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An ethnobotanical survey on some areas of northwest of Isfahan province, Iran

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Abstract

AN ETHNOBOTANICAL SURVEY ON SOME AREAS OF NORTHWEST OF ISFAHAN PROVINCE, IRAN.— Iran is one of the countries which enormously used medicinal plants from the ancient times. In this study, we documented the ethnobotanical data of Golpayegan, and Shahin Shahr and Meymeh counties (Isfahan province) for the first time in Iran. Field study and plant collecting were done in different seasons in 2016–2017. Ethnobotanical data were analyzed using information of questionnaires gained from 27 inhabitants. Totally, 48 plants of 24 families were recorded from studied areas. Asteraceae (36%) and Lamiaceae (23%) are those containing the biggest numbers of cited plants. Moreover, leaves (45.83%) and seeds (18.75%) were the most used parts. This study indicated the importance of useful plants of studied areas and the necessity of doing this kind of research on other parts of country in order to preserve this valuable information of local inhabitants.

Key words: ethnobotany; Iran; Isfahan province.

Resumen

ESTUDIO ETNOBOTÁNICO DE ÁREAS DEL NOROESTE DE LA PROVINCIA DE ISFAHAN, IRÁN.— Irán es un país que ha utilizado de manera destacada las plantas medicinales desde la antigüedad. En este estudio, documentamos los datos etnobotánicos de los condados de Golpayegan, Shahin Shahr y Meymeh (provincia de Isfahán) por primera vez en Irán. El estudio de campo y la recolección de plantas se realizaron en diferentes temporadas en 2016 y 2017. Los datos etnobotánicos se analizaron utilizando información proveniente de cuestionarios realizados a 27 informantes. En total, se registraron 48 plantas de 24 familias de las áreas estudiadas. Las familias *Asteraceae* (36%) y *Lamiaceae* (23%) son las que contienen un mayor número de plantas citadas. Las hojas (45,83%) y las semillas (18,75%) son las partes de planta más utilizadas. Este estudio indica la importancia de las plantas útiles de las áreas estudiadas y la necesidad de realizar este tipo de investigación en otras partes del país con el fin de preservar esta valiosa información de los habitantes locales.

Palabras clave: etnobotánica; Irán; provincia de Isfahán.

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INTRODUCTION

Awareness about the plants as the sources of medicine dates back to many centuries ago (Stojanoski, 1999; Namsa *et al.*, 2011). Since the ancient time, man has used plants to cure his illnesses or the animal's disease. Nowadays, the use of medicinal plants has been considerably increased in the world due to their low cost, availability, and effectiveness (WHO, 2007).

Ethnobotany is regarded as the study of relationship between plants and humans. This study involved different fields such as environmental history, cultural and political ecology, anthropology, geography and environmental ethics, which can be linked to taxonomy, ecology, nutrition, palynology, conservation biology and pharmacognosy (Nolan & Turner, 2011). In addition, ethnobotanical studies are not restricted to distant places or diverse cultures when people have some information about the plants. This information contains the use of plants as food, medicine, shade, fiber, dye, detergent material, fuel and ornaments. Most of the studies related to ethnobotany require fieldwork and collaborating with local inhabitants (Nolan & Turner, 2011).

Further, the documentation of ethnobotanical information related to local people and folk healers can save these traditions from extinction and help protect natural habitats if the community is informed about the results of ethnobotanical studies, as well as the habitat condition (Khoshbakht & Hammer, 2006).

Iran includes a rich plant resource with approximately 8000 species, among which about 875 species are known as medicinal herbs (Eftekhari & Ramezani, 2004). The plants have been used in different varieties by people, among which some such as peppermint (*Mentha × piperita* L.) and thyme (*Thymus vulgaris* L.) are commonly used as home remedies while some are prescribed and sold by traditional healers (Mozaffarian, 2015).

The residents in different parts of Iran are using various plants for their treatment and pain relief. In this regard, different ethnobotanical studies were conducted in some parts of the country or on special diseases although some parts have not been studied yet due to the vast area (Zargari, 1989–1992; Ghorbani, 2005; Mirdeilami *et al.*, 2011; Mosaddegh *et al.*, 2012; Amiri & Joharchi, 2013; Safa *et al.*, 2013; Azizi & Keshavarzi, 2015).

