

An Introduction on the Endangered Medicinal Species of Mountain's Kelavs (*Kelussia Odoratissima* Mozaff.) in Central Zagros in Kohgiluyeh Region, Iran

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Abstract. Medicinal species of mountain's kelavs, scientifically named (*kelussia odoratissima* Mozaffar.) is an endemic species in Iran. *Kelussia odoratissima* is a perennial species and belongs to the umbelliferae. From the ancient times, the local and nomad societies had believed that the species traditionally have anti-ache, anti-inflation and anti-cough effects. Seed and root of this species are boiled used to cure the common cold and intense coughs and its organs are been used to treat the stomachache, rheumatism and blood refining. The main purpose of this study was to introduce of *K. odoratissima* as an endangered medicinal species in Kohgiluyeh region, Iran. Geologic, topographic, climatologic information derived of the maps of them. Soil and plant cover data had been collected using quadrates establishing and analyzed. Result showed that soil texture was sandy clay loam and sandy loam that had %3.25 organic carbon. Annual rainfall was 865 mm that larger portion of it was snow. The Habitat of *K.odoratissima* was in the range of 2450 to 3000 m of sea level. The region geologically had Asmari, Pabedeh and Gourpi formations. Generally, the habitat of *K. odoratissima* was in snowy regions of central Zagros with minimum height of 2500 m, mean rainfall was more than 500 mm, with frost period more than 4 months, minimum temperature of -15°C and maximum temperature of 25°C, low depth to half-deep soil with the medium texture and with different slopes.

Key words: Kelavs Mountain, Central Zagros, Kohgiluyeh, Endangered species.

Introduction

Medicinal plants are one of the God's greatest creatures. Iran with having a suitable position because of its phylogenetical reserves (more than 7500 plant species), weathering (11 of 13 types of world climate) and political geography conditions, It can reach to an important habitat in the field of medicinal plants. Recognition and introduction of medicinal endemic plants of the country are the first steps that should be done to develop in the field of the medicinal plants. Furthermore, recognition and introduction of the plants have a basic role in management of using them. The rangelands, in addition to producing the foliage, have some other sub-product like medicinal and industrial plants, such as *Ferula gummosa*, *Ferula assa-foetida* and *Dorema ammoniacum* are exported products. Among the different plants families, Umbelliferae is consisted of a wide range of the medicinal and industrial species (Mesdaghi, 2003). Mountain's kelavs is a rare rangeland species and is an endemic plant in Iran. This species grow in the special regions in northern Zagros in SW Iran (e.g. Kohgiluyeh and Boyer-Ahmad province). Mountain's cleaves is a perennial plant that belongs to the Umbelliferae. Height of the species is about 120cm and even to 200 cm.

1. Botanical characteristics

Mountain's cleaves with cylindrical stem (round), lamina (with petiole) of 35 to 55 cm, long terminal parts with length of 7 to 10 cm long, oblong – elliptical, serrate-toothed, with jagged diagonal rule or continuous, sharp peak, close to the mesh with nervure, Umbrella 8 to 12 and radius 2 to 4.5 cm long. Sheet and bracteoles are rapidly falling, yellow petal, regular, Fruit elliptical - circular, 10 to 12 cm in length and width of 7 to 8 mm (Mozaffarian, 2007).

2. Chemical Components

In the organ of plant, a chemical

compound is found that is named "Osthole" that is soluble in alcohol and chloroform, but insoluble in water. Also, mountain's kelavs generally has 4.8% essential oil and vaporizing oil is Apiine. Its fruit has 2 to 3% yellow-white essence that consists of Anidric acid and D-Limonene. The leaves of mountain's kelavs include Apiol that leads to a bitter taste. If the leaves are exposed to the sunrays in a long time, their texture is coarser and Apiol increases (Jaberalansar and Iravani, 2005). From the ancient times, the local and nomad societies had believed that the species traditionally had anti-ache, anti-inflation and anti-cough effects. Also, new researches have proved that Flavonoids as a considerable portion of the compounds have anti-inflammation, anti-virus, anti-diabetes, anti-cancer and anti-toxin that are mainly accumulated in its seeds, stems and Inflorescences (Jaberalansar, 2005). Ftalids are an effective chemical compound that playing an important role as the nutritious supplement and a chemical factor that prevents cancer and ulcer peptic. Ftalids mainly exist in the seed of mountain's kelavs. Gandomkar (1999) expressed that more than %90 essence of the fresh and yellow leaves of the species consists of the Ftalids and the other compounds are ignorable. Saeedi *et al.* (2009) had stated that the seeds of the mountain's kelavs include %25 oil and its most important fatty acid, are Oleic acid %71.3, Linoleic acid %19.14, Palmitic acid %6.65 and Atearic acid %1.9. Ahmadi *et al.* (2007) studied the activity of the antioxidant in mountain's kelavs. The species geographically spreads in western south of Iran (central Zagros) in Isfahan, Chaharmahal-Bakhtiyari, Kohgiluyeh and Boyerahmad, Lorestan, Khouzestan and Fars province. Note that since recent two decades, the growth range of the mountain's kelavs significantly has decreased in mentioned areas. (Shafiei *et al.*, 2004). The destruction of these regions is so much

