Ethnobotany of *Juniperus excelsa* M. Bieb. (Cupressaceae) in Iran

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Research

Abstract

Ethnobotanical data of *Juniperus excelsa* M. Bieb. in Iran is documented from various historical, religious, literary, linguistic and pharmacological viewpoints. Field trips were conducted to different habitats of *J. excelsa* in Iran during 2006-2010 to collect ethnobotanical information about the plant. The present study reveals that *J. excelsa* is considered as a multi-purpose tree by indigenous people of Iran, and has been used as medicine, incense, material for constructing buildings, fencing, different household articles and decoration. It is respected as a "holy" tree by some Turkmen and Kurdish tribes in Iran.

Introduction

Juniperus L. (Cupressaceae) is a genus of evergreen shrubs or trees and the second most diverse of the conifers, with some 67 species in the world occurring from sea level to above the tree-line (Adams 2004). Junipers are long-lived trees which sometimes live up to 2000 years. This genus is represented in Iran by five species, namely, *Juniperus communis* L., *Juniperus excelsa* M. Bieb., *Juniperus foetidissima* Willd., *Juniperus oblonga* M. Bieb and *Juniperus sabina* L.

Juniperus excelsa occurs in the Mediterranean region, SE Europe, Caucasus, Iran, Iraq and the Arabian Peninsula. It is taxonomically the most difficult and the most common juniper species in Iran. It can be found almost in all alpine regions of Iran including the Alborz and Zagros mountain chains and higher elevations of SE Iran (Assadi 1998, Zare 2001) (Figure 1). It survives under harsh climatic conditions of mountain rocky escarpments, and is considered as a unique precursor tree species in such habitats.

Members of local communities in Iran likely have been using *J. excesla* for different purposes for a long time. However, traditional knowledge regarding the use of *J. excelsa* by indigenous communities in the country has not yet been fully documented. The present study aims to obtain a better understanding of the traditional knowledge of rural people of Iran about *J. excelsa*.

Botanical Description

Juniperus excelsa (syn. *Juniperus polycarpos* K. Koch & *Juniperus macropoda* Boiss. var. *polycarpos*) is an evergreen tree or occasionally a shrub, up to 20-25 m tall, with a pyramidal or broad crown. Juvenile leaves are ternate, acicular, while mature leaves are scale-like, ovate-rhombic, light green or yellowish-green. Male strobili are solitary, terminally located on ultimate branchlets. Female cones are mostly solitary and axillary, sub-terminally located on ultimate branchlets, surrounded by green leaves or bracts, purplish-green to blue colored (Figure 2). Mature cones are globose, purplish-brown to blackish-purple.

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Figure 1. Major mountain chains of Iran. Provinces of Iran in which research was conducted: **A**) West Azarbaijan, **B**) East Azarbaijan, **C**) Ardebil, **D**) Qazvin, **E**) Tehran (now divided into Alborz and Tehran provinces), **F**) Mazandaran, **G**) Golestan, **H**) Khorasan Shomali, **I**) Semnan, **J**) Khorasan Razavi, **K**) Lorestan, **L**) Isfahan, **M**) Yazd, **N**) Kohgilūyé va Boyer-Ahmad, **O**) Fars, P) Kerman, and **Q**) Hormozgan.

Geographical Distribution and Habitat of J. excelsa In Iran

Juniperus excelsa is generally a higher altitude taxon. It occurs throughout the hills and mountains of remote areas in Iran (Figures 1,3). The Alborz mountain chain in north, the Kopet-dagh mountains in the northeast, the Zagros mountain chain in the west and southwest, the Jebale e Barez, and Makran mountains in south and southeast of Iran comprise its natural habitats in the country. It becomes increasingly rare southwards, along the latter mentioned mountains. Figure 4 shows the distribution of *J. excelsa* populations in Iran.

The tree lives in altitude ranges from 1000 m a.s.l. (Ashkhaneh in Kopet-dagh mountains) to 3500 m a.s.l. (Dena in the Zagros Chain) in Iran. It forms the tree-limit in several mountain ranges and grows mainly on stony, rocky calcareous or non-calcareous slopes with an annual precipitation between 500-1000 mm. The plant is resistant to summer drought and heat, and forms open forests growing mixed with *Amygdalus scoparia* Spach and *Acer monspessulanum* L. It also comprises parts of oak-scrub communities with *Pistacia khinjuk* Stocks and *Pistacia atlantica* Desf., in the Junipereto-Pistacietea steppe forests of Iran (Zohary 1973).

