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Ethnobotanical survey of medicinal plants in Delfan County, Lorestan Province, Iran

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Original Research

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Abstract:

Ethnobotany investigates the traditional and local application of plants in different regions. This study aimed to introduce the most important medicinal plants in Delfan County, Lorestan Province, Iran, and their applications in traditional therapies. The plant samples in the area were collected during the growing season based on the common methods of plant taxonomy using different flora and other sources. The medicinal species were identified using different flora and other references. The family, genus, species, and plant organs with medicinal value were determined. The protective classes of plants were investigated using the Red Data Book of Iran. Ethnopharmacological data were collected using various references, questionnaires, field survey methods, and group interviews. In total, 212 species were collected, of which 114 medicinal species belonging to 33 families and 95 genera were identified. The results showed that the largest families in terms of the number of medicinal species; Lamiaceae with 23 species (20.18%), Asteraceae with 20 species (17.54%), Fabaceae with 9 species (7.89%), Apiaceae with 7 species (6.14%), and Poaceae and Brassicaceae each with There are 6 species (5.26%). Biological forms of plants were determined based on Raunkiaer. Hemicryptophytes 44.70%, therophytes 30.70%, chaemophytes 11.40%, phanrophytes 7% and geophytes 6.10% of the plants of the region. Many species (about 34%) have Irano-Turanian region distribution. Iran's endemic species in the region include two types of protection class in Endangered (EN) with 2 species and Vulnerable (VU) with one species. Examining the therapeutic properties of medicinal plants in the studied area showed that they are anti-inflammatory (11%), diuretic (11%), anti-diabetic (10%), digestive (8%) antimicrobial (7%), analgesic (6%), sedative (6%), stomachic (6%), hepatoprotective (5%) and cough (5%) are the most used medicinal plants in the region.

Keywords: Ethnobotany; Life form; Chorology; Delfan County; Medicinal plants; Conservation status

Introduction

Ethnobotany is a branch of traditional knowledge that deals with the recognition of the indigenous people about the therapeutic properties of plants (Vafadar and Toghranegar, 2020). Ethnobotany is a scientific method of monitoring the information available in the public mind. A very important part of the sources of information in an ethnobotanical study is related to the data obtained from the natural life of the local people regarding their attitude to plants (Omidi et al., 2012). Considering the diversity of Iran's vegetation and the numerous traditional and scientific resources that have been left in the field of traditional medicine since long ago, these studies can provide valuable solutions and achievements to find new medicinal plants and herbal medicines (Ghadimi and Ghavam, 2021).

Medicinal plants have been important in treating diseases for centuries and constitute the basis of traditional Iranian medicine. A significant percentage of Iran's plant species are medicinal plants, indicating high potential in this field. Medicinal plants refer to a wide range of plants that are used to treat or prevent disease (Bagheri et al., 2021; Nadaf et al., 2025).

Implementing any project such as improvement, restoration, and protection of forests and rangeland requires identifying and introducing plants, including medicinal and industrial plants (Eshaghi et al., 2016). Identification of vegetation cover and geographical distribution of plants in a region is the basis of ecological surveys and research, and it has an important impact on proper rangeland management (Thakur et al., 2020). The diversity in medicinal plants has caused

the country of Iran to be considered as a producer and exporter of some medicinal items, including gum tragacanth, asafoetida, etc.

Using appropriate planning in this field, it is possible to prevent the indiscriminate exploitation of medicinal plants in the form of direct harvesting from nature, which leads to the destruction of plant cover and the extinction of valuable species.

Domestication, cultivation, and harvesting of medicinal plants are important steps in the direction of protecting the environment, treating diseases, and providing raw materials for various industries and creating employment (Hooshidari, 2009). Indigenous knowledge of medicinal plants is one of the fundamental steps in the field of sustainable development of medicinal plants and can provide important basic information to researchers of this field. The information obtained from the local people can lead to the identification of new medicinal species and new effective substances that can be used to treat diseases (Mirzaei et al., 2016). Fundamental planning for the development of medicinal plants requires a detailed examination of the current situation, adequate recognition of the potentials in agricultural fields and natural resources, as well as a correct recognition of the limitations and challenges (Sefidkon, 2008).

In the field of collecting and identifying medicinal plants from different regions of the country, much research has been conducted. Ahmadi et al. (2010) investigated the medicinal plants of Lorestan province in a study that led to the identification of 151 medicinal species belonging to 63 families and 90 genera. Jankju et al. (2011) conducted a study of the flora of North Khorasan and identified 534 species belonged to 315 genera and 68 families. Nemati and Jalilian (2012) investigated the medicinal plants of Kermanshah province, identifying 208 medicinal species belonging to 198 genera and 72 families. Mirzaei et al. (2016) studied the medicinal plants of Gareen Mountain in Delfan County and identified 75 species belonging to 25 families. Additionally, AmirAhmadi et al. (2022) investigated the Flora, Life Form, and medicinal species of the Central Part of Eastern Kiyar (between Dastgerd Imamzadeh and Shalamzar) in Chaharmahal and Bakhtiari Province, determining 66 medicinal species and two species in critical conservation status.

Due to the climatic diversity and topography of Lorestan province, its flora has been studied by many researchers. The Flora of Sefid Kouh (Asri and Mehrnia, 2002), Oshtorankoh protected area (Abbasi et al., 2015), Oshtorankouh alpine (Dehshiri and Mahdavar, 2016), Sarab-e-Kahman (Mehrnia, 2021) and Garin Mountain (Mirzaei, 2023) have been studied.

This study was conducted to identify the medicinal plants of the eastern Delfan County. Its main objectives were to identify and accurately evaluate the medicinal plants of the region, their biological forms and geographical distribution and introduce the endemic species and their protection status. Also, considering that the studied area has not been investigated and studied ethnobotanically, the results of this research can provide valuable information about the ethnobotany of plants in this area.