In addition, few ethnobotanical studies have been done in spite of the diversity of medicinal herbs and the extent of Isfahan province (Sajadi & Ghanbari, 2011; Abbasi *et al.*, 2012; Mardani-nejad & Vazirpour, 2012). Thus, the present study aimed to collect ethnobotanical information in Golpayegan county and Shahin Shahr and Meymeh county to enhance the related information about the useful plants of those areas.

MATERIALS AND METHODS

An ethnobotanical survey was conducted in Isfahan province with the elevation range between 1700 to 2300 m, 28 °C mean annual temperature, and 300 mm annual rainfall. Isfahan province is situated in the central part of Iran with a population of 5.121 million, based on the 2016 census. This province is a part of Irano-Turanian phytogeographic region, which is located between the Zagros mountain range and the Kavir desert, which involves 107,029 km² areas with an average elevation of 1600 m. The Zagros mountain chain resides in the western borders of the province. Dalankuh, Darrabid, and Karkas are considered as the major mountains of Isfahan province with the highest peak of 3915 m above the sea level. The Karkas range divides the province into two distinct topographic and climatic areas including the more temperate western and the arid eastern regions. The ethnobotanical information was collected from five villages selected randomly. The villages were located in the north of Golpayegan county and west of Shahin Shahr and Meymeh county (Fig. 1 and Table 1).

Shahin Shahr and Meymeh county have an arid-cold climate with the annual rainfall of 160.5 mm. The typical vegetation of this area includes *Artemisia sieberi* Besser, *Acantholimon scorpius* (Jaub. & Spach) Boiss., *Astragalus verus* Olivier, *Stipa hohenackeriana* Trin. & Rupr., *Zygophyllum atriplicoides* Fisch. & C. A. Mey., *Atriplex verrucifera* M. Bieb., *Halocnemum strobilaceum* (Pall.) M. Bieb., *Stachys inflata* Benth., *Peganum harmala* L., *Hertia angustifolia* (DC.) Kuntze and *Scariosa orientalis* (Boiss.) Soják. Furthermore, *Amygdalus scoparia* Spach is found in some high altitudes (Feizi *et al.*, 2017).

Golpayegan has a moderate semi-arid climate and 263.2 mm annual rainfall with the typical

