

Full Length Research Paper

# Medico-ethnobotanical studies of edible wild fruit plants species from the flora of north western Pakistan (D. I. Khan district)

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Accepted 6 April, 2011

The present research work is based on 11 wild edible fruit plants species belonging to 8 genera of 8 families. The plants are: *Capparis decidua* (Forsk.) Edgew, *Cordia dichotoma* Forster, *Cordia myxa* L., *Grewia tenax* (Forsk.) Fiori, *Monotheca buxifolia* (Falc.) Dcne. ex Engler, *Nannorrhops ritchiana* (Griff.) Aitchison, *Nelumbo nucifera* Gaertn., *Salvadora persica* L., *Salvadora oloides* Decne, *Zizyphus mauritiana* Lam., *Zizyphus nummulari* (Burm.f) Wight. and Arn. These plants were collected from the north western part of Pakistan (Dera Ismail Khan District) during 2007 to 2008. The main aim of this study is to document the knowledge of ethnobotanical importance of wild edible fruit plants species. In view of the importance of this study related comprehensive and detailed data was collected. Results were arranged in systematic order of botanical names, English name, Local / vernacular name, family, locality, occurrence, habit and habitat, flowering period ethnobotanical and ethnomedicinal uses. Photographs of some plants have been presented. It is concluded that during drought conditions or so, wild edible fruits may be used as substitute for food.

**Key words:** Medico-Ethnobotanical studies, wild fruit plants, Dera Ismail Khan, Pakistan.

## INTRODUCTION

Fruits are one of the oldest forms of food known to man. There are many references to fruits in ancient literature, Vedas state that the fruits form the base of the Food of Gods. According to Qur'an, the fruits like grape, date, fig, olive and pomegranate are gifts and heavenly fruits of God. The people in ancient times regarded fruits to be endowed with magic or divine properties. They gave them due reverence and dedicated them to their gods and goddesses. They also used their designs in decorating temples, vestments or ceremonial garments and sacred vessels. Fresh and dry fruits are the natural staple food of man (Marwat et al., 2009a). They are an important source of minerals, fiber and vitamins, which provide essential nutrients for the human health. The most important nutrients present in plants are

carbohydrates, oils, proteins, minerals, ascorbic acid and the antioxidant phenols, such as chlorogenic acid and its polymers (Aberoumand and Deokule, 2009). They are easily digested. They exercise a cleansing effect on the blood and the digestive tract. Persons subsisting on this natural diet will always enjoy good health. Moreover, the ailments caused by the intake of unnatural foods can be successfully treated by fruits. Fresh and dry fruits are thus not only a good food but also a good medicine (Marwat et al., 2009a). Fruits, eaten raw or consumed as fresh juice, are excellent ways to retain and balance the moisture level in the body. The low level of sodium in fruits plays an important role for people who would like to avail of a salt-free diet. Dry fruits like apricots, raisins and dates are storehouses of calcium and iron, essential for the strengthening of bones and maintaining good blood, respectively (Pederson, 2009).

Plants are an essential component of the universe. Human beings have used plants as medicine from the

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very beginning of time. After various observations and experimentations medicinal plants were identified as a source of important medicine, therefore, treatment through these medicinal plants began in the early stages of human civilization (Malik, 2001). Approximately 70% of the homeopathic drugs are prepared from the fresh plants. Similarly more than 90% of tibbi medicines are prepared from herbs. Pakistan is very rich in plants of medicinal value (Nasreen and Khan, 2001). Dera Ismail Khan (D. I. Khan) district (7,326 km<sup>2</sup>; 31°15' to 32°32'N and 70°11' to 71°20' E) is located in the extreme south of the Khyber Pakhtun Khwa (KPK), Pakistan. The area is gifted with diverse and unique flora, as it is adjacent to the South Waziristan Agency and Sulaiman Range in the West, Koh Sheikh Buddin in the North and Indus River in the East (Anonymous, 1998). The main aim of this study is to document the knowledge of ethnobotanical importance of wild edible fruit plants since there has been conducted no such study in this area.