Materials and methods

Delfan County is located in the northwest of Lorestan province. Its average annual precipitation is about 490 mm and the average annual temperature is 11.8 °C. The mean annual minimum and maximum temperatures are about 4.8 and 18.9 °C, respectively. In terms of vegetation, Delfan County is divided into two

parts: forest (southern part) and rangeland (northern part). According to Zohary (1973), Delfan is located in the Irano-Turanian region, composing

three subregions of oak forests, semi-steppe zone (subalpine zone) and high mountains (alpine zone).

The study area is in the east of Delfan County with an area of approximately 65 km^2. It is located from 33°56′27″ to 34°14′44″ northern latitude and from 47°52′ 31″ to 48°17′58″ Eastern longitude. The highest and lowest elevation of the study area is 3202 m and 1691 m above sea level, respectively (figure 1).

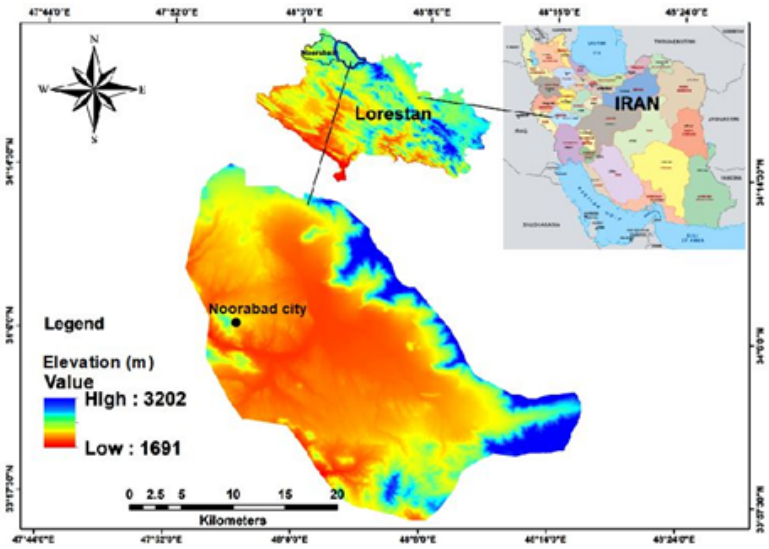

Figure 1. Location of study area in Iran and Lorestan province.

Research method

The collection of plant samples and investigation of the flora of the area during two consecutive growing seasons (spring 2021 and 2022) was done by field survey method. Samples were collected at least every two weeks and different plants that had reached the full growth stage were collected. The collected plants were pressed and dried and pasted on the cardboard of herbarium and then transferred to the Herbarium of Lorestan University. Identification of plant samples was done using Flora Iranica (Rechinger, 1963-2012), Flora of Iraq (Townsend et al., 1960-1985), Flore de l' Iran (Ghahreman, 1979-2021), Flora of Iran (Assadi et al., 1998-2024). Plant classification was done based on the Angiosperm Phylogeny Group (Chase et al., 2022). The names of the plants and their authors were unified with the International Plant Names Index (IPNI, 2023) and Plants of the World Online (POWO, 2025). To determine the geographical distribution of plant species, the available sources in the field of Iranian plant geography, including Zohary (1973), Takhtajan (1986) and White and Leonard (1999), was used. The life forms of plants were determined by the Raunkiaer system (Raunkiaer, 1934).

Conservation classes and exclusive plant species of Iran in the region based on the Red data book of Iran (Jalili and Jamzad, 1999) was determined. For this purpose, the list of names of exclusive plant species of the study area was compared with the list of plant species in the mentioned sources, and a separate list of Iran's exclusive plants in the region and their protection classes were determined.

After identifying the plants, ethnobotanical information was collected through the interviews. For the interview, the informed people, especially traditional botanists who had information about medicinal plants in the city and village, sellers of medicinal plants, farmers and gardeners of medicinal plants, as well as itinerant sellers (47 people in total) were selected to identify the important medicinal plant species of the study area and the traditional use of the people (Table 1).

Results

In this study, 114 medicinal plant species from 33 families and 95 genera were collected (Table 2). The most important families in terms of the number of medicinal species; Lamiaceae with 23 species (20.18%), Asteraceae with 20 species (17.54%), Fabaceae with 9 species (7.89%), Apiaceae with 7 species (6.14%) and Poaceae and Brassicaceae with 6 species (5.26%) (figure 2).

Classification of life forms based on the Raunkiaer method showed that hemicryptophytes 4470%, therophytes 30.70%, chaemophytes 11.40%, phanrophytes 7% and geophytes 6.10% of the plants of the region. (figure 3).

The results showed that 34% of plant species in the region belong to the Irano-Turanian vegetation region, and after that Irano-Turanian region/ Mediterranean region/ Euro-Siberian region with 19%; Irano-Turanian region/ Mediterranean region with 11%; Cosmopolitan with 8%; Irano-Turanian region/ Euro-Siberian region with 7% and other vegetative elements are present in the region with a lower percentage (figure 4).

The study of the organs used by medicinal plants showed that flowering branches and all plant organs in 13% of plants and seeds and fruit respectively with 11% and 10% more of the other organs were used (figure 5).

Examining the therapeutic properties of medicinal plants in the studied area showed that the anti-inflammatory (11%), diuretic (11%), anti-diabetic (10%), digestive (8%) antimicrobial (7%), analgesic (6%), sedative (6%), stomachic (6%), hepatoprotective (5%) and cough (5%) are the most used medicinal plants in the region (figure 6).

In this study, 114 medicinal plant species from 33 families and 95 genera were collected and identified in the region and the characteristics of each such as life form, geographical distribution and organ used in Table 2 are presented.

Iran's endemic species in the region include two types of protection class in Endangered (EN) with 2 species and Vulnerable (VU) with one species (Table 3).

