

Ethnobotanical study of medicinal plants of Boyer Ahmad and Dena regions in Kohgiluyeh and Boyer Ahmad province, Iran

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ABSTRACT

Background and aims: The current paper aimed to collect and document the information about medicinal plants of Boyer Ahmad and Dena regions and their applications by indigenous inhabitants.

Methods: The field surveys were carried out from March 2015 to September 2016 under supervision of local people. Collected plant specimens were identified to species level using Flora of Iran and Flora Iranica. Subsequently, information including scientific names, local names, parts used, method of preparation, medicinal effects, growth forms, and chorotypes for 71 species were recorded.

Results: Medicinal plants belonged to 62 genera and 29 families. Apiaceae (14.08%) and Lamiaceae (14.08%) had the most number of species among other families. Based on Raunkier method, hemicryptophytes with 42.25% is the highest growth form and the most common chorotype was Irano-Turanian type (70.42%). The most used parts are aerial parts (40/85%), and the most common mode of preparation was infusion (24%). The results of this study indicate that local people in Boyer Ahmad and Dena regions have used all collected plants for medicinal, food and sanitary purposes and their knowledge about identification of plants and their habitats, medicinal and edible properties is extensive.

Conclusions: Native knowledge leads to obtaining valuable information including medicinal properties of plants, usable parts, time of growth, best time for harvesting and areas which have growing potential. Therefore, it is vital to investigate the native knowledge about medicinal plants in various regions of Iran.

Keywords: Ethnobotanical study, Medicinal plants, Dena and Boyer Ahmad region.

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INTRODUCTION

Most of the information about the usage of medicinal plants is still in the hands of traditional healers and knowledge of healers is either lost or passed to next generation by word of mouth.¹ Therefore, it seems necessary to perform ethnobotanical studies to record all the knowledge about folk medicine practiced among native people.

Ethnobotany deals with the collection of valuable medicinal plants by a group of people and describes their different uses.² Actually, plant biodiversity plays an important role in these aspects. In this regard, collection, identification, and assessment of the diversity of medicinal plants can be beneficial for discovering new drugs.

Having various climate and geographical regions and also different types of mountains, plains, deserts, hills, rivers, and wetlands as well as with 8000 plants species and 1727 endemic species, Iran is considered as one of the ten important sources of plant speciation and a center of valuable medicinal plants in the world.^{3,4} Historical evidences confirm that Iran has the most ancient precedent in using the medicinal plants.⁵ In recent years, traditional use of plants for medical purposes has drawn the attention of researchers in our country as well. Ethnobotanical surveys were conducted in the Turkmen Sahra region for the first time⁶ and more recently in other parts of the country.^{7, 8, 9, 10, 11, 12, 13}

Study of Kuhgiluyeh va Boyer Ahmad region's medicinal plants was conducted by Mosaddegh et al. who identified 138 species of such plants. This province with a long history in traditional medicine has shown to be one of the main centers of production and supply of herbal plants in Iran. The majority of inhabitants of this region are nomadic people moving between warm and cool parts of the province. Because of the historically close

connection between nature and inhabitants of this province, almost all of the families in a certain nomadic population have relatively considerable knowledge about local medicinal plants for treating common health problems.¹²

Therefore, documentation of medicinal plants and their usage by indigenous inhabitants of different cities of this province is an important matter.

The current paper aimed to gather the information about the medicinal plants of Boyer Ahmad and Dena regions and their applications by native inhabitants and traditional practitioners.

METHODS

The regions of Boyer Ahmad and Dena, as parts of Zagros mountains with an area of about 65000 square kilometers, are located between northern latitude 30°40'05" N and eastern longitude 51°35'16" E in the east of Kohgiluyeh va Boyer Ahmad province. Dena with altitude of 4409 m above sea level is the highest peak in this area.

The field surveys were carried out in almost all parts of this region especially Yasuj, Sisakht, Karik, Biare and Dashtak, from March 2015 to September 2016 under supervision of one local person as a native guide with regards to the climate of the region and growing season and habitats of plants using GPS and topographic maps with a focus on collecting ethnopharmacological information from local people especially elderly people, farmers, herbalists, and medicinal herb vendors in different parts of the region.