Figure 2. Female (top) and male (bottom) cones of *Juniperus excelsa* M. Bieb. in Iran.

Iran was host to vast Juniper forests in the past, so that, the total surface of Juniper forests of the country was estimated around 3,400,000 ha, about 100 years ago. But it decreased to 1,100,000 ha, in 80 years (Zare 2001). This dramatic decrease is partly because of the excessive use of the plant as fuel in winters. The other reason is due to the exceedingly slow growth of juniper; so that in many areas groves of very old trees occur, with little or no signs of rejuvenation. Dormancy of Juniper seeds is broken by passing through the stomach of animals such as bears. Consequently, there are relatively rich populations of juniper in national parks and protected areas, such as Golestan and Jahan Nama (Golestan province),

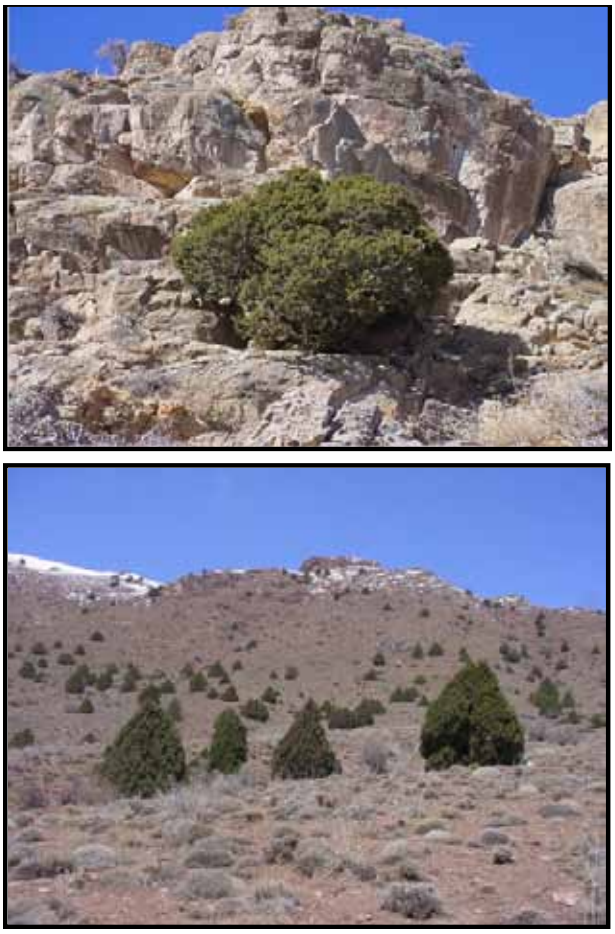

Figure 3. Habitats of *Juniperus excelsa* M. Bieb. in Iran.

Tandureh (Khorasan Razavi province) and Khabr (Kerman province) where bear populations are protected.

Methods

Several field trips were conducted to different parts of Iran during 2006-2010 to document the human interactions with *J. excelsa*. Khorasan (Khorasan Razavi and Khorasan Shomali), Golestan, Mazandaran, Gilan, Yazd, Kerman, Kohgilūyé va Boyer-Ahmad, Hormozgan, Isfahan, Lorestan, Ardebil, West and East Azarbaijan, Tehran and Semnan (Figure 1) were among the surveyed provinces which are home to *J. excelsa* populations. These areas are inhabited by the Turkmen, Azeri, Mazandarani, Fars, Lurs and Kurdish ethnic communities.

A total of 63 informants were interviewed in visited areas. Interviewees were selected among elderly people, shepherds and traditional healers in visited regions. An open-ended interview with a questionnaire was used to document ethnobotanical data obtained from native people during field surveys. Vernacular names, medicinal uses, mode of administration for treating human ailments along with other specific uses were recorded in the question-

Figure 4. Distribution of *Juniperus excelsa* M. Bieb. in provinces of Iran: **A**) West Azarbaijan, **B**) East Azarbaijan, **C**) Ardebil, **D**) Qazvin, **E**) Tehran (now divided into Alborz and Tehran provinces), **F**) Mazandaran, **G**) Golestan, **H**) Khorasan Shomali, **I**) Semnan, **J**) Khorasan Razavi, **K**) Lorestan, **L**) Isfahan, **M**) Yazd, **N**) Kohgilūyé va Boyer-Ahmad, **O**) Fars, P) Kerman, and **Q**) Hormozgan.

naire. Interviews were done in the fields or homes of villagers and traditional healers. Interviewees were asked to come to the field and identify the plant. In cases of elderly people who were not able to come to the field, photographs, small branches and fruits of the tree were shown to them to confirm the plant name. Voucher specimens are deposited at the Central Herbarium of Tehran University (TUH) and the Herbarium of Traditional Medicine and Materia Medica Research Center (TMRC).