Discussion and conclusion

In the study of the eastern flora of Delfan County, 114 medicinal species belonging to 33 families and 95 genera were identified. The distribution of genus and species among the families showed that Lamiaceae family with 16 genera and 23 species, Asteraceae with 18 genera and 20 species, Fabaceae with 8 genera and 9 species, Apiaceae with 5 genera and 7 species and Poaceae family with 5 genera and 6 species were the most prominent families in the region, respectively. Ahmadi et al. (2010) identified 151 medicinal species in Lorestan province. Delfan et al. (2019) identified 218 medicinal species in the ethnobotany of native medicinal plants in the Zagheh and Biranshahr districts of Lorestan

Table 1. Characteristics of the interviewees.

Age range (years)	number	Frequency (%)	Sexuality	number	Frequency (%)
20 – 30	4	9	Man	33	70
30 – 40	7	15	Woman	14	30
40 – 50	9	19			
50 – 60	5	11			
60 – 70	13	27			
>70	9	19			
Total	47	100		47	100

Table 2. List of plant names, family names, Chorology, life forms, Local name and their used parts.

Family/species name	Life Forms	Chorotype	Plant organ Used	Local Name	Medicinal uses
Amaranthaceae					
Chenopodium album L.	Th	Plurireginalbor-trop	All Organs	Taresalmak	carminative, digestive, diuretic, and laxative
Dysphania botrys (L.) Mosyakin & Clemants. *Syn*: *Chenpodium botrys* L.	Th	Cosm	All Organs	Salmone Harumah	stimulant, diuretic, carminative, emmenagogue, pectoral, also in asthma, and catarrh
Amaryllidaceae					
Allium stipitatum Regel, *Syn*: *Allium hirtifolium* L.	Ge	IT	Bulb	Zill	Reducing sugar and fat blood, eliminating parasites, healing wounds
Allium remediorum (R.M.Fritsch) R.M.Fritsch	Ge	IT	Leaf	Surpa	ameliorated memory and cognitive dysfunction
Anacardiaceae					
Pistacia atlantica Desf.	Ph	IT	Fruit, Stem and Leaves	Kolang	anti-diabetic, antihyperlipidemic, anti-microbial, antiviral, antitumoral, digestive, diuretic, emmenagogue, wound healing, and analgesic effects
Pistacia khinjuk Stocks.	Ph	IT	Fruit, and Gum	Kolang narma	aphrodisiac, antiseptic, antihypertensive and management of dental, digestive, liver, urinary tract, and respiratory tract disorders
Apiaceae					
Bifora testiculata (L.) Spreng	Th	IT	Fruit	Geshenizak	stomachic and carminative
Falcaria vulgaris Bernh.	He	ES-Med-IT	Leaf	Paghaza	treatment of skin and gastric ulcers, liver diseases and digestive problems
Ferula assa-foetida L.	He	IT	Latex	Bezhe	Anticonvulsant, asthma and cough
Ferula gummosa Boiss.	He	IT	Latex	Bezhe	treatment of infectious diseases including diarrhea, skin infection, intestinal parasites and influenza
Heracleum persicum Desf. ex Fisch.	He	IT	Fruit and Leaves	Kolpar	neurological, digestive, respiratory, rheumatological and urinary tract disease
Prangos pabularia Lindl.	He	IT	Seeds and Leaves	Loom	car- minative, stimulant and diuretic
Prangos uloptera DC.	He	IT	Leaf	Loom	treatment of digestive disorders and healing scars
Apocynaceae					
Cynanchum acutum L.	Ph	Med-IT	All Organs	Lelaei	milky latex is used for skin and eye problems
Asparagaceae					
Muscari neglectum Gass.	Ge	Med-IT	All Organs	Kerkakharona	antirheumatic, stomachic, diuretic, expectorant and anti-verruca

Life Forms: He: Hemicryptophytes, Th: Therophytes, Ch: Chaemophytes, Ge: Geophytes, Ph: Phanrophytes
Geographic distribution: IT: Irano-Turaonian, M: Mediterranean, ES: Euro-Siberian, SS: Saharo-Sindian, Cosm: Cosmopolitan

Continued of Table 2.

Family/species name	Life Forms	Chorotype	Plant organ Used	Local Name	Medicinal uses
Asteraceae					
Achillea millefolium L.	He	IT-ES	Flowers	Bereng Das	anti-microbial, antiseptic, diuretic, stomachic, anti-diabetic, emmenagogue, antispasmodic, antianemia
Achillea cretica L. *Syn*: *Achillea santolina* L.	He	IT	Leaves and Flowering Branches	Bereng Das	anti-hemorrhagic, healing, and analgesic
Artemisia persica Boiss.	Ch	IT	Leaves and Flowering Branches	Joshan	anti-fungal effects, anti-parasitic, anti-neoplasm, antinociceptive, anti- epileptic, anti-anxiety
Phonus lanatus (L.) Hill. *Syn*: *Carthamus lanatus* L.	Th	IT-ES	Aerial Organs	Derek Zarda	decrease depression symptoms, relieve inflammation
Centaurea solstitialis L.	Th	Med-IT	Flowers	Cham Zelea	treat ulcers and stomach related diseases
Cichorium intybus L.	He	ES-Med-IT	Roots, Areial Organs	Chagh Chagha	anti-fungal, analgesic and anti-diabetic properties
Cirsium arvensis (L.) Scop.	He	Cosm	Flowers	Pishook kaouva	digestive ailments, hypertension, bleeding, metrorrhagia, scabies, pyogenic infections, ulcers, and skin infections
Cnicus benedictus L.	Th	Med-IT	Leaves, Flowerss and Stems	Khar Bemarek	treat anorexia, dyspepsia, flatulence, indigestion, diarrhea, migraine
Echinops ritro L.	He	IT-Med	All Organs of the Plant	Ghan Shakarook	diaphoretic and diuretic effect
Gundelia tournefortii L.	He	IT	Stems	Kangar	anti-diabetic, Laxative, sedative, anti-inflammatory, anti-parasite, antiseptic and emetic effects
Pentanema britannica (L.) D.Gut.Larr., Santos-Vicente, Anderb., E.Rico & M.M.Mart.Ort. *Syn*: *Inula britannica* L.	He	ES	Aerial Organs	Zanjafil	hepatoprotective, cytotoxic, anti-neuroinflammatory, and anti-inflammatory
Inula helenium L.	He	IT-ES	Roots	Zanjafil	anti-microbial and general tonic herb
Lactuca serriola L.	Th	ES-Med-IT	Seeds, Leaves and Stems	Kahoo Khardar	digestive, diuretic, hypnotic, narcotic and sedative
Matricaria chamomilla L.	Th	ES-Med-IT	Flowers	Gol Mana	anti-inflammatory, antiseptic, carminative, healing, sedative, and spasmolytic activity
Onopordom acanthium L.	He	IT	Roots, Stem Skin and Seed	Khar daya	anti-inflammatory, antitumor
Pulicaria dysenterica (L.) Bernh.	He	ES-Med-IT	Flowersing Branch, Roots	Kek Kosh	astringent and can be used in the treatment of dysenter
Silybum marianum (L.) Gaertn.	Th	Med-IT	Root, Fruit, Oil and Aerial Parts	Derek kaouva	Detoxification, blood pressure reduction, blood fat reduction
Sonchus oleraceus L.	Th	Cosm	All Organs and Latex	Gol Shirdar	anti-diabetic, anti-inflammatory, antipyretic, antinociceptive, anxiolytic
Tanacetum kotschyi (Boiss.) Grierson	He	IT	Flowering Branch	Berenjdas Kohi	anti-diabetic, insecticide, and hepatoprotective activities, as well as against festering wounds, skin ulcers, urinary tract infections, and sexually transmitted diseases
Xanthium strumarium L.	Th	Plurireginalbor-trop	Root and Fruit	Derek Chasbenak	treatment of malaria, tuberculosis, rheumatism