Interviews were conducted using semi-structured questionnaires and open-ended questions at homes or at medicinal plant stores and finally, 220 questionnaires were filled out by local inhabitants.

On the other hand, collected plants were dried and pressed as herbarium

specimens and deposited at the Herbarium of Agricultural & Natural Resources Research & Education Center, Kohgiluyeh and Boyer-Ahmad Province. Plant specimens were identified to species level using identification keys in Flora of Iran¹⁴ and Flora Iranica.¹⁵ Voucher specimens were labeled and kept in Agricultural & Natural Resources Research & Education Center, Kohgiluyeh and Boyer-Ahmad Province Herbarium for further researches in future.

Then, information including their scientific names, local names, parts used, method of preparation, and medicinal effects were recorded.

RESULTS

In the present study, 71 traditionally used plants in Boyer-Ahmad and Dena regions were recorded (Table 1). A total of 220 interviews with 51 informants aged 28-83 years were done. The documented species corresponded to 62 genera, belonging to 29 families. Apiaceae (14.08%) and Lamiaceae (14.08%) had the highest number of species (Fig. I).

Based on Raunkier method, hemicryptophytes with 42.25% and hydrophytes with 1.41% had the highest and

the lowest growth forms. The most common chorotypes was Irano-Turanian type (70.42%).

Different parts of medicinal plants (roots, leaves, fruits and seeds, intact plant, etc.) were used by the local inhabitants as medicines. The most used parts were aerial parts (40.85%), fruits (11.27%), leaf (9.86%), Flowers (7.04%), root (7.04%), seed (5.63%), bark (4.23%), stem (4.23%), gum (4.23%), bulb (2.82%), latex (1.41%) and gal (1.41%), (Fig. II).

The most common mode of preparation was infusion (24 %), followed by decoction (21%), oral (17%), cooked (13%), powder (12%), edible (9%) and poultice (4%) (Fig. III).

The results obtained from the present study indicated that these medicinal plants were used in the treatment of many diseases particularly digestive system (27%), cold (22%), stomachache (12%), kidney and urogenital disease (8%), gynaecological disease (5%), skin (2%), nervous weakness (2%), diabetes (2%), warts (2%), toothache (1%), and jaundice (1%) and also as an anti-fever (4 %), blood purifier (3%), sedative (3%), hypolipidemic (2%), expectorant (2%), and carminative (2%) (Fig. IV).

