
Ethnobotany of date palm (*Phoenix dactylifera*) in Baluch tribe of Saravan region, Baluchistan, Iran

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This study surveys the ethnobotany of *Phoenix dactylifera* in Saravan region of Iran from various aspect including distribution, economic, linguistic, food and pharmacological. A questionnaire for data collection of Date Palm was prepared and 80 farmers were interviewed. Field trips were conducted to different groves of *Date palm* for collection of ethnobotanical information about this plant in Saravan during 2010-2013. The present study reveals that date palm groves are concentrated in Saravan, Jalgh and Gosht. Total area under date's cultivation in the district is 19,000hectares, with total production of 50000-60000 tons per year. Results showed that dates have a great potential for economic preferment of the people in this area. Mozafati and Rabbi are the dates that have economic value. *P.dactylifera* is considered as a multi-purpose tree by native people of Saravan Rural houses are constructed by leaves and trunks of date palm. Moreover leaves of this species are used for handcrafts. The fruits are aphrodisiac and also used as medicine for cough, blood purgation, anemia, laxative, and cancer. Decoction of seeds is applied for kidney problems and grinded seeds are used as fodder for animals. *P.dactylifera* is respected as a "life" tree among the Baluch tribes and has been used as food, animal feed, medicine, buildings material, fencing, different household articles, decoration and handcrafts. Major problem in this region from orchardist viewpoints, are insect damage, fruit slump, little information about customers and markets, lack of modern techniques for harvesting, processing, packaging and specially lack of substructure for producing good quality fresh dates.

Key words: Ethnobotany, *Date palm*, Saravan

Introduction

Indigenous knowledge has an important role in development of commercial products and sourcing of medical remedies. Recently, research in the field of ethnobotanical studies has increased on medicinal, cultural and commercial ethnobotany (Egbe *et al.*, 2012). One of the earliest plants that have

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a long historical use with sustaining mankind life is *Phoenix dactylifera* L. that its cultivation may have been return to 5000 B.C (Popenoe, 1924). This plant is a monocotyledoneus woody perennial that commonly known as date palm belonging to Arecaceae family. Arecaceae mainly distributed in the desert and semi-desert areas of the world and has 200 - 210 genera with 2800 - 3000 species. All species of *Phoenix* genus are adornmental, except date that has been cultivated for its fruit. (Shafi Bhat and Al-Daihan, 2012; Ghahraman, 1985). The date palm demonstrate that life current in the desert area, because this plant endures high temperatures, drought and salinity more than many other fruit crop plant species. Date palm among heavenly religions has a special sanctity. The Holy Qoran refers the date palm in many suras (chapters) and verses. Prophet Muhammad (peace is upon him) is reported to have said that the best property is the date palm, that cure many disorders, and he urged Muslims to eat dates and tend it (El-Juhany, 2010). Iran is one of the largest producers of date. There is 1108677 tons production of this fruit through the years of 2011 (FAO) (GolshanTafti *et al.*, 2006; Iranmanesh, 2006). The palm tree is highly regarded to researchers from many disciplines involve of Agriculture, Biological Sciences, Animal Sciences, Chemistry and Medicine. Anwar in 2006 carried out a bibliometric analysis of the literature on date palm. His studies showed that research on date palm grew very fast from 1971 onward, had the highest growth in 1989 and stabilized after that. The results confirm that the literature on date palm is of interdisciplinary nature. According to Anwar reports, many ethnobotanical studies on the dates have not been conducted (14 paper citations until 2004). A few ethnobotanical research have been done in date palm, whiles regarding Plant Physiology, Plant Diseases, Food and Feed Chemistry have been presented more than 300 papers. Marwat *et al.* in 2012 investigated etnobotanical and Socio-Economic aspect of Dwarf Palm (*Nannorhops ritchieana*) and Date Palm in Dera Ismail Khan District of Pakistan (Marwat *et al.*, 2012). In Iran, the studies on this species despite its high value, is low. So far, no ethnobotanical study has been reported. This work highlighted some current uses of the date palm by Baluch community in Saravan.