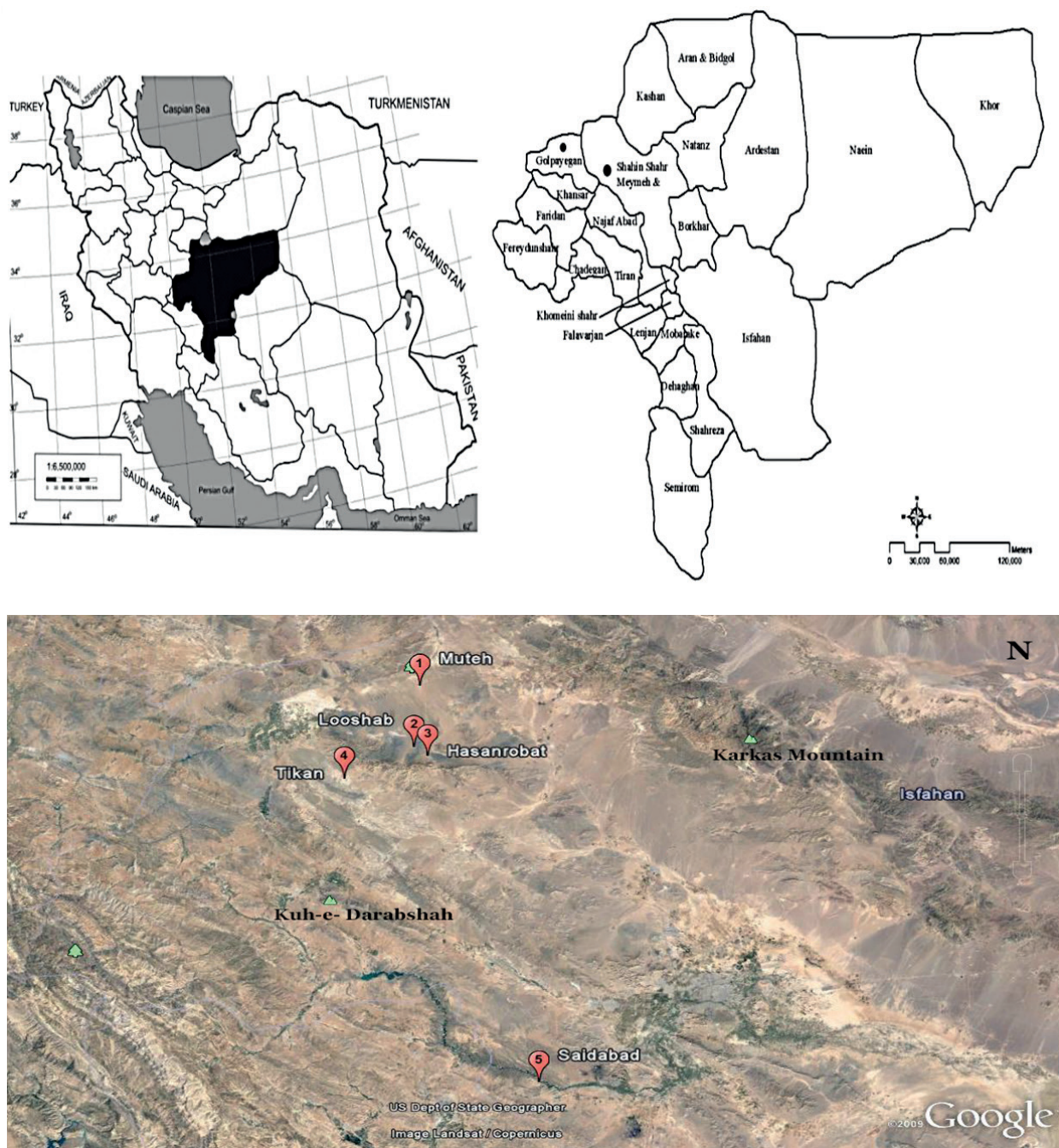


Figure 1. Map of the studied areas in Isfahan province (Image adapted from Google Earth).

vegetation of *Artemisia aucheri* Boiss., *Artemisia sieberi* Besser, *Astragalus verus* Olivier, *Astragalus gossypinus* Fisch., *Stipa hohenackeriana* Trin. & Rupr. and *Cousinia cylindracea* Boiss. (Feizi *et al.*, 2017).

Different ethnic groups are living in different parts of Iran like Kurds, Turkmens, Lurs, etc. although the inhabitants in these villages are not related to any definite ethnic group. Some immigrated

from Khorasan province during 18th century and they are residing in those villages now (Savina, 1980). They speak Persian language although there are some local accents. Further, most of the inhabitants are farmers and stockholders.

In order to collect the related information, traditional healers and knowledgeable people known by local communities were interviewed. Snowball sampling technique was used for selecting the

Table 1. Locations detail of present study.

Village	Altitude (m)	Coordinates	County	Inhabitants	Number of interviewees
Muteh	1915	33° 37' 33" N, 50° 47' 13" E	Shahin Shahr & Meymeh	898	5
Looshab	1780	33° 26' 08" N, 50° 46' 05" E	Shahin Shahr & Meymeh	305	9
Hasanrobat	2285	33° 24' 25" N, 50° 48' 37" E	Shahin Shahr & Meymeh	1700	7
Tikan	2018	33° 20' 20" N, 50° 33' 20" E	Golpayegan	230	3
Saidabad	1777	32° 23' 48" N, 51° 08' 37" E	Golpayegan	1629	3

participants (Albuquerque *et al.*, 2014). Totally, 27 inhabitants (female = 17; male = 10), aged 33–95 years, were selected. As the people in Tikan and Saidabad villages spoke Persian with Golpayegani accent, two local people accompanied us as native translators during the interviews. Prior to the interview, all of the participants were invited to take part in the project and were informed about the objective so they took part in the interview with satisfaction.

As some were uneducated, the questionnaires were filled by the researchers. The questionnaire included some information related to age, gender, degree of education, local plant names, the plant parts used, uses/ailments treated (Appendix). Each participant was interviewed only once.