Table 1. Recorded plants

No	Family	Scientific name	Local name	Plant part used	Uses	Local uses	Growth form	Chrotyps	Herbarium Number
1	Adiantaceae	<i>Adiantum capillus-veneris</i> L.	Kamar-Aviz	Aerial part	Decoction	Cold, expectorant	HE	M	6196
2	Amaryllidaceae	<i>Allium akaka</i> S.G. Gmel. ex Schult. & Schult. f.	Lepo	Leaf	Cooked, Infusion	Cold, kidney stones	Ge	IT	3079
3	Amaryllidaceae	<i>Allium ampeloprasum</i> L.	Tareh	Leaf	Cooked, Infusion	Cold, infection	Ge	IT	4629
4	Amaryllidaceae	<i>Allium hirtifolium</i> Boiss.	Mosir	Bulb, Leaf	Cooked, Infusion	kidney stones, infection	Ge	IT	5131
5	Amaryllidaceae	<i>Allium jesdianum</i> Boiss. & Buhse	Lizak	Leaf	Cooked, Infusion	Diarrhea, kidney stones, Cold	Ge	IT	3326
6	Anacardiaceae	<i>Pistacia atlantica</i> Desf.	Baneh	Gum, Fruit, Bark	Edible	toothache, joint pains, Diuretic	PH	IT	4666
7	Anacardiaceae	<i>Rhus coriaria</i> L.	Somagh	Fruit	Orally	Diuretic, astringent	PH	IT, M	6200
8	Anacardiaceae	<i>Pistacia khinjuk</i> Stocks	Kolkhong	Fruit	Edible,	tonic, carminative	PH	IT	6020
9	Apiaceae	<i>Chaerophyllum macropodium</i> Boiss.	Garkava, Chelghaba	Aerial part- young stem	Cooked, Infusion	Cold, Stomachic	HE	IT	4449
10	Apiaceae	<i>Echinophora cinerea</i> (Boiss.) Hedge & Lamond	Khari	Leaf, flower	Powdered dry leaves	aromatic , disinfectant, condiment	HE	IT	4507
11	Apiaceae	<i>Eryngium billardierei</i> Heldr. ex Boiss.	kharzul	Root, Young aerial part	Orally	Stomachic, sedative, Diuretic,	HE	IT	6073
12	Apiaceae	<i>Foeniculum vulgare</i> Mill.	Raajuneh	Seed	Infusion	carminative, tonic, Diuretic,	HE	IT, M	4538
13	Apiaceae	<i>Fenilassa-foetida</i> L.	Gane-bu	Gum	Poultice, Infusion	digestive system, Asthma, anti-parasite	HE	IT	4545
14	Apiaceae	<i>Ferula haussknechtii</i> H. Wolff ex Rech. f.	Angiyun	Seed, Stem	Powdered fruits, Infusion	diabetes, carminative, Reducing blood lipid	HE	IT	1325
15	Apiaceae	<i>Ferulago angulata</i> (Schltld.) Boiss.	Chavil	Aerial part	Powdered dry leaves	aromatic , condiment, sedative	HE	IT	5227
16	Apiaceae	<i>Trachyspermum ammi</i> (L.) Sprague	Zenion	Fruit, Seed	Infusion	carminative, sedative	TH	IT	4526
17	Apiaceae	<i>Smyrnium cordifolium</i> Boiss.	Ovandol	Aerial part	Infusion, Orally	kidney stones, Diuretic	HE	IT	4396
18	Apiaceae	<i>Dorema aucheri</i> Boiss.	Bilahr	Aerial part	Edible, Decoction	Stomachache, Constipation, digestive system, Gastroenteritis	PH	IT	4432
19	Araceae	<i>Arum elongatum</i> Steven	Kardeh	Aerial part	Cooked, Decoction	Cold, anti-parasite	Ge	IT	4118
20	Asteraceae	<i>Achillea filipendulina</i> Lam.	Berenjas	Aerial part	Powder and infusion of dried flowers	Menstruation disorders regularization, therapy of. Infections	HE	IT, ES	3091
21	Asteraceae	<i>Matricaria aurea</i> (Loefl.) Sch. Bip.	Babooneh	Flower	Infusion	sedative , skin	TH	IT	3329
22	Asteraceae	<i>Cichorium intybus</i> L.	Kashni	Stem- Leaf- Root	Orally, cooked and taken with yogurt, powdered flower	Sedative , Diuretic, Reducing blood lipid	Ge	ES, M, IT	2611
23	Asteraceae	<i>Gundelia tournefortii</i> L.	Kangar	Root, Seed	Cooked, Infusion	Digestive system, Gastroenteritis	HE	IT-M	4626