Geographical Distribution of date palm

Exact native distribution of date palms is unknown, but probably originated somewhere in the desert oases of northern Africa and Western Asia. Dates are cultivated on about 2.9 million acres of land and produced in 35 countries worldwide (Al-seeni, 2012; Bhat and Al-Daihan, 2012).To the late

nineteenth century date palm was cultivated only in the old world. Nowadays, it is cultivated in many parts of the world such as United States: California, Arizona, Texas; Mexico; Brazil; Argentina; South Africa; Australia; Namibia). Although, the major production is still in the Arabic region and in the Middle East (www.naturland.de).

In Iran, date palm has been cultivated in 13 provinces. More than 99% of annual productions of this crop are from Hormozgan, Kerman, Fars, Sistan and Baluchistan, Bushehr, and Khozestan provinces (figure 1) (Hajian, 2005). Sistan and Baluchistan province has 42623.5 (hectare) dry and irrigated groves in Iran and has first position of date cultivation in this country. This province produces 163120.32 tons date per year that is ranked five production of Iran. (Jahad Agricultural Organizations Reports). Saravan in this province has many palm gardens. Most of the plantations and groves of date palm in Saravan are concentrated in MokSokhteh (8000 hectares) of Jalgh district.



Fig. 1. Date palm cultivation region in Iran. The provinces sorted on the basis of average production, reported by Agriculture-Jihad ministry in 2011. 1: Jiroft region in Kerman, 2: Bushehr, 3: Kerman, 4: Khozestan, 5: Sistan and Baluchestan, 6: Fars, 7: Hormozgan, 8: Yazd, 9: Kermanshah, 10: South Khorasan, 11: Kohgiluyeh and Boyer-Ahmad

Material and methods

Description of study area

Saravan is located in the southern-east of Baluchistan between $62^{\circ} 17' 5.38''$ to $62^{\circ} 22' 2.56''$ longitude and $27^{\circ} 20' 14.53''$ to $27^{\circ} 24' 28.26''$ latitude, 1000–1500

m above sea level (Hafezi moghadas *et al.*, 2009a, 2010b) (figure 2). The longest mountain of this area is Siahan chain that located at east of it and started from near of Taftan mountain and continue to Nahook where is close to Pakistan. Bark mountain chain resides in the west of this region. The most important river is Mashkik that originated from the southern hillside of this township where is near to Khash. The weather of study area is warm and semi-dry having low rain. However, the weather of this location is modest in winter with average of 100 mm per year rainfall (<http://www.sbportal.ir/fa/sistan/cityinformation/saravan>).

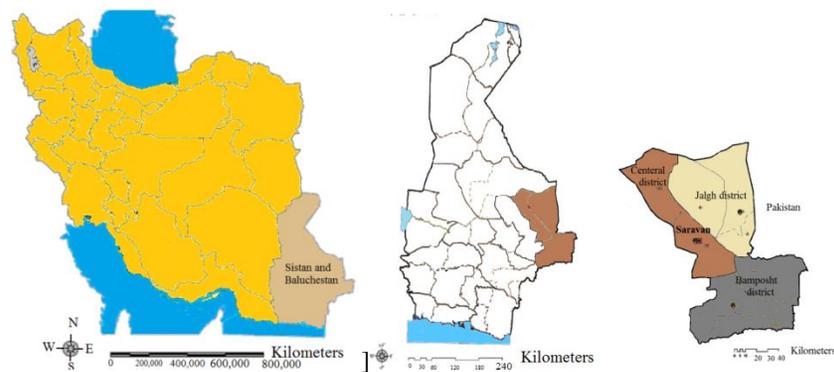


Fig. 2. Map of the study area (Sistan and Baluchistan province, South East of Iran, Saravan)

Data collection

This research work conducted during 2011-2013 in Saravan, Iran. Questionnaire for data collection of Date Palm was designed and farmers were interviewed. Information including the date palm production, main date cultivars, local terms and dialects about date, the different use and parts use of dates, and related problems and challenges was recorded. Mean age of informants was 45 year and 85% were male.