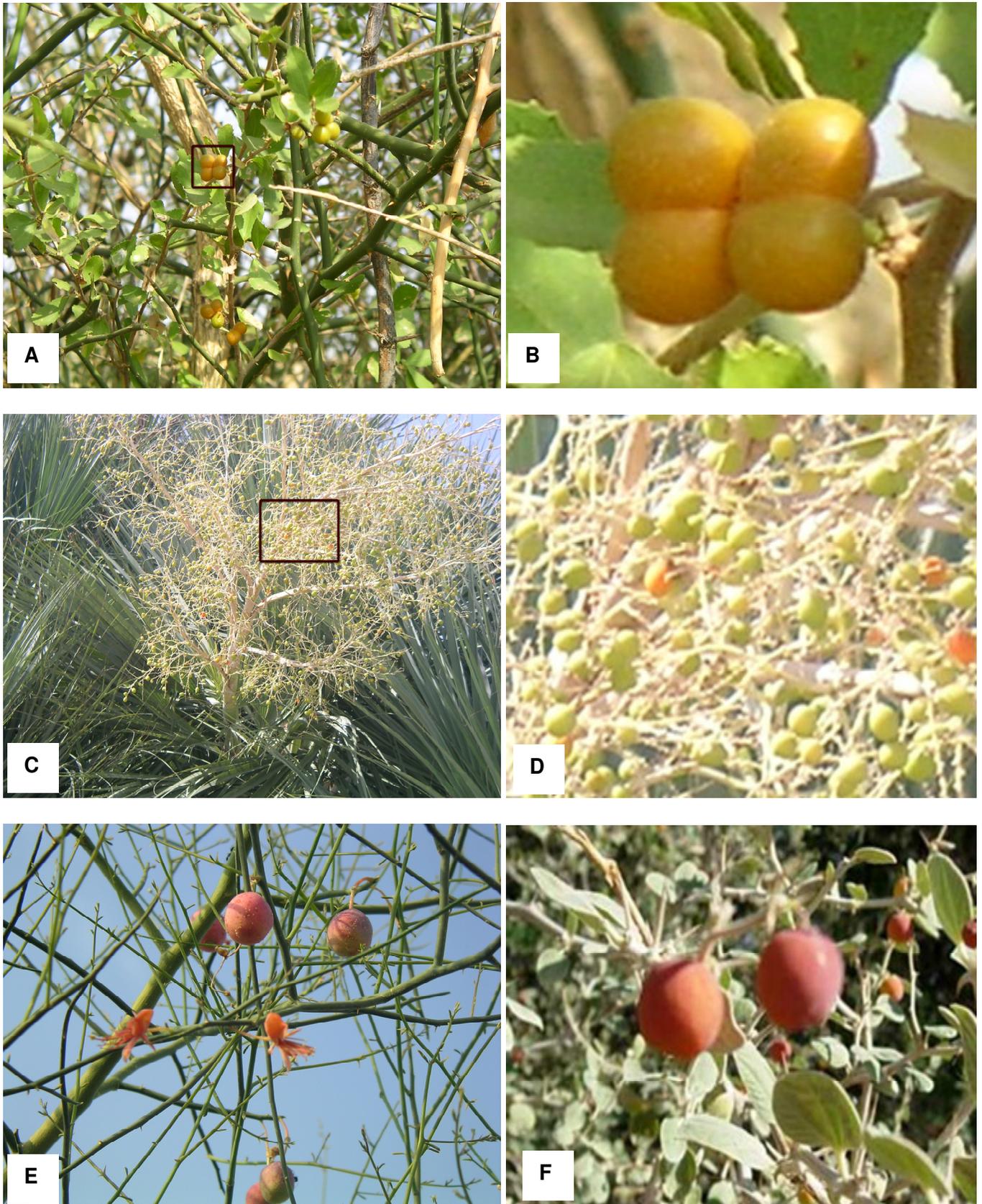
## MATERIALS AND METHODS

The selected area was extensively surveyed from February 2007 to April 2008 and the specimens were collected. A questionnaire was made to collect information about the uses of wild edible fruit plants species used by the local inhabitants of D. I. Khan District. Normally, the elderly known people including men and women, who were familiar with traditional uses of the plants, were interviewed for the extraction of folk knowledge. Plants were identified with the help of available literature (Ali and Nasir, 1989; Nasir and Ali, 1972-1984) and by comparing with the already identified plant specimens of the herbarium, Quaid-i-Azam University, Islamabad. After correct identification, the plants were deposited in the Department of Plant Sciences Quaid-i-Azam University, Islamabad for future references. Photographs of some plants have been presented (Figure 1A to F).