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Continued of Table 2.

Family/species name	Life Forms	Chorotype	Plant organ Used	Local Name	Medicinal uses
Boraginaceae					
Lithospermum officinale L.	He	ES-Med-IT	Seeds and Leaves	Sangdo	anti-inflammatory, and anti-microbial effects
Brassicaceae					
Alyssum alyssoides (L.) L. *Syn*: *Alyssum campestre* L.	Th	ES-Med-IT	Fruit	Ghodoma	used as a relaxant and cough suppressant
Capsella bursapastoris (L.) Medik.	Th	Cosm	Flowering Branch	Tara Kohi	stop bleeding, improve heart function, prevent high blood pressure, treat wounds and inflammation
Descurainia sophia (L.) Webb ex Prantl	Th	Cosm	Branch and Seed	Khakshir	relieve cough, prevent asthmaa, reduce edema, antitumor, antipyretic, anti-inflammatory, diuretic and analgesic activities
Lepidium latifolium L.	He	ES-Med-IT	Seeds And Fruits	Tara Shahi	diuretic, antihypertensive, and anti-tumour
Sinapis arvensis L.	Th	Med	Seed and Stem	Terpoka	anti-inflammatory effect, cough
Sisymbrium officinale (L.) Scop	Th	ES-Med-IT	Seed	Khakshir Tebi	throat ailments and common flu, as expectorant, and for the control of asthmaa
Caprifoliaceae					
Lonicera nummulariifolia Jaub. & Spach.	Ph	Med-IT	Aerial Organs	Shan	anti-inflammatory, antiviral, anti-microbial, hepatoprotective, neuroprotective, anti-diabetic, and other activities
Caryophyllaceae					
Acanthophyllum microcephalum Boiss.	Ch	IT	Root	Khar joo	Appetizing, skin infection, chickenpox
Dianthus orientalis Adams.	He	Med-IT	Seed	Mikhak	Effects of against Paracetamol Triggered Oxidative Stress, Hepatic and Renal Injurie
Silene conoidea L.	Th	Med-IT	Flower	Giah Narma	treating respiratory, anti-diabetic
Stellaria media (L.) Vill.	Th	Cosm	All Organs	Dana Ghanari	treatment of obesity, anti-diabetic, dermal infections, inflammation, gastric ulcers and stomach cramps
Colchicaceae					
Colchicum persicum Bake.	Ge	IT	Flowers, Tubers and Seeds	Solenjon	treatment gout, amyloidosis and cirrhosis
Convolvulaceae					
Convolvulus arvensis L.	He	Plurireginalbor-trop	Stem, Leaf, Root	Pichenak	traditionally used as laxative
Euphorbiaceae					
Euphorbia polycaulis Boiss. & Hohen.	He	IT	Latex	Khoashir	Treatment of corns and warts, laxative
Fabaceae					

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Continued of Table 2.