Results

According to important role of date in this region, the different uses of the date palm were classified into six categories including: food, handicraft, construction, medicine/cosmetics, fertilizer, and direct use .The documented plant part uses are also summarized in Table 1.

Date palm cultivars of Saravan

There are about 1,500 known date palm cultivars in the world, (Jaradati and Zaid, 2004) though Bashah mentioned the number as high as 5,000 cultivars (Bashah, 1996). Each cultivar is insulated from a unique seed, cloned and multiplied vegetatively'. Moreover, tissue culture' have increased the number of date palm cultivars recently. (Jaradati and Zaid, 2004)

In Iran there are more than 400 varieties of dates that they are the richest germplasm in the world. About 50 varieties of them have a feeding value that can be exported (Pezhman, 2002). Different Varieties of dates don't have scientific name so that natives nomenclature them according to condition and morphological properties, (Siahpoosh *et al.*, 2011). Some of the most commercial cultivars of date palm in Iran are: Mozafati, Barhi, Kabkab, Rabbi, Shahani, Mordaseng, Khasi, Zahidi, Gantar, Piarom, Almehtari, Sayer (Hajian, 2005). About 56 cultivars have been identified in Saravan (Agricultural Jihad of Saravan, unpublished data), that their prominent are Mozafati, Rabbi, Zardan, Rengeno, Makili, Halile, Shendeshkan, Sabzo, Popo, Kalegi, Sohrok, Pimazoo, Khoshkij, Kroch, Baranshahi. The cultivars are categorized in three main groups depend on their moisture percent involve: soft (e.g. Rabbi, Mozafati, Koroch), semi-dry (e.g. Charpan), and dry (e.g. Pimazoo, Rengeno, Popo). Common date palm cultivars of Saravan were collected and identified by locals. Some of their physical properties were studied, results showed in table 1.

Table 1. Some physical properties of nine local date cultivars grown in Saravan

Cultivars	Fruit Length (cm)	Fruit diameter (cm)	Fruit pulp weight(g)	Seed weight (g)	Total weight	Fruit moisture percentage
Mozafati (S)	4.04	2.76	16.22	1.26	17.50	38.89
Rabbi (S)	4.57	2.00	12.91	0.89	13.85	41.32
Zardan (S)	3.49	2.10	8.47	1.06	9.54	45.26
Rengeno (D)	3.47	1.82	6.99	0.99	7.99	14.59
Sohrok(S)	3.70	2.15	9.70	0.85	10.75	45.49
Koroch (S)	3.38	1.89	8.30	1.01	9.37	43.14
Kalegi(S)	3.01	2.18	7.86	1.00	8.95	44.89
Halile	3.13	2.54	12.71	0.71	13.46	41.39
Pimazo (D)	3.81	2.82	5.33	0.83	6.17	17.01

Table 1. Some physical properties of nine local date cultivars grown in Saravan (con't)

Cultivars	color	shape	maturity	Other propertis
Mozafati (S)	Black	Thick	Sept.	the most famous cultivars that accounts for 10% of total Iranian date crop. long shelf life
Rabbi (S)	Black	Long	Sept.	a cultivar favoured by many Baluchs for its sweetness level and very popular in Jalgh region of Saravan.
Zardan (S)	yellow-brown		Aug	medium-sweet date, precocious
Rengeno (D)	Brown to Dark Brown	Long Thick	Sept.	wrinkled skin is very sugary and is famous as "chocolate date"
Sohrok(S)	Black		Sept	
Koroch (S)	dark-brown	Short and Thick	Oct.	
Kalegi(S)	bright brown		Sept	tender skin, sweet flavor, small seed
Halile Pimazo (D)	yellow	Long	Nov Oct	serotinous



Fig. 3. Common date palm cultivars of Saravan

Hamin, date harvesting, in Saravan

In Iran, date harvesting time, depending on the variety, starts from August and last to the end of November. Date harvesting in Baluchistan named Hamin. It's started of first summer to after that. Hamin vary in different parts of Balochistan. The primary hosts are areas with warmer weather and the region is cooler, later to be greeted Hamin. Each year depending on variations in atmospheric conditions and wind, beginning of Hamin varies. This season often takes about 4 months. The end of Hamin is named "Iirhet". In Saravan, Hamin starts with Zardan date variety and ends with Halile. Mozafati variety located approximately in the middle of harvest, Hamin, and devoted most of the Hamin time.