## RESULTS AND DISCUSSION

Results of the survey show that fruits of 11 wild plants species belonging to 8 genera of 8 families are used by the local inhabitants of the research area for multiple purposes. All plants are alphabetically arranged. Results were arranged in systematic order of botanical names, English name, Local / vernacular name, family, locality, occurrence, habit and habitat, flowering period ethnobotanical and ethnomedicinal uses (Tables 1, 2 and 3). Clinical observations have shown that potassium, magnesium and sodium contents of the fruit act as a diuretic and diuresis - frequency of urination is considerably increased when fruits and fruit juices are taken. They lower the urine density and thereby accelerate the elimination of nitrogenous waste and chlorides. Fruits furnish minerals to the body (Marwat et al., 2009a). *Capparis decidua* (Forsk.) Edgew. Fruit is used to cure diarrhea in cattle and goats. Bark powder is used in cases of anorexia, indigestion and rheumatism (Khan, 2009). In Sudan, the fruit of *C. deciduas* is relished by camels and wherever within their reach, by goats. The

fruits are also consumed by man (AFTD, 2009a; Freedman, 1998a; Satyanarayana et al., 2008). The green berries (fruits) are used in food preparations like pickles due to the belief that they have antidiabetic action (Satyanarayana et al., 2008). One of its preferred uses in the Sudan and India is as a shade and shelterbelt. The very bitter roots are used in the Indian and Farsi pharmacopoeia and the root bark is used to cure swollen joints (AFTD, 2009a). In the traditional system of medicine, the bark has been shown to be useful in the treatment of coughs, asthma and inflammation, roots used in fever and buds in the treatment of boils. In Unani system leaves act as appetizer, help in cardiac troubles, fruits used in biliousness, root bark is used as anthelmintic and purgative, wood coal used in muscular injuries. In Sudan, *C. decidua* is used in swellings, jaundice and infection of joints (Satyanarayana et al., 2008). Flowers and fruits of *C. decidua* are extensively used in diet as vegetable and pickle in Rajasthan and Haryana (Mishra et al., 2000). *Cordia dichotoma* Forster: Ripe fruits are eaten raw. The immature fruits are pickled and are also used as a vegetable (Freedman, 1998b; AFTD, 2008b). The leaves yield good fodder and are lopped for this purpose. The tree is used as a fuel wood and for making agricultural implements. Seeds of the species are anti-inflammatory (AFTD, 2008b). Its fruits are used as cooling, astringent, emollient, expectorant, anthelmintic and purgative. Analgesic, anti-inflammatory and hepatoprotective activities have also been reported from the plant (Kuppast and Nayak, 2006). Protective role of *Cordia myxa* L. against liver fibrosis induced by carbon tetrachloride (CCl<sub>4</sub>) or thioacetamide (TA) was investigated. Plant was extracted in different solvents and the extracts were evaluated for their phenolic content and antioxidant activity. It was found that the fresh *C. myxa* extract offered better protection against liver fibrosis induced by these chemicals (Afzal et al., 2007). *C. myxa* fruit is eaten in season. Its fruits also can be used as an expectorant and in treating the diseases of the lungs. In the raw condition, they contain a gum which can be used beneficially in gonorrhoea. They lessen thirst and the scalding of the urine, remove pain from the joints and the burning of the throat and are also effective in treating the diseases of the spleen. In southern Iran the fruits are used as a demulcent. The raw fruits are used as a vegetable. A very good pickle of raw fruits is also made. The mucilaginous substance of the fruit can be used as a gum for pasting sheets of paper, cardboard, etc. (Parmar and Kaushal, 1982). The fruits of *Grewia tenax* consumed by man and animals contain a large amount of iron and can be made into a refreshing drink. Young leaves are consumed by livestock, they are slightly palatable at the end of dry seasons, and have fairly good feed value. Bees visit the flowers for pollen and nectar. The branches are used as firewood, and can be used in charcoal making. *G. tenax* wood is used in making weapons such as clubs, bows and arrows and for other