24	Asteraceae	<i>Artemisia aucheri</i> Boiss.	Daramah	Aerial part	Decoction	Stomachache	CH	IT	6032
25	Asteraceae	<i>Achillea millefolium</i> L.	Berenjas	Aerial part	Powder and infusion of dried flowers	gynaecological disease, Stomachic, accouchement facilitate	TH	IT	4070
26	Asteraceae	<i>Tanacetum polycephalum</i> Sch. Bip.	Daramah	Flower	Infusion	Stomachache, gynaecological disease	HE	IT-ES	6228
27	Boraginaceae	<i>Anchusa italica</i> Retz.	Gol-e garzon	Flower	Infusion	Coughs, Nervous weakness	TH	IT	3309
28	Brassicaceae	<i>Lepidium draba</i> L.	Sozeh, Macheh	Aerial part	Infusion	Cold, sedative, rheumatism	HE	PL	4086
29	Brassicaceae	<i>Descurainia sophia</i> (L.) Webb ex Prantl	Khakshi- Khakshir	Seed	Decoction	gynaecological disease, Stomachic	TH	ES, M, IT	5121
30	Brassicaceae	<i>Nasturtium officinale</i> W.T. Aiton	Bakalu	Aerial part	Orally	kidney stones	Hyd	IT	5379
31	Elaeagnaceae	<i>Eleagnus angustifolia</i> L.	Senjed	Fruit	Orally	anti-fever, astringent	PH	IT	1358
32	Euphorbiaceae	<i>Euphorbia helioscopia</i> L.	Shirshirok	Latex	Poultice	Warts, Skin rash	HE	IT	2500
33	Fagaceae	<i>Quercus brantii</i> Lindl.	Balii	Gal, Fruit	Edible,	Stomach ulcers, Diarrhea, astringent	PH	IT	1530
34	Fumariceae	<i>Fumaria parviflora</i> Lam.	Shah-Tareh	Aerial part	Infusion	digestive system, jaundice	TH	PL	2681
35	Geraniaceae	<i>Geranium tuberosum</i> L.	Sizan chopan	Aerial part	Decoction	sedative, astringent	GE	IT	1881
36	Hypericaceae	<i>Hypericum perforatum</i> L.	Daruy-e simi, Dava Simi	Aerial part	Infusion	gynaecological disease, disinfectant	HE	ES, M	5850
37	Juglandaceae	<i>Juglans regia</i> L.	Gerdo		Powdered dry leaves	disinfectant	PH	ES-M	1886
38	Lamiaceae	<i>Dracocephalum kotschyi</i> Boiss.	Zerovi	Aerial part	Infusion	rheumatism, Anti cancer	HE	IT	2244
39	Lamiaceae	<i>Mentha longifolia</i> (L.) Huds.	Pihen	Aerial part	Orally, infusion	Stomachache, carminative, joint pains, Diarrhea	Ge	ES, M, IT	2358
40	Lamiaceae	<i>Mentha piperita</i> L.	Nana	Aerial part	Orally, infusion	Stomachache, carminative, digestive system	Ge	ES, M, IT	1362
41	Lamiaceae	<i>Satureja bachtiarica</i> Bunge	Orishom- kohi	Aerial part	Infusion	Cold, sedative,	HE	IT	5317
42	Lamiaceae	<i>Stachys lavandulifolia</i> Vahl	Pashmuk	Aerial part	Infusion	headache, sedative, Migraine	HE	IT	4420
43	Lamiaceae	<i>Stachys pilifera</i> Benth.	Olileh	Aerial part	Infusion	sedative, Women infertility	HE	IT	1966
44	Lamiaceae	<i>Teucrium polium</i> L.	Halpeh	Aerial part	Decoction, infusion, cooked aerial part	Hypertension, diabetes, Reducing blood lipid	HE	PL	5880
45	Lamiaceae	<i>Thymus daenensis</i> Celak.	Orishom- Sarhadi	Aerial part	Infusion	Cold, Coughs, expectorant,	CH	IT	6093
46	Lamiaceae	<i>Ziziphora clinopodioides</i> Lam.	Pihene- kohi	Aerial part	Infusion	Cold, sedative	CH	IT	2177
47	Lamiaceae	<i>Salvia sclarea</i> L.	Marvareshk	Seed, Aerial part	Infusion,	Cold, disinfectant	HE	IT	3418
48	Liliaceae	<i>Fritillaria imperialis</i> L.	Gol-e Negin	Bulb	Powdered dry bulbs	toothache, sedative,	Ge	IT	3167
49	Linaceae	<i>Linum album</i> Boiss.	Barzak	Aerial part	Infusion	Stomach ulcers, purgative	TH	IT, M, SS	6003
50	Malvaceae	<i>Alcea hohenackeri</i> Boiss.	Gol-e gakheiru	Flower	Infusion	Cold, Infection of urinary system, angina	HE	IT	6023
51	Fabaceae	<i>Alhagi persarum</i> Boiss. & Buhse	Khar Oshtor	Aerial part	Decoction	kidney stones, sedative	TH	IT	5786
52	Fabaceae	<i>Astragalus gossypinus</i> Fisch.	Gineh	Gum	Infusion	toothache, Constipation,	CH	IT	4326
53	Fabaceae	<i>Glycyrrhiza glabra</i> L.	Bale	Root	Decoction	Cold, Stomach ulcers	HE	IT	2317