Linguistic term in Date palm (terminology)

Ahmad Parsa (VIII, pp. 139-41) has included a list of eighty-four names (without a gloss) for date varieties in Makrān (<http://www.iranicaonline.org/articles/date-palm>). Many vernacular terms related to dates, is used by Baluch tribes that some of them still used

Mòk: The vernacular name of date palm in Baluchistan. So Baluchistanis called the Makran (this region is rich palm land area) (Dehvari. M, 2008).

Ivar: traditionally fertilization of the female flowers by male pollen that is done by man

Goarank: The date palm is propagated only by planting shoots

Kònt: trunk of date palm

Gòzhn: male plants

Gaddag: date pits (seed)

Sis: Palmtrunk fiber that is located in side of branches

Kònkòr: Sheath that pollen is located inside it.

Mòhak: root of date

Mahr: thick branch of date

Kušk: matter in themiddle of the palm trunk that is delicious and sweet

Kapotk: sheath of leaf

Different Stages of Maturity

Different Stages of Maturity of dates in Baluchi language are as follow:

Konkor: This stage is five weeks after pollination, color is dark green.

Pòne (Kimri): This stage include from five to seventeen weeks after pollination, fruit rapidly increase in size and weight.

Papok or Kong (khalal) or Kharak): This stage include from eighteen to twenty-four weeks after pollination (takes about 2 months). In this stage in some varieties, color is yellow and red and some cultivars are sweet and savory and prepared for harvesting.

Kondog (Rutab) stages: Fresh and very sweet date palm which twenty-five to twenty-seven weeks after pollination include (about 3 months). In this stage half of date is ripen.

Hormag or Nah (tamar): The final step of fruit ripening. The fruit in this stage is very dehydrated, completely ripen and wrinkled brown color skin in many different varieties.

Different uses of Date palm trees by local people in Saravan

Use categories

To prepare the data for quantitative analysis, all ethno-botanical data gathered were placed into six use categories; food and snack, medicinal use, handcrafts and ornamental, building and fuel. These categories were based on the authors' perspective and understanding of the ethno-botanical data. The categories were created to facilitate the analysis of data.

Pharmacological activities of Date

Agbonvet al investigated antidiarrheal activity of aqueous fruit extract of date in 2013. Results showed that extract significantly ($p < 0.05$) decreased the frequency of defaecation and gastrointestinal motility (Agbon *et al.*, 2013). Khanavi *et al.* (2009) and Biglari *et al.* (2008) investigated antioxidant activity of some date varieties. They demonstrate the potential of Iranian dates as antioxidant functional food ingredients. (Khanavi *et al.*, 2009, Biglari *et al.*, 2008). Fruit of date has been used for relief of sore-throat, cough, asthma and fevers. In addition, the syrup of date has diuretic and febrifuge activity in urinary disorder and this is demulcent so (Idu *et al.*, 2008). Neeraj Vyawahare *et al.* in 2009 mentioned that the various parts of this plant were widely used in traditional medicine for the treatment of various disorders, which include inflammation, cough, memory disturbances, paralysis, loss of consciousness, nervous disorders (Vyawahare *et al.*, 2009). In Baluch tribe, the seed powder is used in some traditional medicines. Its decoction was applied for treating kidney stone, diarrhea and genitourinary ailments.

Yassein evaluated antibacterial effect of date palm pit on some bacteria urinary tract infection in 2012. Date Palm seed extract compared with antibiotics include gentamicin and rifampin were highly effective in inhibiting growth of bacteria (Yassein, 2012).

Jassim and Naji in 2010 surveyed antiviral activity of the pit of date palm against lytic *Pseudomonas* phage. Results showed that date pit extracts have a strong ability for inhibition infectivity of *Pseudomonas* phage (Jassim and Naji, 2010). In addition, Baluch tribe in Saravan has used decoction of pit for amplification of respiration, acute and chronic lung and relieve cough.