Family/species name	Life Forms	Chorotype	Plant organ Used	Local Name	Medicinal uses
Coronilla varia L.	He	IT-ES	All Organs	Yonja Baghi	The crushed plant has been rubbed on rheumatic joints and cramp
Lathyrus aphaca L.	Th	ES-Med-IT	Flowering Branch, Seed	Holar	analgesic
Lotus corniculatus L.	He	ES-Med-IT	Flowering Branch, Seed	Yonja Haroma	painkiller, antihemoroidal, diuretic and sedative
Medicago sativa L.	He	Cosm	Flowering Branch	Yonja	treatment of digestive, central nervous system disorders, anti-diabetic, asthmaa, inflammation, gallstones, kidney disorders, and anti-microbial infections
Melilotus albus Medic.	Th	ES-Med-IT	Flowering Branch	Yonja Esbe	prevent the blood from clotting
Melilotus officinalis (L.) Lam	He	IT-ES	Leaves, Flowers and Stems	Yonja Zard	anti-oxidation, anti-tumor and anti-inflammatory effects
Onobrychis cornuta (L.) Desv.	Ch	IT	Aerial Organs	Esperes	Fix insomnia
Vicia lens (L.) Coss. & Germ. *Syn*: *Lens culinaris* Medik.	Th	Med	Seed	Noozhi	Anti-microbial
Vicia sativa L.	Th	Med	Seed	Gayna	particular anti-Parkinson, anticholinesterase, antidepressant, anticonvulsant, anti-microbial
Geraniaceae					
Geranium lucidum L.	Th	Med-ES	All Organs	Sizenak	Astringent and diuretic
Hypericaceae					
Hypericum helianthemoides (Spach) Boiss.	He	IT	Fruit and Leaf	Gol Zarda	Sedative, treatment of infections, removal of kidney stones
Iridaceae					
Iris hymenospatha B. Mathew & Wendelbo	Ge	IT	Tuber	Zanbagh	expectorant, antiparasitic, cold treatment, laxative
Lamiaceae					
Ajuga chamaecistus Ging. Ex Benth.	He	IT	Flowering Branch	Meshmeshak	vasodilator, anti-inflammatory
Dracocephalum ibericum M.Bieb. *Syn*: *Lallemantia iberica* (Bieb.) Fisch. & C.A.Mey.	Th	IT	Leaves and Flowering Branches	Konji Siyah	treatment of common cold, coughing, stomach and abdominal pain
Lamium album L.	He	ES-Med-IT	Flowering Branch	Gazenah	antiarthritic, anti-inflammatory, antiviral, immunomodulatory, wound healing, and neuroprotective activities
Lycopus europaeus L.	He	ES-Med-IT	Aerial Organs	Cheng Gorg	cure coughs, respiratory disorders and as a natural remedy for sleeplessness
Marrubium vulgare L.	Ch	Med-IT	Flowering Branch	Pina Haroma	expectorant, tonic, diuretic, diaphoretic, antinociceptive, antihypertensive, anti-diabetic, gastroprotective, antihepatotoxic, anti-inflammatory, wound-healing, antiproliferative, and immunomodulatory activity.

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Geographic distribution: IT: Irano-Turaonian, M: Mediterranean, ES: Euro-Siberian, SS: Saharo-Sindian, Cosm: Cosmopolitan

Continued of Table 2.

Family/species name	Life Forms	Chorotype	Plant organ Used	Local Name	Medicinal uses
Melissa officinalis L.	He	Med-IT	Leaves and Flowering Branches	Baderanjoba	improves depression, anxiety and stress
Mentha aquatica L.	He	Plurireginalbor-trop	Leaves and Flowering Branches	Pina	therapy for many types of disorders
Mentha longifolia (L.) Huds.	He	ES-Med-IT	Aerial Organs	Pina	antiseptic, anticarcinogenic, expectorant, sedative, diuretic
Nepeta cataria L.	He	ES-Med-IT	Flowering Branch	Mefarah	antitussive, astringent, carminative, diaphoretic, semmengogue, refrigerant, sedative, stimulant, stomachic, and tonic
Nepeta persica Boiss.	Ch	IT	Flowering Branch	Pina Kohi	Stomach tonic, carminative, edible vegetable, appetizing
Phlomis persica Boiss.	Ch	IT	Flowering Branch	Bala Goosh	anti-diabetic, gastric ulcer, hemorrhoids, inflammation, and wounds, cough
Salvia bracteata Banks & Sol.	Ch	IT	Leaves and Flowering Branches	Shainek	digestive aids, antiseptics, sedative, anxiolytic, hypnotic, pain reduction and anti-diabetic
Salvia reuteriana Boiss.	He	IT	Leaves and Flowering Branches	Shainek	Anti-inflammatory, body sweat control, anti-diabetes, reduction of women's milk
Salvia hydrangea DC. ex Benth.	Ch	IT	Leaves and Flowering Branches	Gol Arvana	anti-inflammatory and sedative
Salvia macrosiphon Boiss.	He	ES-IT	Seed	Shaina	pharmacognostic, anti-inflammatory and analgesi
Scutellaria pinnatifida A. Ham.	He	IT	Leaves, Flowers and Roots	Maryami	nsomnia, hepatitis, allergy, and arteriosclerosis
Stachys benthamiana Boiss.	Ch	IT	Flowering Branch	Chaei shoo	stress, skin inflammations, digestive disorders, asthmaa and genital tumors
Stachys lavandulifolia Vahl.	Ch	IT	Flowering Branch	Golmona	Anti-flatulent, laxative, pain reliever, cold treatment
Stachys pilifera Benth.	Ch	IT	Flowering Branch	Azboa Nesar	used as an herbal tea for treating asthmaa, rheumatoid arthritis, and infections
Teucrium orientale L.	He	Plurireginalbor-trop	Flowering Branch	Maryami	anti-microbial, anti-inflammatory, antimalarial, antipyretic, antiulcer, antinociceptive, anti-diabetic, antihypertensive, and hypolipidemic
Teucrium polium L.	He	ES-Med-IT	Flowering Branch	Mryami	anti-inflammatory, anti-diabetic, hepatoprotective, hypolipidemic
Thymus kotschyanus Boiss. & Hohen.	He	IT	Flowering Branch	Azboa	improve the digestive process and to treat respiratory disorders, expectorant
Ziziphora clinopodioides Lam.	Ch	ES-Med	All Organs	Pina Kohi	stomach tonic, carminative, anti-microbial, and expectorant
Liliaceae					
Fritillaria imperialis L.	Ge	IT	Tuber	Lala Vazhegon	antitussive and expectorant
Nitrariaceae					
Peganum harmala L.	He	IT-SS	Seed	Asban	cardiovascular, neurologic, anti-microbial, digestive and anti-diabetic activities

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Continued of Table 2.