**Figure 1.** (A) *Grewia tenax*, (B) Enlarge Fruit of *Grewia tenax*, (C) *Nannorrhops ritchiana*, (D) Enlarge fruit of *Nannorrhops ritchiana*, (E) *Capparis deciduas*, (F) *Zizyphus numularia*.

**Table 1.** Taxonomic information of wild fruit plant of Dera Ismail Khan District.

S/N	Botanical name	Common name	Local name	Family	Locality	Occurrence
1.	<i>Capparis decidua</i>	Caper tree, leafless caper bush.	Kira (P), Karir, Dela (U), Kreeta (S)	Capparidaceae	Draban Kalan, Daman, Merdil Wanda, Bilot Sharif, Paniala	Common
2.	<i>Cordia dichotoma</i>	Sebestan Plum, clammy cherry	Lasuri (S) Lasora (P)	Boraginaceae	Khisor range, grown in fields or houses but not common.	Not common
3.	<i>Cordia myxa</i>	Sebestan Plum, clammy cherry	Lasora (P)	Boraginaceae	Khisor range, grown in fields or houses but not common.	Not common
4.	<i>Grewia tenax</i>	White spurry	Anzirai(P) gunghi (S)	Tiliaceae	Khisor range, Bilot shrif, Dara Zinda, Shiekh Maila	Common
5.	<i>Monothea buxifolia</i>	-----	Gur Gura	Sapotaceae	Dara Zinda, Shiekh Maila	Not common
6.	<i>Nannorrhops ritchiana</i>	Dwarf palm, Mazri palm.	Patha, Mazri (U), Maziray (P).	Palmae / Arecaceae	Paniala circle (cultivated), Sheikh Buddin, Dara zinda, and along the eastern skirts of Sulaiman Range (wild).	Common
7.	<i>Nelumbo nucifera</i>	Indian lotus	Kanwal, Behi	Nelumbonaceae	Found in standing water near D.I. Khan- Darya Khan Bridge.	Not common
8.	<i>Salvadora oleoides</i>	Tooth brush tree	Jhal, Khabbar, Pilu.	Salvadoraceae	Paniala, Pahar pur, D.I.Khan, Draban Kalan, Shiekh Maila.	Common
9.	<i>Salvadora persica</i>	Tooth brush tree	Jhal (S) Plaman (P), Pilu(U).	Salvadoraceae	Paniala, Pahar pur, D.I.Khan, Draban Kalan, Shiekh Maila.	Common
10.	<i>Zizyphus mauritiana</i>	Indian jujube	Ber (S,U), Bera (p)	Rhamnaceae	Cultivated and self sown throughout the district.	Common
11.	<i>Zizyphus numularia</i>		Jher Beri, (S, U), Karkanra	Rhamnaceae	Sheikh Mella, Darazinda, Khisor range, Sheikh Baddin.	Common

P = Pushto, S = Seraiki, U = Urdu.