Food Uses of Date

Date fruits consist of 70% carbohydrate, 2.5% protein, 0.4% fat, 2.1% minerals, 3.9% fiber, and 15% - 30% moisture contents. Vitamins A, B complex and K are also found in dates (Marwat *et al.*, 2012; Sohaimy, 2010). That is why it has a high nutritional value. This crop due to having simple sugars like fructose and dextrose easily digested and it could be used as a primary energy source for replenishing the maximum energy for every age group, Then it is used as restorative fruit in Saravan especially in holy month of Ramadan. Low quality fruits are used in feeding animals. Surplus dates are made into cubes, paste, powder (date sugar), jam, jelly, juice and syrup in this region. In Saravan, Ranginak and Halva are made by date and are used as snack. Pulp or heart of date that is basic cells in center of trunk, is used as additive in salad by natives. Movahed *et al.* (2011) investigated its nutrition and revealed that it consists of lipid (28g), protein (28g) and carbohydrates (2.29g). Mineral elements are Zn, Fe, Mg, P, Mn, Ca, K and Se.

Animal food

Seeds of date constitutes between 10% and 15% of fruit weight. World production of dates reaching 9 million tons in 2007, from these approximately 960 thousand tones date seeds are produced (Amany *et al.*, 2012). At present, seeds are used mainly for animal feeds such as cattle, sheep, camel, and poultry industries. Date seeds are tough and before being fed to animals some processing including, soaking and grinding are necessary.

House building, household articles and fencing

Due to high resistance of date fiber (sis) against Termite damaging (Esmaili and GhalehNooi, 2012), it is applied for industrial building in some part of this region and especially in rural areas. Date palm trunk is suitability used as timber for building roof of house, for this purpose Rabbi cultivar more than of other has been used that its stems called "Cont". In most visited areas,

the leave and long branches are used for roofing and fencing as a hedge. Wood of the date-palm is used as beam in buildings by villagers that named "Mahr". Esmaili and Ghaleh Noii in 2012 investigated effect of date palm fiber as natural stabilizer on mechanical properties of brick, and revealed that palm fiber in brick cause to delay in defeat, fragment and smite. (Esmaili and GhalehNoii, 2012).

Table 2. Use Categories and part used of Date palm in Saravan.

No	Use Categories	Part used	Explanation of use and
1	Food and Snack	Fruit, trunk pulp	cubes, paste, spread, powder (date sugar), jam, jelly, juice and sirup
2	Animal Feed	Inedible fruit, seed	almost inedible fruit which grows wild in parts is used for livestock,
3	medicine	Fruit, seed	Astringent, intestinal troubles, fever, nervous, demulcent, diuretic and refrigerant in genitourinary disorders, inflammation
4	Handcrafts	branch, seed	Leaf fiber used in weaving of baskets and for sewing of mats, hats, making Parbond, Tagerd, Sajjadeh, Babezah, Savas, Sond, Ropk, <u>Sopu</u> , Chilek
	Decoration and ornamental building	Thin branch	
5		Trunk, Sturdy frond, leaves, branch	Roofing, fencing, camp shelters, Kapar
6	Fuel	Branch, wig, sheath	



Fig. 4. Photograph showing quantity sold to different agencies by farmers.
Source: Primary data collected through questionnaire

Fuel

This tree has a long history of use as fuel almost in studied regions. Mahr and kapotk (sheath of leaf) use more for fuel in Saravan.

Decoration and Ornamental use

Dried and small young branches are used for decoration in some villages.

Handcraft

Followings are the main products of Date Palm Leaves as handcrafts:

1. *Sajjadeh (Musallah)* (A mat to pray on single person): It is used both in homes and mosques for prayer.

2. *Prayer beads*: In some of the mosques, mostly in villages, the seeds are used by local people for the recitation of the sacred names of Allah and Durood (invoke Allah's blessings) on Rasulullah (Sallallahu alaihe wassallam). Seeds are cut and erased to give them proper shape of beads and are used in making of rosary.