54	Fabaceae	<i>Trigonella foenum-graecum</i> L.	Shamliyah	Seed, Laef	Decoction	Reducing blood lipid and sugar	TH	IT	2644
55	Plantaginaceae	<i>Plantago lanceolata</i> L.	Barhang	Seed	Infusion	respiratory problems, infection	HE	ES,M,IT	3058
56	Polygonaceae	<i>Reum ribes</i> L.	Rivas	Aerial part	Orally	diabetes, blood purifier, Reducing blood lipid	HE	IT	2412
57	Polygonaceae	<i>Rumex acetosa</i> L.	Torshok	Leaf	Orally	kidney stones, Diarrhea	HE	IT	3397
58	Ranunculaceae	<i>Nigella sativa</i> L.	Siahdoneh	Seed	Infusion	Coughs, diabetes, Reducing blood lipid	TH	IT	4406
59	Rosaceae	<i>Amygdalus scoparia</i> Spach	Badoum	Gum, fruit	Orally, infusion	gynecological disease, Tonic	PH	IT	6222
60	Rosaceae	<i>Cotoneaster</i> spp.	Shirkhesht	Fruit- munn	Orally	jaundice, Constipation	PH	IT	4946
61	Rosaceae	<i>Crataegus oxyacantha</i> L.	Siseh	fruit, flower	Orally, Infusion	Anemia, blood purifier	PH	ES	5083
62	Rosaceae	<i>Rosa canina</i> L.	Lili soru	Fruit, Flower	Decoction, Orally	Reducing blood lipid	PH	ES	4550
63	Rosaceae	<i>Rosa damascena</i> Mill.	Gol-e Bosoni	Flower	Orally	Constipation	PH	IT	4093
64	Rosaceae	<i>Rubus sanctus</i> Kuntze	Timare	Fruit, Leaf	Orally	jaundice	PH	ES,M	3924
65	Salicaceae	<i>Salix excelsa</i> S.G. Gmel.	Bii	Aerial part	Orally	jaundice, Anti-fever	PH	IT	2374
66	Scrophulariaceae	<i>Verbascum songanicum</i> Schrenk ex Fisch. & C.A. Mey.	Zarmi	Aerial part	Decoction	Expectorant, ulcer conglutinative	HE	IT-ES	3907
67	Scrophulariaceae	<i>Verbascum cheiranthifolium</i> Boiss.	Zahmahi	Aerial part	Decoction	disinfectant, respiratory problems, ulcer conglutinative	HE	IT	3452
68	Thymelaeaceae	<i>Daphne mucronata</i> Royle	Kheveshk, Kheshk	Leaf, Fruit, Bark	liniment, decoction	Warts, Skin rash	PH	IT	6035
69	Valerianaceae	<i>Valeriana sisymbriifolia</i> Vahl	Sonbol altib	Root	Decoction	sedative, carminative, digestive system	HE	IT	5773
70	Violaceae	<i>Viola tricolor</i> L.	Gole- Sarbanfshe	Root, Leaf	Infusion	Diarrhea, Diuretic	HE	IT	5086
71	Zygophyllaceae	<i>Peganum harmala</i> L.	Dinesht	Fruit	Infusion	disinfectant, respiratory problems	TH	IT	4633