Family/species name	Life Forms	Chorotype	Plant organ Used	Local Name	Medicinal uses
Malvaceae					
Alcea aucheri (Boiss.) Alef.	Ch	IT	Flowers and Seeds	Golhiro	anxiolytic and sedative
Malva parviflora L.	Th	ES-Med-IT-SS	Seeds and Leaves	Tayer	anti-diabetic, hepatoprotective, neuroprotective, anti-irritant, anti-ulcerogenic, analgesic
Althaea officinalis L.	He	ES-Med-IT	Leaves and Flowering Branches	Golhiro	anti-diabetic, hepatoprotective, neuroprotective, anti-irritant, anti-ulcerogenic, analgesic
Papaveraceae					
Fumaria asepale Bioss.	Th	ES-Med-IT	All Organs	Shahtara	pain, inflammatory diseases, anti-diabetic
Fumaria vaillantii Loisel.	Th	Med-IT	Flowering Branch	Shahtara	Expectorant, diuretic, soothing, breast softener
Papaver argemone L.	Th	Med	Flowers and Capsules	Gol Sora	anti-diabetic, hepatoprotective, neuroprotective, anti-irritant, anti-ulcerogenic, analgesic
Plantaginaceae					
Plantago ovata Forsk.	Th	IT-SS	Seed	Dom Rouah	anti-inflammatory ability
Plantago psyllium L.	Th	Med-IT	Seed	Dom Rouah	immunomodulatory, antiproliferative
Poaceae					
Cynodon dactylon (L.) Pers.	He	Cosm	Rhizome	Panja Merkhi	antiviral and anti-microbial activity, against snake bites, gout and rheumatic affection, anti-inflammatory activity, reduce burning sensation, hyperdipsia, haematuria, leprosy, bronchitis
Elymus repens (L.) Gould. *Syn*: *Agropyron repens* (L.) P. Beauv.	He	Med-IT-ES-SS	Rhizome	Ganem Barika	soothing diuretic and for calming pain and spasm in the urinary tract
Hordeum distichon (L.) Lam.	Th	Cosm	Caryopsis	Joo Shetona	soothing to the throat and provides easily assimilated nutrients
Hordeum vulgare L.	Th	IT-Med- SS	Caryposis	Joo Kawa	anti-inflammatory, hypoglycaemic, anti-depressant, anti-atherosclerotic
Lolium temulentum L.	Th	ES-Med-IT	Caryopsis	Chacham	diarrhoea, haemorrhages and malaria
Phragmites australis (Cav.) Trin. ex Steud.	Ge	Plurireginalbor-trop	All Organs	Nei	analgesic, anti-diabetic, antihyperlipidemic, anti-inflammatory, anti-microbial, antiproliferative, and hepatoprotective activities
Polygonaceae					
Rheum ribes L.	He	IT	Flowers, Stems, Roots	Revas	hemorrhoids, measles, smallpox, digestive ailments, and diarrhea
Rumex crispus L.	He	IT-ES	Roots, Leaves	Torshak	anti-microbial infections and malaria
Rumex patientia L.	He	IT-ES	Fruits, Roots and Leaves	Torshak	laxative, diuretic, antipyretic, wound cure, and anti-inflammatory properties
Primulaceae					
Samolus valerandi L.	He	Plurireginalbor-trop	All Organs	Giah Joo	treat digestive issues and skin conditions
Ranunculaceae					

Life Forms: He: Hemicryptophytes, Th: Therophytes, Ch: Chaemophytes, Ge: Geophytes, Ph: Phanrophytes
Geographic distribution: IT: Irano-Turaonian, M: Mediterranean, ES: Euro-Siberian, SS: Saharo-Sindian, Cosm: Cosmopolitan

Continued of Table 2.

Family/species name	Life Forms	Chorotype	Plant organ Used	Local Name	Medicinal uses
Ranunculus arvensis L.	Th	ES-Med-IT	Flowers	Alale	intermittent fevers, gout and asthma
Resedaceae					
Reseda lutea L.	Th	ES-Med-IT	Dried Root	Esperek	Antitumor and anti-HIV
Rosaceae					
Prunus lycioides (Spach) C.K.Schneid. *Syn*: *Amygdalus lycioides* Spach.	Ph	IT	Fruit	Arjen	treating blood fat, Inflammation of the prostate, durectic, and kidney stone
Prunus mahaleb L. *Syn*: *Cerasus mahaleb* (L.) Mill.	Ph	IT	Fruit and Kernels, Wood	Halona	immunostimulant, aphrodisiac, expectorant, diuretic, for shortness of breath and for prostatic hyperplasia
Rosa canina L.	Ph	IT	Fruit	Golbakhi	anti-diabetic and anti-obesity
Sanguisorba minor Scop.	He	Med	All Organs	Toot Rooa	diuretic, digestive and appetite-stimulant properties
Rubiaceae					
Galium verum L.	He	ES	Aerial Organs	Doisenak	diuretic, choleretic and as the treat- ment for gout and epilepsy
Scrophulariaceae					
Verbascum sinuatum L.	He	Med-IT	Leaves and Flowers	Gol Mahouri	antihistaminic, analgesic, antiseptic, and sedative
Thymelaeaceae					
Daphne mucronata L.	Ph	IT-ES	Fruit	Toylek	used for the treatment of rheumatism, toothache, ulcer and muscular complications

Life Forms: He: Hemicryptophytes, Th: Therophytes, Ch: Chaemophytes, Ge: Geophytes, Ph: Phanrophytes
Geographic distribution: IT: Irano-Turaonian, M: Mediterranean, ES: Euro-Siberian, SS: Saharo-Sindian, Cosm: Cosmopolitan

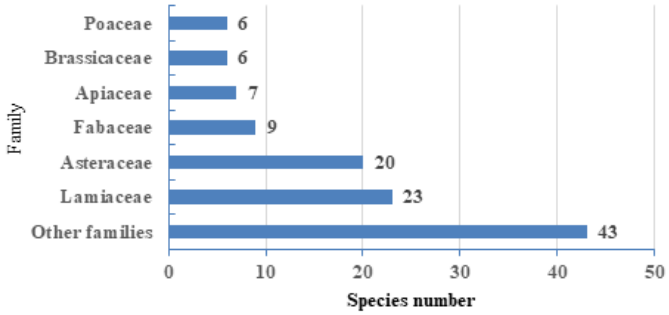

Figure 2. The number of species related to families in the study area.