3. *Tichk*: Sopa is a traditional utensil. It is large flat plate with raised edges, for serving bread, fruit etc.

4. *Tagerd* (matting). Small and thin mat that is used for multipurpose.

5. *Roppk*(Groom): Used for cleaning purposes.

6. *Sabt* (Basket): These are of small and large sizes used for packing fruits especially dates

7. *Chilek* (rope): Rope of palm fiber:

8. *Parbond*: A mean for climbing palm

9. *Sond*: a basket that covers date clusters for protection against insects, birds and wind.

10. *Savas*: Espadrille

11. *Kapat*: A tool for holding of sew supplies

Moreover Tablecloth, Hodda (Large basket), Hat, Babezah or Meshab (Hand fan) is made from leave of date.

Discussion

Date palm is considered as a sacred tree and highly respected by Baluch communities. The results of this study reveal that, there is a big potential for growing Date palm in Saravan region of Iran. 50000-60000 tons of date are produced in Saravan in year (Agricultural Jihad of Saravan, unpublished data). The prominent varieties of dates grown in the area are Mozafati, Rabbi, Zardan, Rengeno, Sohrok, Pimazo, Halile, Makili, Sabzo, Piaram, Kalegi, Koroch. Rabbi Dates are famous for unique production and taste among all other varieties. This cultivar contributes about 40% to the total production of dates in the study area (Dehvari, 2008). Date palm plays an important role in the diet and social life of communities and provides work opportunities for inhabitants of this region such as gathering, packing, processing and hand crafting. Women

living in the study area are playing an important role in supplementing their household income by manufacturing date palm products at house-hold level.

The plant is used both medicinally and non-medicinally by the local inhabitants of the studied region. The most common use of the tree concerns its fruit as vitality food and the second most used part of the tree is the wood and leaves for building houses and fences as well as making household items and handcrafts. In addition, the main medicinal part of the tree is the fruit and seed with a relatively wide application such as fortifying, nutritious and aphrodisiac in traditions and practices related to curing different health problems. Results of this study showed that the fruit and the leaves of date palm are the most important parts of the plant in the daily life of the Baluch people in Saravan. Despite a huge potential for growing date palm in Baluchistan, growers confront many limitations and challenges such as insect damage, plant pathology, fruit slump, little information about customers and markets, lack of modern techniques for harvesting, processing, packaging, and importantly lack of substructure for producing good quality fresh dates. The date palms are dioeciously. Fertilization of the female flowers by male pollen is required, and in Saravan fertilization is done traditionally and manually by man and is not left to the wind or insects. Depending on the female variety and regional conditions 2-4 male palms are required to pollinate one hundred females.

There is still a great gap for improvement in the field of date palm cultural practices, pre and post harvest, packaging and marketing. *Rhynchophorus ferrugineus* is the most important pest that is quarantine in Saravan. Larvae of this insect cause a tunnel inside the trunk and can lead to tree death (in some area of Saravan, *Razhya stricta* is used for control of this insect and other pest in farm). On the other hand still traditional techniques for cultivation is used. If production and processing constraints are removed, quantity and quality of this crop can be improved in Saravan, therefore, to achieve of this purpose a well organized and thorough research is needed.

Conclusions and Recommendation

Ethno-botanical studies of plants like date palm in traditional communities such as Baluch tribe are scarce in the Baluchistan of Iran. We believe that the studding of date palm can not only increase the awareness of Baluch community regarding their traditional knowledge, but also can even improve the quality of the life of this tribes. The date palm is a major agricultural crop in the East of Baluchistan, Saravan. Therefore, ethnobotanical studies of date tree will facilitate public policies of Baluchistan region about its production. Due to the potential and challenges about date production in Saravan, following suggestions are recommended: biological control of pests,

replacing old groves through plant tissue culture techniques, construction of dates processing and packing manufactory, creation of handcrafts manufactory, establishment of processing industries for date waste and government support for date producers.

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Fig. 5. Supplementary figures

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