In order to identify the plants referred by the participants, they were asked to accompany the researchers to show the plants. However, they were asked to give the address of the mentioned plants when it was impossible due to the distance or old age. Field study and plant collection were done in the spring, summer and autumn in order to assign the exact scientific name of plants during 2016–2017. Further, the plant specimens were determined by using *Flora Iranica* (Rechinger, 1965–2008) and *Flora of Iran* (Assadi, 1988–2010). Voucher specimens were deposited in the herbarium of Alzahra University (ALUH).

The ethnobotanical data were analyzed using Microsoft Excel 2013 software. Table 2 indicates the complete information on the useful plants in the studied areas. Family, scientific name, vernacular name (in Persian language with Golpayegani accent), parts of the plants used, preparation and medicinal effects or edible use were explained.

The number of the uses reported for each plant (NU) were calculated and the frequency of citation (FC) was divided by the total number of informants

(N) to provide the relative frequency consensus (RFC, Tardío & Pardo-de-Santayana, 2008); RFC = 1 shows that all participants mentioned the plant as useful.

RESULTS AND DISCUSSION

General results

In the present study, 48 plants, which were traditionally used (i.e. it is used since ancient times), were recorded (Table 2). Asteraceae and Lamiaceae (36% and 23%, respectively) were considered as the most used families followed by Apiaceae and Fabaceae while other families were less used (9%) (Fig. 2).

The most used parts of these plants were leaf (45.83%), seed (18.75%), and aerial parts (12.50%). Further, other parts of plants were used by the locals less than 10% (Fig. 3).

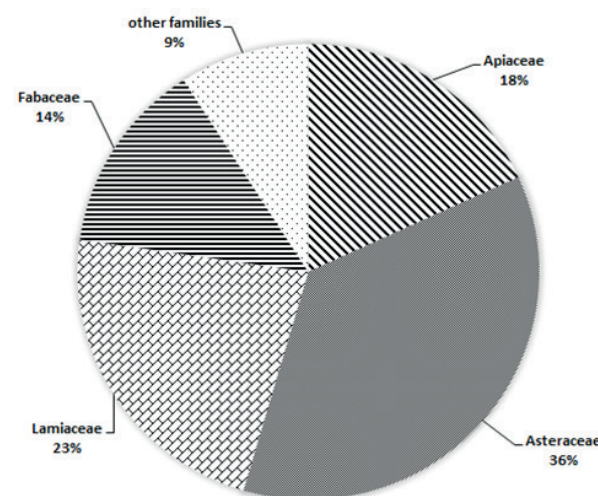


Figure 2. Percentage of families with medicinal importance in the studied area.

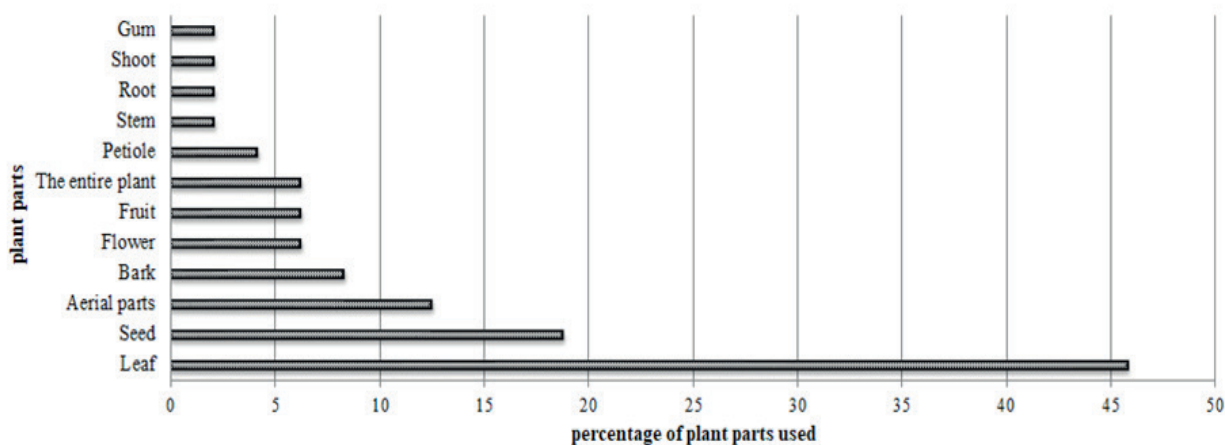


Figure 3. Percentage of plant parts used in the studied area.