that we should design a plan to rescue Zagros region (Mosaddegh, 2005). The aim of this study is introduce, estimate and map the spread of the species in Kohgiluyeh region.

Materials and Methods

The studied region is located in NW Kohgiluyeh and Boyer-Ahmad province (central Zagros), Kohgiluyeh Township, Dishmouk district (DelAfrooz mount) that is bordered with Chaharmahal -o Bakhtiyari and Khouzestan provinces. The studied region is located at 50-18 to 50-23 eastern latitudes and 31-23 to 31-27 northern longitudes widths. In this study, the required information and data are supplied in two following methods:

Library investigations include: studying the books, journals, seminar reports, documents, these and that are achieved into the country and overseas related to the subject and based on the recent findings.

Case studies and regional studies were achieved by Agricultural and natural resource research center, Kohgiluyeh and Boyer-Aahmad province, Agricultural Jihad Organization, etc.

The field studies data were including the collection of soil vegetative cover data. Climatic, topographic and geologic, then their maps were made of and analyzed. Soil data (including organic carbon, depth and texture) and vegetative cover (i.e. coverage percent, and frequency of species) systematically collected using the quadrates plot. 220 plots sized $2 \times 2 \text{ m}^2$ had been settled along six transects with lengths of 500, 500, 350, 300 and 250 m. Note that the transects sizes were determined based on topography of the region. On the other hand, difference of transects lengths was due to the cross-section of data collection in the field and this region. Organic carbon of soil had been determined using the wet oxidation method (Walky and Black, 1934). Also, soil texture of the samples was determined by the soil texture

triangulation. Plot positions were recorded by GPS.

Results

Data analysis showed that mountain's kelavs species had the following ecological properties:

Habitat properties: The species grows in the heights 2450 to 3000 m at the steepest slopes of the province. Minimum temperature of the region is -15°C and its maximum temperature is to 25°C . The region soil generally is shallow with pebbles and semi-deep in some points. The region has 4 land units. The land has steep class at % 25 to 30 and upper.

Geology: This region geologically includes Asmari, Pabedeh and Gourpi formations.

Climate: This region, based on Iran's climatology map, is located in cold semi-humid class. Annual rainfall is about 853 mm based on a neighbor station that often consists of snow. Annual minimum and maximum temperature average are 5°C and 17°C , respectively.

Soil: Result of soil analysis showed that its texture was loam and sandy loam. Also, organic carbon of soil was %3.25. Habitat of mountain's kelavs species is located in shallow and semi-deep soils.

Vegetative Cover: Distribution map of kelavs species provide by GIS that showed in (Fig. 1). In addition, distribution classes are showed in (Table 1). Dominant types of the vegetative cover were *Prangos*, *Astragalus*, *Ferula*, *Daphne-Astragalus*, *Prangos-Kelussia*, *Kelussia-Prangos*. Of course, *Bromus tectorum*, *Cichorium intybus*, *Prangos ferulacea* species had more frequency than the other species in the plots. Some of these species were shown (Table 2). The species belonged to 13 families that separately showed in (Fig. 2). Umbelliferae and Asteraceae families had the highest frequency and Brassicaceae family had the lowest frequency.