Results and Discussion

Vernacular names of Juniperus excelsa in Iran

Juniperus excelsa has a variety of local names in different parts of Iran (Table 1). The most widely known common name is **ors**. The documented plant part uses are also summarized in Table 1. No traditional use was documented by our survey in East Azarbaijan, Khorasan Razavi, Kerman and Yazd provinces.

Table1. Ethnobotanical uses of *Juniperus excelsa* M. Bieb. in different provinces of Iran surveyed between 2006-2010.

Province	Vernacular name(s)	Parts used	Uses/ mode of preparation
Ardebil	-	Wood, female cones	Wood is used as fuel & for building houses. Female cones are used as a diuretic.
Fars	**Wol**	Wood, female cones	Wood is used as fuel & for household articles & fencing. Female cones are used for decoration.
Golestan	-	Wood	Wood is used for building houses. In some parts, the tree is considered as holy and the wood is used in cemeteries for good people as an emblem of eternity.
Hormozgan	**Aures**	Wood, female cones	Wood is used as fuel, for household articles & fencing. Powdered mature female cones are used for muscle pain.
Isfahan	-	Leaves	Leaf smoke is used to treat parasites.
Khorasan Shomali	**Archa**	Wood, female cones, leaves	Wood is used as fuel & for household articles. Female cones as eaten for digestive problems. Leaves are used for incense.
Kohgilūyé va Boyer-Ahmad	**Wol**	Wood, gum, female cones, leaves	Wood is used as fuel, & for making household articles & fencing. Gum is used to treat toothaches. Powdered female cones are used for for menstruation disorders, uterine cists, female infertility, & prostate & urinary problems. Leaves are used for incense.
Lorestan	**Aors**	Wood, female cones	Wood is used for building houses. Female cones are eaten.
Mazandaran	-	Wood, leaf, gum	Wood is used as fuel. Smoke of wood, leaves & gum are used as an anti-bacterial, anti-parasite & to repell evil & diseases.
Qazvin	**Aversk**, **Abersk**	Wood	Wood is used as fuel, for household articles & fencing.
Semnan	**Gouz**, **Komrud**, **Arves**	Wood, gum, leaves	Wood is used as fuel. Gum is used to treat stomach ache. A leaf infusion is used for cardiac & nervous problems, & as a natural dye.
			It is considered as holy in some parts of the province.
Tehran	**Abhil**	Female cones	Cones used as a diuretic, for dysmenorrhea & intestinal indigestion (Hooper & Field 1937, Parsa 1960).
West Azarbaijan	**Aorest**	Gum	Gum is used for backache and rheumatism.
			The tree is considered as holy.

Different uses of J. excelsa by local communities in Iran can be classified as below:

House building, household articles and fencing: The main importance of *J. excelsa* lies in its suitability as timber for building houses and fencing. In most visited areas, the bark is used for roofing and dried long branches are used as a hedge for fencing.

Fuel: The tree has a long history of use as fuel almost in all studied regions.

Decoration: Dried female cones and small young branches of *J. excelsa* are used for decoration in some villages.

Incense: Dried leaves of *J. excelsa*, usually mixed with other available aromatic plants such as leaves of *Peganum harmala* L., are used as incense.

Food: In some areas raw or baked female cones are eaten as food. Local people of Esfarayen (Khorasan Shomali province) consume raw cones with rice. Female cones are eaten raw or in a decoction to prevent stomach reflux.

Pain reliever: Gum and female cones are used as a pain reliever by local inhabitants in some parts of visited areas. Indigenous people of Genu mountain (Makran mountains), powder the dried female cones and spread it over the dried skin of animals. The painful part of the body is covered by this skin for about 4 hours a day until the pain is completely relieved. In West Azarbaijan, people use the gum for relieving rheumatism pains and backache. Indigenous people of Kohgilūyé va Boyer-Ahmad province put the gum directly on an aching tooth to relieve the pain.

Female infertility & menstruation disorders: A decoction of *J. excelsa* female cones is used to treat menstruation

disorders by local people of Kohgilūyé va Boyer-Ahmad province. They also use powder of cones as a component of their traditional remedy for female infertility and uterine cysts. Indigenous people of Tehran province use the powdered cones for dysmenorrhea.

Prostate and urinary problems: A decoction of female cones is taken orally for prostate problems by local people of Kohgilūyé va Boyer-Ahmad province.