All informants mentioned *Tripleurospermum disciforme* (C. A. Mey.) Sch. Bip., *Descurainia sophia* (L.) Webb ex Prantl, *Astragalus gossypinus*, *Stachys lavandulifolia* Vahl, *Hordeum vulgare* L. and *Peganum harmala*, which indicated the highest value of RFC while the lowest value of same index was reported for *Juglans regia* L., *Cynodon dactylon* (L.) Pers. and *Diarthron lessertii* (Wikstr.) Kit Tan.

Medicinal plants

In the studied area, the plants were mostly used by the locals for digestive system problems (25%, 12 plants), sore throat (12.5%, 6 plants), and temperature regulator (10.41%, 5 plants).

Tripleurospermum disciforme, *Descurainia sophia*, *Astragalus gossypinus*, *Stachys lavandulifolia*, and *Peganum harmala* were considered as the most popular medicinal plants known by the locals.

Tripleurospermum disciforme has flavonoids, terpenoids and tannins, which claimed to have antibacterial activities and are effective on gastric ulcer (Minaiyan *et al.*, 2006; Chehregani *et al.*, 2010; Mandegary *et al.*, 2014).

Aerial parts of *Descurainia sophia* have different kinds of amino acids, fatty acids and hydrocarbons (Khan & Wang, 2012). Further, anti-inflammatory, antipyretic, and analgesic activities were recorded for this plant (Nimrouzi & Zarshenas, 2016).

Astragalus gossypinus has flavonoids and polysaccharides (Asgari Nematian *et al.*, 2008; Alijani *et al.*, 2011). The roots of different species in *Astragalus* were used to treat nephritis, diabetes,

and some kinds of cancers (Asgari Nematian *et al.*, 2008).

Stachys lavandulifolia consist of various phenolic compounds and essential oils (Ghasemi Pirbalouti & Mohammadi, 2013; Rahimi Khoigani *et al.*, 2017), which claimed to have antibacterial activities and can be effective in primary dysmenorrheal and gastric disorders (Nabavizadeh *et al.*, 2011; Fooladvand & Fazeli-nasab, 2014).

The seeds in *Peganum harmala* are rich in alkaloids such as harmine, harmaline and harmalol both quantitatively and qualitatively so that they can have remarkably antifungal and antibacterial activities (Zargari, 1989–1992; Benbott *et al.*, 2013; Behidj-Benyounes *et al.*, 2014).

Edible plants

Some plants were used in local cuisines although most of the cited plants were used medicinally. Further, leaves of *Falcaria vulgaris* Bernh., *Lepidium draba* L. and *Silene conoidea* L. and young bark of *Eryngium bungei* Boiss. were used in local foods.

Locals consume some plants like *Crepis sancta* (L.) Bornm., *Lactuca undulata* Ledeb., *Tragopogon graminifolius* DC., *Alhagi persarum* Boiss & Buhse and *Papaver bornmuelleri* Fedde as temperature regulators, since the areas under study have hot summer.

Other uses

As for non-medicinal and non-food uses, the seeds of *Rubia tinctorum* L. have been used in painting

carpet yams and textures from ancient times in the studied areas. After decocting the seeds, the solution was liquidized and the yams or textures were boiled within solution until they colored red. *Eremurus persicus* (Jaub. & Spach) Boiss. has been extensively used for non-medicinal purpose. The juice of fresh root was extracted and used as glue. Leaf of *Juglans regia* is used as cockroach killer liquid in toilet. Then, the solution was liquidized and poured on toilet well after decocting the leaves and making a thick liquid. Stems of *Zygophyllum atriplicoides* were burnt as fuel in an outdoor fireplace and its smoke was gathered, dried and used as kohl.

Plants with side effects

Long time application of *Tripleurospermum disciforme* may cause constipation. High consumption of *Gundelia tournefortii* can lead to diarrhea. Women do not use *Cichorium intybus* L., *Tripleurospermum disciforme* and *Pimpinella anisum* L. during pregnancy because of possible danger of these plants for their fetuses.