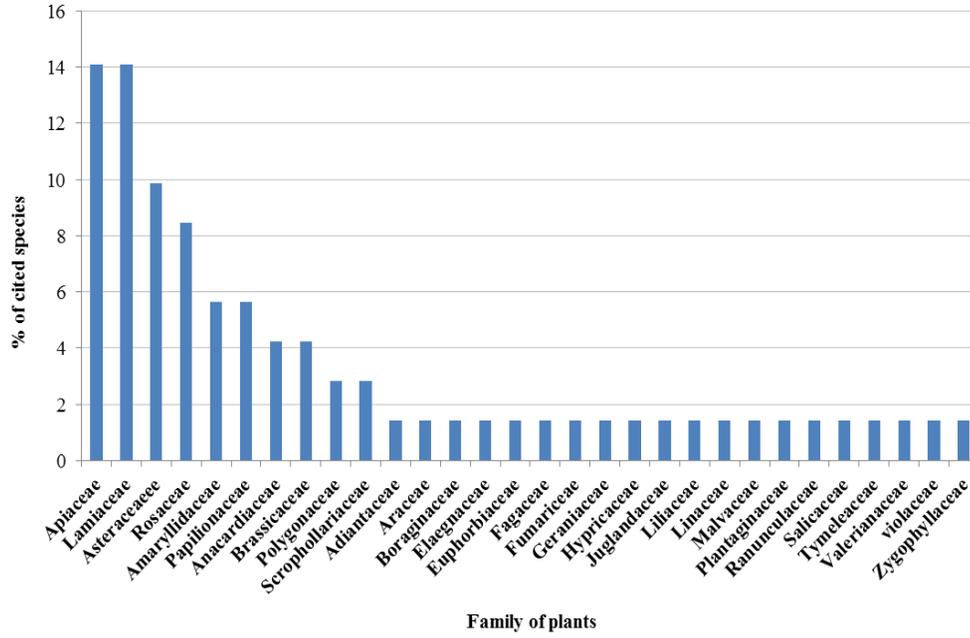


Figure I: Plant families with the highest number of cited species.

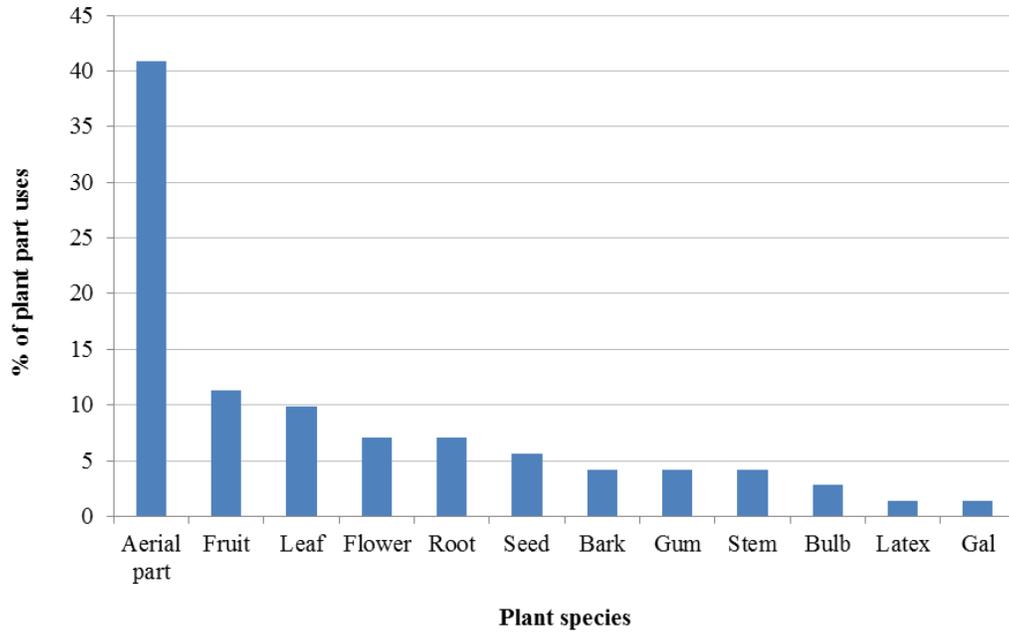


Figure. II: Percentage of used plant parts.