general purposes. In Kenya plant parts are used as a remedy for colds and chest complaints and also as a chief constituent in a typhoid remedy. The shrub can be used for hedging (AFTD, 2008c). Its fruit is usually eaten raw in India. Leaves are boiled and eaten as vegetable. In Sudan its fruit is eaten fresh, or dried for later consumption. A drink is prepared by soaking the fruit overnight, hand-pressing, sieving, and sweetening (Freedman, 1998c). Dried plants are used as fuel. Decoction of the wood is given for the treatment of the cough and pain in the side (Badshah et al., 2006). The ripe fruits of *G. tenax* (Forsk.) Fiori, *G. flavescens* Juss and *G. villosa* Willd. are either eaten fresh or left to dry

for consumption at a later date. In Sudan, a drink is prepared by soaking the fruits over-night, and then they are hand pressed, sieved and sweetened. A light porridge is prepared by the addition of flour or custard to *Grewia* drink and served during the fasting month of Ramadan and is also fed to lactating mother to improve their health and lactating abilities. Moreover, the fruits are made into a fermented drink in Sudan and Southern Africa (Elhassan and Yagi, 2010). *Monothea buxifolia* is honey bee, fuel wood species. It is browsed by camels and goats (Rashid and Marwat, 2006). It is one of the numerous species of wild fruits and nuts found in different areas of Pakistan (Ahmad et al., 2008). Fruits are eaten

**Table 2.** Indigenous ethnobotanical uses of wild fruit plants of D. I. Khan District.

S/N	Botanical name	Local name	Habit and habitat	Flowering period	Indigenous ethnobotanical uses
1.	<i>Capparis decidua</i>	Kira (P), Karir, Dela (U). Kreeta (S)	Shrub common in desert parts of the area.	May-Jul	Camels browse the young branches of the plant, the wood is used in making of agricultural tools. The dried plant is used for fuel purpose. The ripe fruit is eaten by the local inhabitants.
2.	<i>Cordia dichotoma</i>	Lasuri (S) Lasora (P)	A polygamo-dioecious tree.	Mar-Apr	Leaves are used as fodder. Fruit is eaten. The dried branches are used as fuel.
3.	<i>Cordia myxa</i>	Lasora (P)	A polygamo-dioecious tree.	Mar-Apr	Leaves are used as fodder. Fruit is eaten. The dried branches are used as fuel.
4.	<i>Grewia tenax</i>	Anzirai (P) gunghi (S)	Small, depressed shrub, found in and semiarid plains and hills arid.	Feb-Aug	The leaves are used as fodder for cattle, especially for goats. The dried plant is used as fuel wood species.
5.	<i>Monothecca buxifolia</i>	Gur Gura	Small shrub found in hilly area	Apr-May	It is honey bee, fuel wood species. Browsed by camels and goats. Fruits are eaten by local people and birds.
6.	<i>Nannorrhops ritchiana</i>	Patha, Mazri (U), Mazairay (P).	Perennial, gregarious, usually small tufted palm, found in sandy hilly areas.	Jul-Oct	The leaves are used for making rope used for weaving bedstead (charpayee), tray (Skor), hand fan (Bozay), small prayer mat (Musalla), large prayer mat (Suff), Grain bins (Puzai) - for storage of grains, hot pot (Chabai/ Chabbi), hat (Topee), grooms (Jharu) and basket (Tokrai /Tokris). Fruit is eaten, dried plant is used for fuel purposes.
7.	<i>Nelumbo nucifera</i>	Kanwal, Behi	Perennial submerged herb.	Sept-Nov	The rhizome (Bhen) of <i>Nelumbo nucifera</i> is used as vegetable and seeds are eaten.
8.	<i>Salvadora oleoides</i>	Jhal, Khabbar, Pilu.	Shrub or small tree found in rocky slopes and sandy area.	Mar- Jun	Wood is used as fuel. Branches and leaves serve as camel fodder. The sweet fruits are eaten
9.	<i>Salvadora persica</i>	hal (S) Plaman (P), Pilu (U).	Shrub or small tree found in rocky slopes and sandy area.	Mar- Jun	The dried parts are used as fuel, wood is also used in making of agricultural implements. Miswak (toothbrush) is made from its root. Branches and leaves serve as fodder. The ripe fruits are eaten.
10.	<i>Zizyphus mauritiana</i>	Ber (S,U), Bera (p)	Cultivated and self sown throughout the district in arid and semi-arid area.	Jul-Sept	The wood is used in making of bedsteads, agricultural implements, house poles, tool handles, yokes, household utensils, also valued as firewood, a source of charcoal, branches used for fencing and hedges, leaves used as fodder, fruit is edible.
11.	<i>Zizyphus numularia</i>	Jher Beri, (S, U), Karkanra	Shrub or small tree found in arid and semi-arid region usually in hilly area.	Mar-Jun	It is firewood and honey bee species, branches are used for hedging and fencing; leaves browsed by goats and camels. Wood is used in making of agricultural tools. The fruit is edible.