Limitation of the study

In the present study, only 48 plants were reported as most of interviewees were too old and they could not remember all the useful plants used with details; although there were some other plants, the names of which were disregarded. In addition, some old inhabitants who were well-informed, refused to participate the survey, which is regarded as a serious problem leading to the disappearance of valuable information as it was explained by some authors in other parts of Iran (Ghorbani, 2005; Mosaddegh *et al.*, 2012). Finally, some traditional medicines made by traditional healers from local plants were considered as a source of income. Therefore, they failed to provide accessibility to the secret formulas of these kinds of mixture.

CONCLUDING REMARKS

In the present paper, the first ethnobotanical survey of Golpayegan, and Shahin Shahr and Meymech counties was reported. Asteraceae and Lamiaceae are regarded as the families mostly used by locals.

The results were in consistent with those in the previous studies from Isfahan province and other parts of the country (Ghorbani, 2005; Abbasi *et al.*, 2012; Mosaddegh *et al.*, 2012). Further, leaf, seed, and aerial parts are the most commonly used parts in studied areas, which were in line with the studies on west and north-western Iran (Miraldi *et al.*, 2001; Mosaddegh *et al.*, 2012). Based on the results, medicinal plants were the category with the greatest number of uses and plants for digestive disorders were the most reported in this category. Similar results were obtained in other parts of Iran (Miraldi *et al.*, 2001; Ghorbani, 2005; Mosaddegh *et al.*, 2012).

Nowadays, the migration of locals to nearby cities has increased due to the climate change in recent decades and more droughts. Most of the young locals are living in urban areas, which results in destroying the chain of ethnobotanical data transition from traditional healers to youngsters. It seems that some of the valuable information is being disappeared as it is the case in the area under study (Mirdeilami *et al.*, 2011; Moein *et al.*, 2015).

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Table 2. List of plant studied and their uses (* shows the medicinal use of plants for animals). Vernacular names are in Persian language, with Golpayegani accent. FC: frequency of citation; RFC: relative frequency consensus; NU: number of uses reported.

Voucher no.	Family	Scientific name	Vernacular name	Part used	Preparation	Medicinal use	Edible / non-medicinal use	FC	RFC	NU
et 18	Amaranthaceae	<i>Anabasis haussknechtii</i> Bunge ex Boiss.	Ordolok	Aerial parts	Decoction	For sheep tinea*	–	17	0.630	1
et 1	Amaranthaceae	<i>Chenopodium album</i> L.	Salmakeh	Leaf	Decoction	Sore throat	As an ingredient in local foods	22	0.814	2
et 19	Amaranthaceae	<i>Salsola kali</i> L.	Alaf shoor	Young aerial parts	Cooked	Used with yogurt for heat exhaustion	–	17	0.630	1
et 2	Apiaceae	<i>Anethum graveolens</i> L.	Shevid	Seed	Powdered	Cramps	As an ingredient in local foods	18	0.667	1
et 3	Apiaceae	<i>Eryngium bungei</i> Boiss.	Zool	Young bark	–	–	As an ingredient in local foods	13	0.481	1
et 4	Apiaceae	<i>Falcaria vulgaris</i> Bernh.	Panje kalagh	Young leaf	–	–	As an ingredient in local potage/ eaten with omelet	25	0.926	1
et 5	Apiaceae	<i>Pimpinella anisum</i> L.	Badian	Seed/ leaf	Powdered	Flatus	–	16	0.592	1
et 6	Asphodelaceae	<i>Eremurus persicus</i> (Jaub. & Spach) Boiss.	Sirish	Root	Raw	–	Root juice is used as glue	20	0.741	1
et 7	Asteraceae	<i>Cichorium intybus</i> L.	Kasni	Whole plant	Decoction	Diuretic/ Detoxifies of body/ relieves itching	–	23	0.851	3
et 8	Asteraceae	<i>Crepis sancta</i> (L.) Bomm.	Alaf shirinak	Young leaf	–	Temperature regulator	Eaten with vinegar as temperature regulator	19	0.704	1
et 9	Asteraceae	<i>Gundelia tournefortii</i> L.	Kangar	Petiole	Cooked	Antiseptic/ treatment of intestinal worm	As an ingredient in local foods	25	0.926	2
et 10	Asteraceae	<i>Lactuca undulata</i> Ledeb.	Hovveh	Young leaf	Raw	Temperature regulator/ fungicide agent in yogurt water skin	Eaten as temperature regulator	21	0.778	2
et 11	Asteraceae	<i>Launaea acanthodes</i> (Boiss.) Kuntze	Alk	Young bark	–	–	Chewing as gum	18	0.667	1
et 12	Asteraceae	<i>Artemisia herba-alba</i> Asso	Terkh	Leaf	Herbal tea	Flatus	–	20	0.741	1
et 13	Asteraceae	<i>Tragopogon graminifolius</i> DC.	Shengeh	Aerial parts	Raw eaten	Kidney stone	Eaten with vinegar as temperature regulator	21	0.778	2