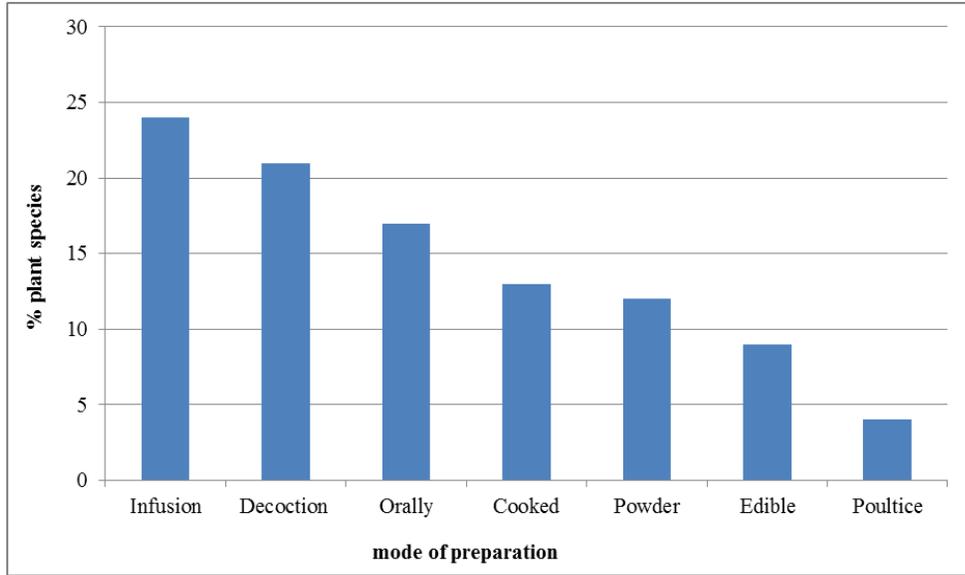


Figure III: Mode of preparation.

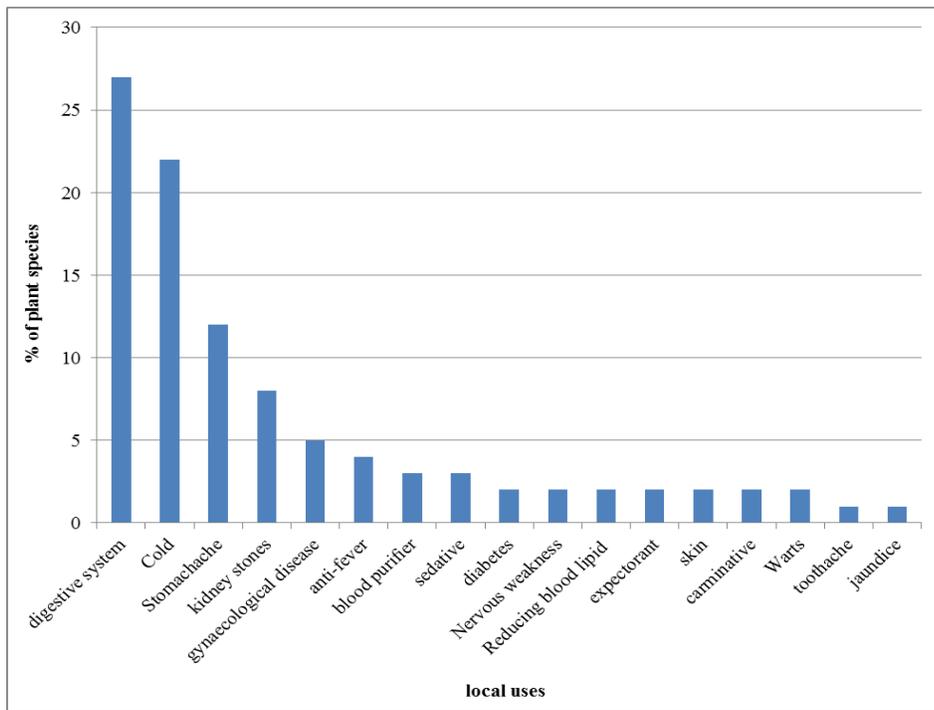


Figure. IV: Local uses of plant species.

DISCUSSION

Various geographical conditions of Iran and different ecosystems on the one hand and the ancient Iranian culture on the other hand have provided noteworthy knowledge about traditional botany and the properties of each plant species.