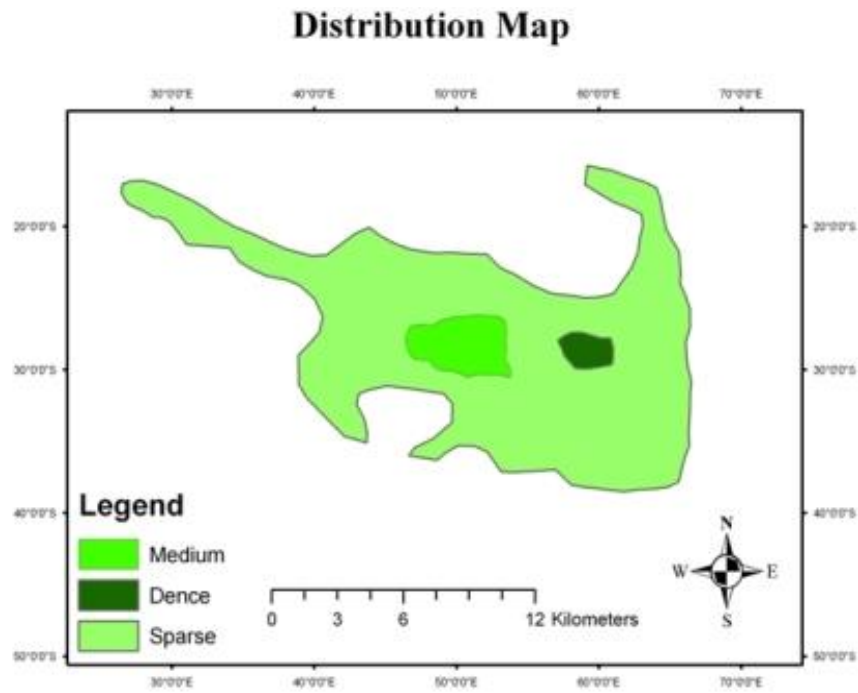


Fig. 1. Distribution map of *K. odoratissima* species in central Zagros Mountain

Table 1. Distribution classes of *K. odoratissima* species in central Zagros Mountain

Area (ha)	Percent canopy	Class
0.6	> %50	Dense
9.0	%25 –50	Medium
1486	%0.0 – 25.0	Sparse