Table 2. (cont.). List of plant studied and their uses (* shows the medicinal use of plants for animals). Vernacular names are in Persian language, with Golpayegani accent. FC: frequency of citation; RFC: relative frequency consensus; NU: number of uses reported.

Voucher no.	Family	Scientific name	Vernacular name	Part used	Preparation	Medicinal use	Edible / non-medicinal use	FC	RFC	NU
et 14	Asteraceae	<i>Tripleurospermum disciforme</i> (C. A. Mey.) Sch. Bip.	Boomadaran	Leaf and flower	Herbal tea	Stomach ache/ cramps	–	27	1	2
et 15	Brassicaceae	<i>Lepidium draba</i> L.	Moocheh	Young leaf	–	–	As an ingredient in local potage	18	0.667	1
et 16	Brassicaceae	<i>Descurainia sophia</i> (L.) Webb ex Prantl	Khake-shir	Seed	–	Seed, cold water and sugar for heat exhaustion/ Threshed seed in black tea for diarrhea and food poisoning	–	27	1	2
et 17	Caryophyllaceae	<i>Silene conoidea</i> L.	Alaf ash	Leaf	–	–	As an ingredient in local potage/ Cooked and taken with yogurt	16	0.592	2
et 20	Elaeagnaceae	<i>Elaeagnus angustifolia</i> L.	Senjed	Fruit	Raw	Diarrhea	–	24	0.889	1
et 21	Fabaceae	<i>Alhagi persarum</i> Boiss. & Buhse	Teranjebin	Aerial parts	Decoction	–	Temperature regulator	15	0.556	1
et 22	Fabaceae	<i>Medicago sativa</i> L.	Espers	Leaf	Squash	Blood coagulation	–	20	0.741	1
et 23	Fabaceae	<i>Astragalus gossypinus</i> Fisch.	Gavan	Gum	Soak	Cough/ Trichoptilosis/ Hair tonic	–	27	1	3
et 25	Juglandaceae	<i>Juglans regia</i> L.	Gerdoo	Leaf	Decoction	Diabetes	–	3	0.111	1
et 26	Lamiaceae	<i>Lallemantia iberica</i> (M. Bieb.) Fisch. & C. A. Mey.	Balangoo	Seed	Decoction	Cold and sore throat	–	25	0.926	1
et 27	Lamiaceae	<i>Salvia reuteriana</i> Boiss.	Alj-e-shahdaneh	Seed	Powdered with sugar	Menstrual pain/ back ache	–	15	0.556	2
et 28	Lamiaceae	<i>Stachys inflata</i> Benth.	Gav pooneh	Leaf	Dried	–	Taken with yogurt	17	0.630	1
et 29	Lamiaceae	<i>Stachys lavandulifolia</i> Vahl	Chaiee kuhei	Aerial parts	Herbal tea	Stomach ache	–	27	1	1
et 30	Lamiaceae	<i>Ziziphora tenuior</i> L.	Kakuti	Leaf & flower	Herbal tea	Stomach ache	Dried/ Taken with yogurt	18	0.667	2
et 31	Malvaceae	<i>Alcea kurdica</i> Alef.	Khatmi	Leaf / flower	Soak	Trichoptilosis	–	23	0.852	1
et 32	Malvaceae	<i>Malva neglecta</i> Wallr.	Nan kalaghak	Fruits, flowers, leaves	Raw decoction	Cold and sore throat	Leaves cooked with rice/ As an ingredient in local potage	25	0.926	2

Table 2. (cont.). List of plant studied and their uses (* shows the medicinal use of plants for animals). Vernacular names are in Persian language, with Golpayegani accent. FC: frequency of citation; RFC: relative frequency consensus; NU: number of uses reported.