In this paper, efforts have been made to document the traditional knowledge about important medicinal plants of Boyer Ahmad and Dena regions. The presence of 71 medicinal plants indicates high biodiversity of medicinal plants in the region. The highest number of species belonged to the Apiaceae and Lamiaceae families. It might be due to adaptation of these families with climate and other topographical conditions and is generally related to the inhabitants' accessibility to these families in this region. The abundance of hemicryptophytes in the region is due to cold and mountainous climate and the compatibility of this life form with dry season in summer and the lack of precipitation, leading to the most resistant and permanent life form. This area belongs to Irano-Turanian region in southwest of Iran. The lower percentage of other chorotypes is due to its remoteness from other vegetative areas. On the other hand, the dominance of endemic medicinal plants indicated the high increase of the altitude ranges in this area. The most used parts were aerial parts and the reason why leaves and aerial parts were mostly used could be that they were easily accessible and were active in photosynthesis and production of metabolites. The most common mode of preparation was infusion, because it is often mentioned as one of the easiest ways of extraction among local people in most regions in Iran. The abundance of herbs use via gastrointestinal route in our study is similar to some previous studies in Iran (Mosaddegh et al., 2012, Moein et al., 2015).

It is concluded that Boyer Ahmad and

Dena regions have good ethnobotanical potentials for medicinal plants and all of the plants found in this study are most favorable to the local people and their knowledge about identification of plants and their habitats and medicinal and edible properties are extensive. Therefore, it is a suitable place for further ethnobotanical and ethnopharmacological studies and native knowledge leads to obtaining valuable information including medicinal properties of plants, usable parts, time of growth, best time for harvesting and areas which have growing potential.

In this paper, we focused mainly on species by medicinal uses, but some species had other uses such as food, food additives, producing color, and other uses. For example, leaves and fruits of 10 species consisting of *Pistacia atlantica*, *Pistacia khinjuk*, *Eleagnus angustifolia*, *Cichorium intybus*, *Gundelia tournefortii*, *Juglans regia*, *Trigonella foenum-graecum*, and *Crataegus oxyacantha* were used as raw or cooked food.

Our results indicated that medicinal species such as *Thymus daenensis*, *Dorema aucheri*, *Artemisia aucheri* and *Achilla millefolium* were mentioned by many informants. Some species such as *Dorema aucheri*, *Fritillaria imperialis* L., *Allium ampeloprasum*, *Allium hirtifolium*, *Allium Akaka* and *Allium jesdianum* have been endangered by herbalists and traders as they hire the local people for gathering these species due to the economic purposes some species such as: *Allium hirtifolium*, *Echinophora cinerea*, *Ferulago angulate*, *Dorema aucheri*, *Arum elongatum*, *Anchusa italic*, *Nasturtium officinalis*, *Mentha longifolia*, *Satureja bachtiarica*, *Stachys pilifera*, *Thymus daenensis* and *Linum album* are endemic plants in this region. Many of these plants are potentially endangered and vulnerable taxa. Most of the species were used for feeding animals in this region.

Overgrazing is increasingly threatening the endangered medicinal plants in these regions. Therefore, Special attention should be paid to protect these species of this region. Harvesting of roots, bulbs, and flowers, which are essential to the survival of the plants, often lead to vanishing these plants. In addition, local people sometimes sell these medicinal plants in the local market for their life expenses. So, the domestication of these plants is a need for conservations. However, in recent years, aridity and low precipitation have damaged the vegetation in this region.

In addition to the ethnobotanical aspects of this study, the effectiveness of unexamined plants can be evaluated according to the informant's claims to seek for a new drug and it may be a useful way to search for new drugs as well as to keep the ethnopharmacological information alive. Therefore, it is vital to investigate the native knowledge about medicinal plants in various regions of Iran. Otherwise, an important part of the country's natural reserve, which future generations depend directly or indirectly on, may be ignored or forgotten. Identification of plants in each province helps in better identification of restorable natural resources and characteristics and applications of the medicinal plants.

CONCLUSIONS

The results of this study indicate that local people in Boyer Ahmad and Dena regions have used all collected plants for medicinal, food and sanitary purposes and their knowledge about identification of plants and their habitats, medicinal and edible properties is extensive.

As a result of the rich flora of this region, medicinal plants are the most important means of health care. Due to the lack of modern medicine, difficult geography of the district as well as traditional culture cured by plants, serves as

a usual way in this region particularly in elders. So, traditional usage of medicinal plants is more accepted among people of the area. Further studies may be more effective from pharmacological view of point.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest. The authors alone are responsible for the content of the paper.

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