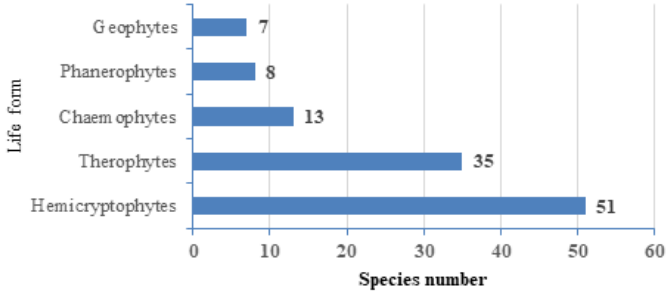

Figure 3. Life form of the plants based on Raunkiaer's method.

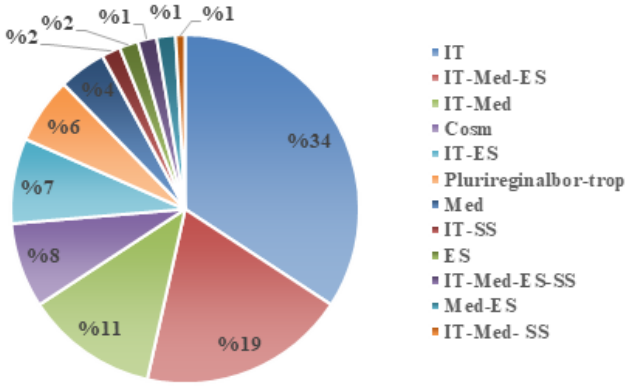

Figure 4. Geographical distribution of identified species
IT: Irano-Turanian, Med: Mediterranean, Es: Euro-Siberian, Cosm: Cosmopolitan, SS: Saharo-Sindian.

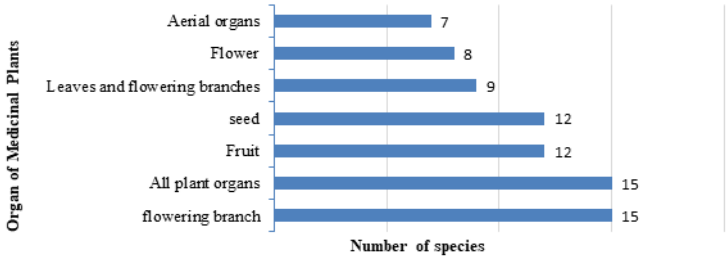

Figure 5. The most used organ of medicinal plants.

Province. Although the number of species in a given region depends on climatic conditions, especially precipitation in collection years, soil type and geological history of that region, the number of species identified in the studied area was compared to other regions of the province corresponds to the reality of the region.

Lamiaceae and Apiaceae families accounted for a total of 43 medicinal species in the region. In general, most of the plants of these two families have essential oils and important effective substances and are considered valuable medicinal plants, which have been reported among the families with the most medicinal plants in other studies conducted in Lorestan province (Ahmadi et al., 2010; Delfan et al., 2019). The abundance of plant species belonging to Lamiaceae family, in addition to showing high medicinal properties in this family, may be due to the presence of suitable environmental conditions for these species. On the other hand, the presence of *Marrubium vulgare* from the Lamiaceae family, which is one of the weeds in the fields and also grows in the barren lands and degraded range, indicates the degradation in the studied area. The Asteraceae family also has many medicinal species in the region. Abundance of Asteraceae family plants may be due to destruction in the region, considering that the studied area is a place for nomadic livestock grazing in spring and summer, therefore, premature grazing and heavy grazing is one of the reasons for the abundance of Asteraceae family plants in the region (Mirzaei, 2023). Experience has shown when the percent-

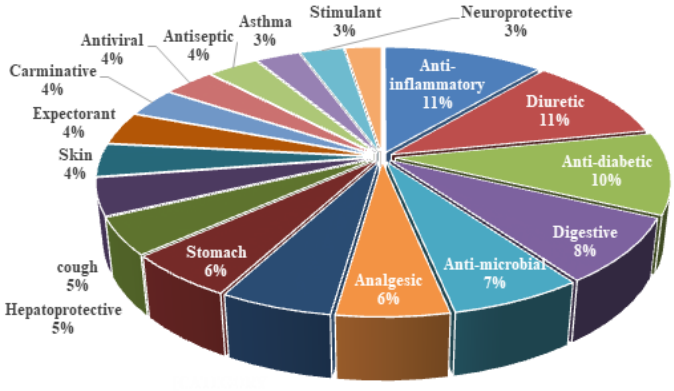

Figure 6. The therapeutic properties of medicinal plants.

Table 3. The list of endemic Species and their Conservation status.

Scientific name of plant species in its family Lamiaceae	life forms	Chorotype	Conservation Class
Phlomis persica Boiss.	Hemicryptophytes	Irano-Turaonian	VU: Vulnerable
Stachys benthamiana Boiss.	Hemicryptophytes	Irano-Turaonian	EN: Endangered
Stachys pilifera Benth.	Hemicryptophytes	Irano-Turaonian	EN: Endangered

age of vegetation degradation in an area increases, plants from some families such as the family Asteraceae become more present in the flora of the region (Nadaf, 2021).

The biological spectrum of plant species and the percentage of presence of each of the biological forms can show the climatic condition of the region because the biological form of plants shows their adaptation to the climatic, soil, biological, and, finally, ecological conditions of a habitat (Archibold, 1995). Based on the life form of the species, it is possible to plan for actions such as restoration, exploitation, study of medicinal compounds, or cultivation of these plants in an appropriate manner. Due to the mountainous conditions in the region and the cold climate, hemicryptophyte plants (with 51 species) were present more than other life forms in the region, which is consistent with published references (AmirAhmadi et al., 2022; Mehrnia, 2021; Tabad et al., 2017). The abundance of hemicryptophyte plants in a region indicates a cold climate and mountains. Therophytes also had a significant presence in the study area. The presence of therophytes in eastern Delfan County, which has mountainous conditions, is not due to unfavorable conditions (low rainfall) but the existence of destruction and human intervention has reduced the number of perennial plants and increased the opportunity for the development of annual plants (Hassanzadeh et al., 2013).