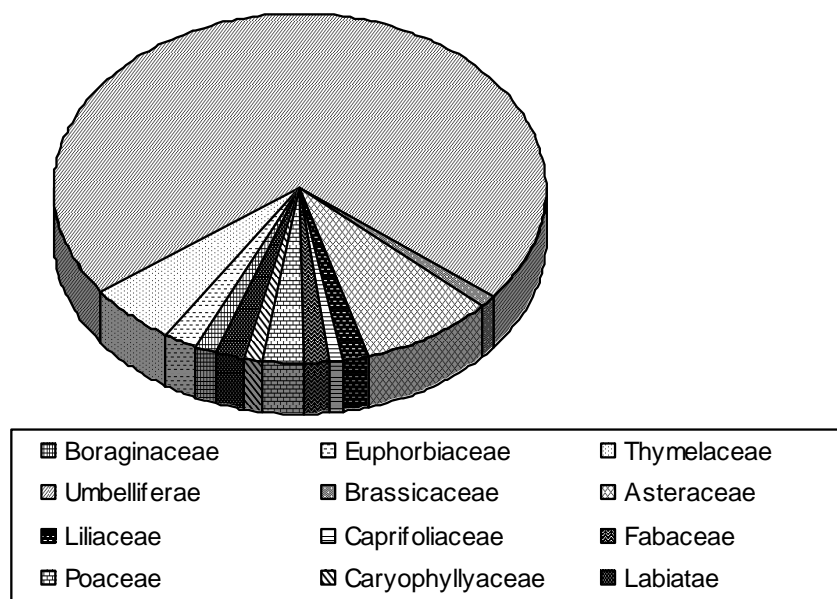


Fig. 2. Histogram of the families and their cover percent

Table 2. Some of plant species in the study region

Species	Family	Growth form	Biological form	Life
<i>Acer monspessulanum</i>	Acteraceae	T	PH	P
<i>Achillea tenuifolia</i>	Asteraceae	F	HE	P
<i>Acanthophyllum spinosum</i>	Caryophyllaceae	SH	CH	P
<i>Allium bodeanum</i>	Liliaceae	F	GE	P
<i>Allium hirtifolium</i>	Liliaceae	F	GE	P
<i>Alyssum bracteatum</i>	Brassicaceae	F	TH	A
<i>Amygdalus lycioides</i>	Rosaceae	T	PH	P
<i>Anthemis haussknechtii</i>	Asteraceae	F	TH	A
<i>Apium nodiflorum</i>	Umbelliferae	F	HE	P
<i>Arabis caucasica</i>	Brassicaceae	F	HE	A
<i>Arnebia decumbens</i>	Boraginaceae	F	TH	A
<i>Artemisia aucheri</i>	Asteraceae	SH	CH	P
<i>Arum albispatum</i>	Araceae	F	GE	P
<i>Asperula orientale</i>	Rubiaceae	F	TH	A
<i>Astragalus adscendens</i>	Fabaceae	SH	PH	P
<i>Astragalus cephalanthus</i>	Fabaceae	SH	He	P
<i>Asyneuma multicaule</i>	Campanulaceae	F	HE	P
<i>Bromus rubens</i>	Poaceae	Gr	TH	A
<i>Bromus tectorum</i>	Poaceae	Gr	TH	A
<i>Cichorium intybus</i>	Asteraceae	F	HE	P
<i>Daphne mucronata</i>	Thymelaeaceae	T	PH	P
<i>Dorema aucheri</i>	Umbelliferae	F	HE	P
<i>Echinops cephalotes</i>	Asteraceae	F	HE	P
<i>Euphorbia helioscopia</i>	Euphorbiaceae	F	HE	P
<i>Ferulago angulata</i>	Umbelliferae	F	HE	P
<i>Gundelia tournefortii</i>	Asteraceae	F	HE	P
<i>Hespris luristanica</i>	Brassicaceae	F	HE	P
<i>Hordeum bulbosum</i>	Poaceae	Gr	GE	A
<i>Hordeum vulgare</i>	Poaceae	Gr	TH	A
<i>Kelussia odoratissima</i>	Umbelliferae	F	HE	P
<i>Lepidium sativum</i>	Brassicaceae	F	TH	A
<i>Lonicera nummulariifolia</i>	Caprifoliaceae	T	PH	P
<i>Mentha longifolia</i>	Labiatae	F	HE	P
<i>Nepeta persica</i>	Labiatae	F	HE	P
<i>Phlomis olivieri</i>	Labiatae	F	HE	P
<i>Poa bulbosa</i>	Poaceae	F	GE	P
<i>Prangos ferulacea</i>	Umbelliferae	F	HE	P
<i>Rhabdosciadium aucheri</i>	Umbelliferae	F	HE	P
<i>Scariola orientalis</i>	Asteraceae	F	HE	P
<i>Solenanthes circinnatus</i>	Boraginaceae	F	HE	P
<i>Taraxacum syriacum</i>	Asteraceae	F	HE	P
<i>Thlaspi arvense</i>	Brassicaceae	F	TH	A
<i>Thymus daenensis</i>	Labiatae	F	CH	P
<i>Tragopogon montanus</i>	Asteraceae	F	HE	P
<i>Vicia kotschyana</i>	Fabaceae	F	TH	P

Ge: Geophytes, TH: Therophytes, PH: Phanerophytes, HE: Hemicryptophytes, CH: Chamaephytes

A: Annual, P: Perennial, F: Forbs, Gr: Gramineae, Sh: Shrub, T: Tree

Discussion and Conclusions

Iran has many capabilities in related to the medicinal plants. This country is the habitat of over 7500 plant species, because of its climatic diversity and high biodiversity it is comparable to Europe's diversity. Based on some studies, about 10 to %15 of Iran's species consist of the medicinal plants (Ebrahimi, 1995). Mountain's kelavs is one of the endemic medicinal species in Iran. Studying the habitat of this plant in Kohgiluyeh region and other similar regions, the result showed that some of its habitat characteristics are highlands and snowy upper heights that are in central Zagros. However, nowadays, this species only is found in rough and far regions. In general, mountain's kelavs grows in the lowest heights about 2500 m above sea level with annual rainfall of 500 mm that consists of %60 snows. Frost period of the its habitat often continued for at least 4 months. Its minimum temperature is -15°C and exceeds rarely over 25°C during the growth season. It also grows in some low regions of central Zagros that had limited to the northern slopes that is either snowy or lower temperature. Natural habitats of mountain's kelavs species are allocated in the shallow to very deep soils with moderate to heavy texture that has high water storage capacity and lacks of salinity and alkalinity. Shafiei *et al.*, (2004) reported that its grows area decreased since 1992 to 2004 from 10425 to 1175 ha, respectively. Whereas, in present study, its habitat area was recognized as only 100 ha. Some evidences also indicted that the growing area of this species has decreased to fewer than 100 ha. Therefore, mountain's kelavs severely are being destruct and it is endangered. Main reasons of destruction in this species are multi-objective uses of this such as consuming, herbage, medicinal, bee breeding and so on. On the other hand, this species is used by either the human

