
176.	<i>Rhus coriaria</i>	Anacardiaceae	R
177.	<i>Rhus tripartite</i>	Anacardiaceae	
178.	<i>Ridolfia segetum</i>	Apiaceae	
179.	<i>Roemeria hybrida</i>	Papaveraceae	
180.	<i>Rubus tomentosus</i>	Rosaceae	
181.	<i>Rumex crispus</i>	Polygonaceae	R
182.	<i>Rumex cyprius</i>	Polygonaceae	R
183.	<i>Rumex pulcher</i>	Polygonaceae	R
184.	<i>Ruta chalepensis</i>	Rutaceae	
185.	<i>Salix acmophylla</i>	Salicaceae	
186.	<i>Salix alba</i>	Salicaceae	R
187.	<i>Salix pseudo-safsaf</i>	Salicaceae	
188.	<i>Salvia dominica</i>	Lamiaceae	
189.	<i>Salvia multicaulis</i>	Lamiaceae	
190.	<i>Salvia triloba</i>	Lamiaceae	R
191.	<i>Sanguisorba minor</i>	Rosaceae	
192.	<i>Sarcopoterium spinosum</i>	Rosaceae	R
193.	<i>Scrophularia xanthoglossa</i>	Scrophulariaceae	R
194.	<i>Scutellaria subvelutina</i>	Lamiaceae	
195.	<i>Scutellaria tomentosa</i>	Lamiaceae	
196.	<i>Sedum nicaeense</i>	Crassulaceae	
197.	<i>Senecio vernalis</i>	Asteraceae	
198.	<i>Silybum marianum</i>	Asteraceae	
199.	<i>Sinapis alba</i>	Brassicaceae	R
200.	<i>Sinapis arvensis</i>	Brassicaceae	R
201.	<i>Smilax aspera</i>	Liliaceae	
202.	<i>Solanum dulcamara</i>	Solanaceae	
203.	<i>Solanum luteum</i>	Solanaceae	
204.	<i>Sonchus oleraceus</i>	Asteraceae	
205.	<i>Stellaria media</i>	Caryophyllaceae	
206.	<i>Styrax officinalis</i>	Styracaceae	
207.	<i>Symphytum palaestinum</i>	Boraginaceae	

Table 1. Contd.

208.	<i>Taraxacum officinale</i>	Asteraceae	
209.	<i>Tetragonolobus palaestinus</i>	Fabaceae	R
210.	<i>Teucrium polium</i>	Lamiaceae	R
211.	<i>Thymus capitatus</i>	Lamiaceae	R
212.	<i>Tordylium aegyptiacum</i>	Apiaceae	R
213.	<i>Trigonella foenum-graecum</i>	Fabaceae	
214.	<i>Tulipa agenensis</i>	Liliaceae	
215.	<i>Typha domingensis</i>	Typhaceae	
216.	<i>Urginea maritime</i>	Liliaceae	
217.	<i>Urtica pullulans</i>	Urticaceae	R
218.	<i>Vaccaria pyramidata</i>	Caryophyllaceae	
219.	<i>Varthemia iphionoides</i>	Asteraceae	R
220.	<i>Verbascum fruticosum</i>	Scrophulariaceae	R
221.	<i>Verbascum sinuatum</i>	Scrophulariaceae	
222.	<i>Veronica anagallis-aquatica</i>	Scrophulariaceae	
223.	<i>Veronica syriaca</i>	Scrophulariaceae	
224.	<i>Vicia sativa</i>	Fabaceae	
225.	<i>Xanthium spinosum</i>	Asteraceae	
226.	<i>Ziziphus lotus</i>	Rhamnaceae	R
227.	<i>Ziziphus nummularia</i>	Rhamnaceae	

R: Rare

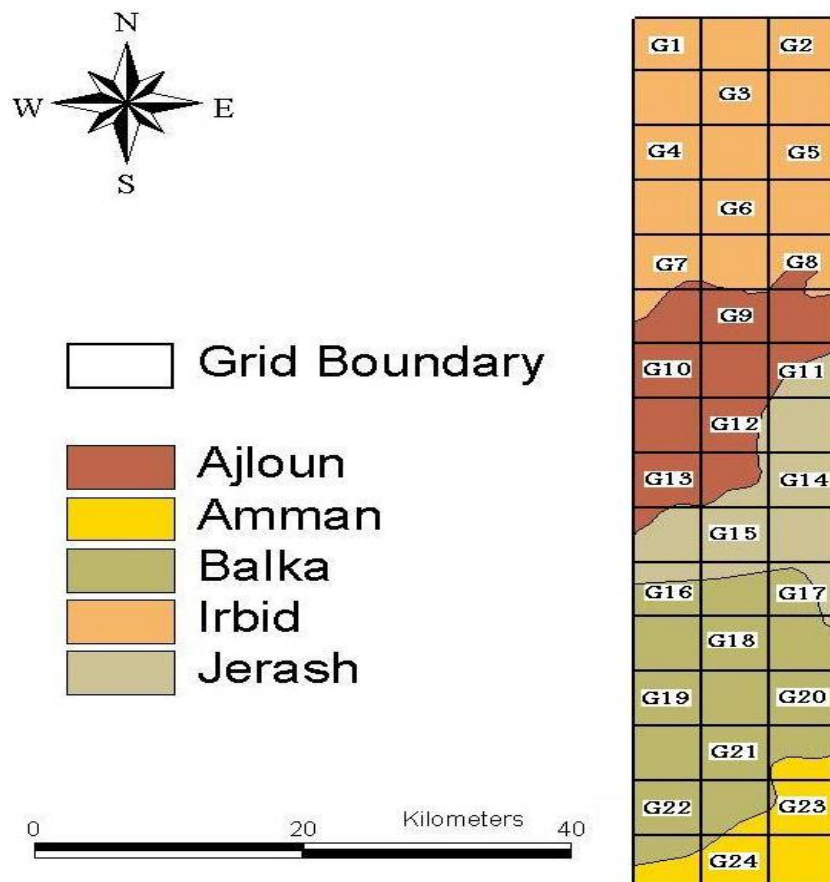


Figure 1. The location of the study area grids in relation to their governorate.

of the survival of many plant species recorded.

Therefore, more efforts are required for the conservation and protection of the medicinal plant species in that rich area; the laws for the conservation of nature are to be seriously enforced.

It was also shown from this study, the use of medicinal herbs in folk medicine which is declining in most of the investigated areas as a result of the following:

1. Degradation of the wild plants resources amongst the medicinal plants.
2. Grazing.
3. Urbanizations.
4. Construction of roads.
5. Forest destructions
6. Lack of elders in most of the study localities, hence the youth comprising the large number of the population from where one could learn about the tradition medicine most.

Finally, collaborative scientific research is needed at local and global level; some of the medicinal plants recorded are rare and threatened wild genetic resources. Priorities in research should be given to those endangered plant species.

Conflict of Interests

The author(s) have not declared any conflict of interests.

ACKNOWLEDGEMENTS

The authors are indebted to the Deanship of Scientific Research at the University of Jordan for their continuous financial support and Miss Asma Bzour for technical assistance.

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