Voucher no.	Family	Scientific name	Vernacular name	Part used	Preparation	Medicinal use	Edible / non-medicinal use	FC	RFC	NU
et 24	Papaveraceae	<i>Fumaria asepala</i> Boiss.	Shah tareh	Whole of plant	Decoction	Eczema and hand chap	–	10	0.370	1
et 33	Papaveraceae	<i>Papaver bornmuelleri</i> Fedde	Gol sorkhi	Young leaf	–	–	Eaten with vinegar as temperature regulator	16	0.592	1
et 34	Plantaginaceae	<i>Plantago lanceolata</i> L.	Barhang	Leaf/Seed	Raw decoction	Infection boil/Septic sore throat	–	16	0.592	2
et 35	Phyllanthaceae	<i>Andrachne fruticulosa</i> Boiss.	Marchoobe	Young leaves and shoots	baked	Used with yogurt to cure heat exhaustion	–	16	0.592	1
et 36	Poaceae	<i>Cynodon dactylon</i> (L.) Pers.	Margh	Leaf	Chewing raw	Headache	–	7	0.259	1
et 37	Poaceae	<i>Hordeum vulgare</i> L.	Jo	Seed	Cooked	As an ingredient in local potage for sore throat	–	27	1	1
et 38	Polygonaceae	<i>Rheum ribes</i> L.	Rivas	Petiole	Raw/cooked	Treatment of intestinal worm/Diarrhea	As an ingredient in local potage/orally eaten	20	0.741	2
et 39	Polygonaceae	<i>Rumex dentatus</i> L.	Torshak	Leaf	Cooked	Cooked as potage for treatment of sore throat	–	21	0.778	1
et 40	Portulacaceae	<i>Portulaca oleracea</i> L.	Khorfeh	Aerial parts	Raw	Antiseptic/treatment of intestinal worms/Diarrhea	–	22	0.815	3
et 41	Rosaceae	<i>Cydonia oblonga</i> Mill.	Beh	Leaf	Herbal tea	Cramp	–	17	0.630	1
et 42	Rubiaceae	<i>Rubia tinctorum</i> L.	Lon jas	Seed	Concentrated decoction	–	Painting carpet yam and texture	21	0.778	1
et 43	Salicaceae	<i>Salix alba</i> L.	Footeh	Bark	Powdered	Urine burn of babies	–	15	0.556	1
et 44	Scrophulariaceae	<i>Verbascum songaricum</i> Schrenk	Goosh khari	Leaf	Smoke	Disinfection of infected wounds	–	21	0.778	1
et 45	Tamaricaceae	<i>Tamarix ramosissima</i> Ledeb.	Gaz	Bark	Smoke	Disinfection of infected wounds	–	19	0.704	1
et 46	Thymelaeaceae	<i>Diarthron lessertii</i> (Wikstr.) Kit Tan	Gazzak	Whole plant	Dried and powdered	Wounds and abscesses	–	8	0.296	1
et 47	Zygophyllaceae	<i>Peganum harmala</i> L.	Seband	Seed	Eaten with water	Food poisoning	–	27	1	1
et 48	Zygophyllaceae	<i>Zygophyllum atriplicoides</i> Fisch. & C. A. Mey.	Ghij	Stem	Smoke	–	Kohl	20	0.741	1

Appendix. Questionnaire model.**First part**

First name/ Family name of interviewee:

Village name:

Age:

Sex:

Job:

Address and Telephone:

Do you use plants as medicine?

Which native plants do you use as medicine or food?

.....
.....

Second part

For each plant:

1) Vernacular name of plant:

2) In which category is this plant grouped? edible, medicine, fodder, other (.....)

3) Which part/parts of plant is used?

flower, root, stem, bark, leaf, seed, fruit, petiole, aerial parts, whole plant, other
(.....)

4) How is it used? fresh, dried

5) Describe the preparation of it to use

.....

6) If the plant is used as medicine, please describe how to use it and for which disease it is applied

.....

7) If the plant is used as medicine, have you ever encountered with any harmful effect?

.....