or the cattle. That is why that this species has been over utilized. Increasing the cattle and ranches and ignoring the appropriate principals of utilization (e.g. overgrazing, grazing premature and eradication) are the other reasons of rangeland destruction under planting of mountain's kelavs species. Increasing consumption demand of the rural and municipal communities is the other factor affecting the extinction, so that price of the green organs and fresh products of the species has greatly increased. On the other hand, because of having severe economical and cultural situation, farmers harvest the organs of it using different instruments, while the snow is melt. Thereby they supply a portion of the prices of their life expenditure via selling it that in many cases, because of ignoring appropriate principles of harvesting, or to hurting its root or bulb this plant entirely are extinct. Based on IUCN, plant species are classified in four classes including exposing, extinction species, with lower risk, vulnerable and with lack of data (Jalili and Jamzad, 1999). Evidence shows that mountain's kelavs species is in endangered species class. This species will be endangered soon with a very high possibility in future. If its conservation and enclosure measures are not achieved, the species may be extinct and will be into the extinct class. At present, employment is one of the main worries of the graduates. We look forward to the governmental organizations and financial and credit institutes to make the situations in which such graduates can develop sites of the plants in the susceptible lands in the country by establishing private corporations and utilizing such plants appropriately. Mountain's kelavs species is one of the first cases for solving this problem that can attracts many volunteers in both the country and world scales using relevant advertisements.

References

- Ahmadi, F., Kadivar, M. and Shahedi, M. 2007. Antioxidant activity of *Kelussia odoratissima* Mozaff. In model and food systems. Food Chemistry. **105(1)**: 57-64. (In Persian).
- Ebrahimi, A. 1995. Medicinal plants of Iranian plateau and Arasbaran, The national conference of medicinal plants of Iran. (In Persian).
- Gandomkar, M. 1999. Investigation of phytochemical volatile oil of *Kelussia odoratissima*. Thesis PhD medicinal science university of Tehran, 83 p. (In Persian).
- Jaberalansar, Z. 2005. Investigation Genetics diversity eight mass *Kelussia odoratissima* plant using chromosome properties and seed germination characteristic. Thesis M.Sc. Isfahan Industrial University, 86p. (In Persian).
- Jaberalansar, Z. and Iravani, M. 2005. *Kelussia odoratissima* plant species endangered in central Zagros region. Issue educational and promotional, 39p. (In Persian).
- Jalili, Z., and Jamzad, Z. 1999. Red data book of Iran. A preliminary survey of endemic, rare and endangered plant species in Iran. Research Institute of Forests and Rangelands (RIFR). Pp: 748.
- Mesdaghi, M. 2003. Range management In Iran. Astane Ghods Publishers, 333p. (In Persian).
- Mosaddegh, A. 2005. Biodiversity. Mojesabz Publishers, 131p. (In Persian).
- Mozaffarian, V. 2007. Flora of Iran, Umbelliferae. Research Institute of Forests and Rangelands Publications, 431p. (In Persian).
- Saeedi, K., Khorshidi, J., Khoshkam, A. and Omidbagi, R. 2009. Analyzes and materials of seed of *Kelussia odoratissima*. The first national conference science and seed technology in Iran (Gorgan). (In Persian).
- Shafiei, A., Syahpour, A. and Kazemi, A. 2004. Investigation development of implant *Kelussia odoratissima* and beneficiary method from it in similar regions in Kohgiluyeh and Boyrahmad Province. Research Project, 11p. (In Persian).
- Walky, A., and Black, I. A. 1934. An examination of Degtjareff method for determining soil organic matter, and a proposed modification of the chromic acid titration method. Soil Science, **37(1)**: 29-38.