The geographical distribution of plant species in a region is a reflection of the influence of different vegetation areas (Nadaf, 2021). Considering that most of the plants in the region (34%) are related to Irano-Turanian vegetation elements, it can be concluded that this region belongs to the Irano-Turanian region. The high percentage of Irano-Turanian species is due to the increase in altitude in the region. The results of other researchers in Lorestan showed that the elements of this vegetative zone had the highest distribution in the studied areas (Veiskarami et al., 2012; Mehrnia and Ramak, 2014; Mehrnia, 2021, 2021). According to Archibold (1995), altitudes between 2000 and 2500 m can make the Irano-Turanian element dominant, so elevation can be one of the reasons for the presence of the dominant Irano-Turanian region in the studied area.

The conservation status of plant species indicates their conditions on the ground and the possibility of extinction of these species. Determining the threat level of plant elements is important to evaluate and manage their conservation status (Pyra et al., 2021). The presence of rare and endangered plant species indicates the severity of the area's destruction. The results showed that Iran's endemic species in the region include two types of protection class in Endangered (EN) with 2 species and Vulnerable (VU) with one species and the necessary attention should be taken by the executive organs to protect these species. These species include *Phlomis persica* (VU), *Stachys benthamiana* (EN), and *Stachys pilifera* (EN). Investigations showed that the residents of the studied area harvested these plants for the treatment of diabetes, asthma and digestive disorders and caused damage to them. Jalili and Jamzad (1999) announced the distribution of geographical range, human impacts and plant biological limitation as the most important factors affecting the risk status of endangered species in Iran.

The study of the used parts of plants showed that aerial flowering branches, all plant organs, fruits, and seeds had the highest medicinal uses, so that 47% of plants in the region are used in these organs. The use of all plant organs among the identified medicinal species can be due to the diversity of biological forms in the study area. The harvesting of medicinal plants in the study area starts at the end of April and reaches its peak in May and June. The plants that are harvested in this period often have a hemicryptophyte biological form, and the parts used are often flowers, young leaves, and stems. Plants harvested in July often have the life form of phanerophytes and hemicryptophytes, and the parts used mostly include fruit and seeds, which often continue until August. Also, the plants that are harvested in the fall often have geophyte biological form, whose underground parts (root, rhizome and tuber) are used, but unfortunately, in recent years, the use of medicinal plants is often not done at the proper time, and this has caused damage to the medicinal plants of the region.

The use of medicinal plants in a traditional way is expanding in third world countries and industrialized countries, and paying attention to this scientific topic can be an introduction to discover many uncertainties related to their natural compounds. Eighty percent of the human population globally depends on medicinal plants as a primary healing option, including for gastrointestinal ailments (Beyene and Deribe, 2016). Despite the many potential talents in Iran, there are few studies published in this field. Of course, in recent years, the tendency of Iranian people to treat with medicinal plants has increased due to the ease of access, less damage and cost-effectiveness. Lorestan province and Delfan county are among the regions of the country where the use of medicinal plants to treat diseases is of interest.

In the present research, an ethnobotanical study was conducted focusing on some of the most important medicinal plants of Delfan County. The most important traditional medicinal uses of plants in the region are anti-inflammatory, diuretic, anti-diabetic, analgesic, sedative and stomach ache, which has also been found in the studies conducted in Za-

gheh and Biranshahr of Lorestan (Delfan et al., 2019), Zarivar region of Marivan (Tabad and Jalilian, 2015), Zanjan (Saadatpour et al., 2017) and Jiroft (Bibak and Moghbeli, 2017). Gastrointestinal diseases are one of the challenges of the cosmetic health system and one of the common causes of mortality (Lenti et al., 2019). Pistacia species were among the plants that are used in the study area as a treatment for digestive diseases. Other ethnobotanical reports also confirm the findings of this research, as Mahjoub et al. (2018) reported that different parts of this plant are traditionally used in the treatment of indigestion, gastrointestinal parasites, constipation, and flatulence.

According to the investigations, many medicinal plants are harvested as spring vegetables from the nature of the study area and are sold in the market, these include *Falcaria vulgaris*, *Gundelia tournefortii*, *Fumaria asepale*, *Rheum ribes*, *Allium jesdianum*, *Heracleum persicum* and *Rumex crispus*. Field investigations showed that these plants are often used locally in traditional medicine for diseases related to stomach, digestion and diabetes. According to the results of this research, Delfan et al. (2019) reported in their study that these plants are used in the same way in Zagheh and Biranshahr County in Lorestan province.

Also, the species *Stachys lavandulifolia*, *Allium stipitatum* and *Thymus kotschyanus* which are used in the study area respectively to treat colds, diabetes and blood lipids and antiparasitic as well as digestive and respiratory diseases, are abundantly harvested and sold in Delfan County market.In general, the results showed that aromatic medicinal species are widely distributed, especially in the mountainous areas of Delfan County. Considering the role and importance of natural essential oils in the pharmaceutical, sanitary, cosmetic, and food industries, it is important to produce them through domestication and cultivation in fields to meet internal needs and prevent the destruction of resources and genetic resources. It is also recommended that the officials and trustees of the natural resource areas, while preserving these valuable reserves, provide the necessary information to all people in the field of not directly harvesting medicinal plants from the natural resource areas so that these huge resources can be used optimally and sustainably.

Authors Contributions
All authors have contributed equally to prepare the paper.

Availability of Data and Materials
All available and required data have been incorporated in the manuscript.

Conflict of Interests
The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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