Anti-biological uses: Wood, leaf and gum smoke of *J. excelsa* is used as an anti-bacterial and anti-parasite in some provinces. Indigenous people of Mazandaran province use smoke of different plant parts as an anti-bacterial agent to protect themselves from different diseases. Local people of Isfahan province expose their cattle to the smoke of Juniper leaves to kill parasites of their skins and wool.

Cardiac and nervous problems: A dried leaf infusion of *J. excelsa* is taken by people of Semnan province to treat cardiac and nervous problems.

Digestive disorders: Female cones are eaten by local people in Khorasan Shomali and Tehran provinces for stomach and intestinal problems.

Diuretic: Powder of female cones is eaten as a diuretic by people of Tehran and Ardebil provinces.

Sacred symbol: *Juniperus excelsa* is considered as a holy and highly respected tree in some parts of Semnan, Golestan and West Azarbaijan provinces. Some villagers of West Azarbaijan believe that the tree is an emblem of martyrs, and no one is allowed to cut the tree. People of Turkmen Sahra in Golestan province, use the evergreen branches of the tree in their cemeteries. Long branches are placed beside the graves of their popular religious male leaders to show that they are always alive and will never be forgotten. While, the branches used for females are shorter. Being evergreen is maintained as a symbol of eternity by these people. Local populations in Mazandaran province state that in their traditional beliefs the smoke of different plant parts repels evils.

Discussion

The results of this study reveal that *J. excelsa* is widely used in Iran and therefore likely has been used for a long time. It is interestingly considered as a sacred tree and highly respected by some indigenous communities. The plant is used both medicinally and non-medicinally by the local inhabitants of the studied regions. The most common use of the tree concerns its wood as fuel and material for building houses and fences as well as making household items. The second most used part of the tree is the female cones, that have a wide range of medicinal and non-medicinal purposes. Gum is used mainly for medicinal purposes such as relieving pains. However, the main medicinal part of the tree is the female cone with a relatively wide application in traditions and practices related to curing different health problems. Leaves are sometimes used for incense and producing natural die.

Similar ethnobotanical uses have been reported for *J. excelsa* in the adjacent countries. It has been a source of timber and fire wood in Pakistan and Turkey (Kargioğlu *et al*. 2010, Walikhan & Khatoon 2007). The tree is used as an antiseptic and parasiticide for animals in Turkey (Bonet & Valles 2007). Similarly, the same use is recorded from Isfahan province by the current study. Muhammad *et al*. (1992) reported antibacterial diterpenes from leaves and seeds of *J. excelsa*. This observation confirms the traditional application of the leaves as an anti-bacterial and parasiticide. In addition to Khorasan Shomali and Semnan provinces of Iran, use of female cones for digestive problems is common in different parts of Pakistan, where they are considered as carminative and used against stomach cramps (Baqar 1989, Hussain *et al*. 2006). Female cones usage for treating problems of urinary system is widespread in Pakistan as well as some parts of Iran. Indigenous people of Pakistan use the cones for treating urinary problems, kidney stones and bladder weakness (Walikhan & Khatoon 2007). The cones are used in Iran and Pakistan for their diuretic and stimulant properties (Baqar 1989, Djavanshir 2003, Hooper & Field 1937, Parsa 1960). They are also used in treating gonorrhoea (Baqar 1989, Djavanshir 2003).

There are other therapeutic effects reported for female cones in folk medicine of Pakistan. Mature female cones are taken orally to relieve headache and fever (Goodman & Ghafoor 1992); they are applied for treating skin diseases, diabetes and different respiratory problems such as asthma and tuberculosis (Baqar 1989, Hussain *et al*. 2006, Qureshi *et al*. 2006); the paste of cones is applied on painful joints and swellings (Qureshi *et al*. 2006); and they have been mentioned to be useful in treating dropsy, gleet, leucorrhoea (Baqar 1989). Ash of wood and leaves is sometimes applied for treating certain skin infections in Pakistan (Walikhan & Khatoon 2007). The mentioned uses were not recorded by our study in Iran.

Conclusions

The present study concluded that *J. excelsa* has been, and is widely used where it grows by indigenous people in Iran. The importance of the plant as an energy resource has been diminished because of reduced population sizes. However, it has still retained its importance as a plant resource for medicine among local populations of the country. Local communities in Iran have knowledge of different aspects of uses of *J. excelsa*. This indigenous information about plant part uses and knowledge of the

people about the utilization of plant resources should be preserved for future generations and studies.

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