Key: P = Pushto, S = Seraiki, U = Urdu.

**Table 3.** Folk medicinal uses of wild fruit plants of D. I. Khan District.

S/N	Botanical name	Common name	Parts used	Folk medicinal uses
1.	<i>Capparis decidua</i>	Caper tree, leafless caper bush.	Fruit, leaves	i) Equal quantity of dried fruit of <i>C. decidua</i> and sugar are ground to make powder. One teaspoon of this powder is taken with a glass of water twice a day for a week. This is very useful for rheumatism and pain of the body. ii) Young shoot (tender branches) are crushed and mixed with flour of wheat. Then this is fed to animals to relieve pain in their bodies. iii) Bark of the plant is crushed to make poultice. The poultice is applied on wounds. This is prescribed for the treatment of the wound.
2.	<i>Cordia dichotoma</i>	Sebestan plum.	Fruit	The eating of fruit, as needed, before meal is recommended for the treatment of male (masculine) sexual weakness.
3.	<i>Cordia myxa</i>	Sebestan plum.	Leaves, bark and fruit	i) The eating of fruit, as needed, before meal is recommended for the treatment of male sexual weakness. ii) The bark, leaves and fruit are used variously as diuretic, demulcent and in stomachache.
4.	<i>Grewia tenax</i>	White spurry.	Leaves	The ash of the leaves is mixed with butter to make poultice. The poultice is applied on wounds and abscesses (children).
5.	<i>Monothecha buxifolia</i>	-----	Fruit	Medicinally fruits are laxative, digestive and are used in urinary tract diseases.
6.	<i>Nannorrhops ritchiana</i>	Mazri palm.	Leaves	The delicate young leaves have a sweet astringent taste and are in great repute for the treatment of diarrhea and dysentery. They are also used as a purgative in veterinary practice.
7.	<i>Nelumbo nucifera</i>	Indian lotus.	Flowers, root	Flowers are prescribed in diarrhea, cholera and liver troubles, as also heart tonic. Powdered roots are anthelmintic for expelling ring worms.
8.	<i>Salvadora oleoides</i>	Tooth brush tree.	Fruit, seeds	The sweet fruits are eaten and seeds yield green oil which is said to be medicinal.
9.	<i>Salvadora persica</i>	Tooth brush tree.	Fruit	i) 250 gm of fruit are placed in an earthen (clayey) pot and its mouth is closed in order to prevent the entrance of water in the pot. The pot is placed in a bucket of water for a night. The fruit is used in the morning on empty stomach. ii) Eating of fruit of 'water melon' before or after the eating of <i>Salvadora</i> fruit is useful. The treatment is continued for a week. This is very useful phytotherapy for the treatment of the tuberculosis.
10.	<i>Zizyphus mauritiana</i>	Indian jujube	Leaves	The paste of crushed fresh leaves is mixed with small amount of soap and ground loaf sugar (gur) and is used as poultice on the abscesses. The bandage is changed after every 24 h and treatment is continued for 3 - 4 days. As a result the new abscesses will disappear and the older ones will burst. This is an effective traditional phytotherapy of poultice of crushed fresh leaves for remedy of the wound.
11.	<i>Zizyphus numularia</i>		Fruit, leaves	Medicinally the fruit is tonic and digestive. Leaves are applied in scabies and boils.

by local people and birds. Medicinally fruits are laxative, digestive and are used in urinary tract diseases (Rashid and Marwat, 2006). Mazari palm (*Nannorrhops ritchiana*) leaves are used for making ropes, trays, hand fans,

prayer mats (small and large), grain bins (for storage of grains), hot pots, hats, grooms and baskets. The ropes are consumed in weaving bedstead. Fruit is eaten (Abbas, 2003). In its native habitat, the young leaves and

fruits are eaten. Other parts of the palm are used for thatching and fuel (Bielski, 2000).

*Nelumbo nucifera* seeds contain flavonoids and alkaloids. Nelumbine is present in dried seeds, cotyledons and young leaves. The rhizomes contain asparagin. Seeds are demulcent and nutritive used in leprosy and skin diseases, for spermatorrhea and erotic dreams. Flowers are cooling, sedative, astringent, bitter, refrigerant and expectorant. The leaves and seeds are used in poultices. The ripe seeds are boiled or roasted. The rhizomes, sliced, are eaten raw or cooked. Roasted seeds used as coffee substitute (Baino, 2007). *Salvadora oloides* Peel (dried fruit) is used to treat rheumatism in animals. Dried fruit is given to animals after parturition during winter to facilitate the expulsion of lochia (Khan, 2009).

*Salvadora persica*: The dried parts of the plant are used as fuel. The wood is used in making agricultural tools. Branches and leaves serve as fodder. The ripe fruit is eaten. Miswak (tooth brush) is made from its root. According to the report of the research done in Cape Town, South Africa Miswak contains large amount of tannic acid (Tannins). The tannins prevent the adherence of the bacteria to the teeth. It is an established fact that *Streptococcus viridans* attacking the heart valves and damaging them come from the mouth. So the use of Miswak is a preventive measure against many diseases of the teeth, gastro-intestinal tract (GIT) and heart. Bacterial plaque is solely responsible for the initiation and progression of periodontal diseases. Tooth brushes and miswak (chewing sticks) are widely used for the mechanical removal of plaque (Marwat et al., 2009b).

Honey is collected from various species of bee likes *Apis cerana* (Oriental bee), *Apis dorsa* (Rock bee), *Apis florea* (Little bee), *Apis mellifera* (European bee) etc. Various plant-species, like *Zizyphus mauritiana* etc., are important sources of nectar and pollen for production of honey (Ahmad et al., 2008). *Z. mauritiana* is also used as fuel and timber species. The leaves are used as fodder for goats, sheep and camels. The fruit is eaten by local people. The decoction of root is used for fever. The decoction of leaves and bark is used in dysentery. The pulp of the fruit is demulcent, sailagogue (Rashid and Marwat, 2006). The leaves are useful to treat scabies and other skin diseases. The decoction of roots is used in fever and as powder applied to old wounds and ulcers. The bark is considered as a remedy in diarrhea. Fruits are mucilaginous, pectoral styptic, considered to purify blood and improve digestion. These are cooling, astringent and useful in bilious affections (Arshad and Rao, 2001).

The fruits of *Zizyphus nummularia*, when fully ripe are gathered in the beginning of the winter months, dried, ground, and sieved. The powder formed is eaten either alone, mixed with Gur (a sugar condiment) or Bajra (millet) flour. It is also reported that the cotyledons are removed from the seed, fried and eaten separately or

mixed with Bajra (millet). Dried fruit is used medicinally (Freedman, 1998d). It is fuel wood and honey bee species. Branches are used for hedging and fencing. Leaves are browsed by goats and camels. Wood is used in making of agricultural tools. The ripened fruit is eaten by local people and birds. Medicinally the fruit is tonic and digestive (Rashid and Marwat, 2006). Paste of leaves is used to cure itch and chronic ulcerous wounds in animals (Khan, 2009).

## Conclusion

The inhabitants of the research area have close relationship with surrounding plant resources. On the basis of results of the study, it has been concluded that 11 wild edible fruit plants may be consumed as food in drought conditions. Indigenous knowledge about use of the land resources is memory based and inherited. Medicinal plants are used only for self medication and domestic use. The local people collect such plants, while doing other main activities in the fields like farming or grazing their livestock. The area is under over grazing and browsing pressure. The local people badly damage the vegetation by cutting the fuel wood species for fuel purposes. Therefore, it is imperative to take necessary steps for the restoration and improvement of the original vegetation.

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