



BER – A FRUIT FOR SUBSISTENCE FARMING

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The Indian jujube (*Ziziphus mauritiana*) also known as ber, Chinese date, Indian cherry, Indian date and Indian plum, belongs to the family Rhamnaceae which consists of about 45 genera and 550 species. It is widely distributed in tropical and sub-tropical regions of the world, grow vigorously and start producing fruits within three years. It withstands alkalinity and slightly water-logged condition. Ber is also known as the poor man's apple and is one of the most ancient fruits indigenous to India. Ber is popular due to high economic returns, low cost of cultivation, wider adaptability and ability to withstand drought. The native of Indian jujube is from the province of Yunnan in Southern China to Afghanistan, Malaysia, Queensland and Australia.

BOTANY

Ziziphus mauritiana is a spiny, evergreen shrub/tree and grows up to 15 m height, with trunk of 40 cm or more diameters; spreading crown; stipular spines and many drooping branches. Bark is dark grey or dull black, irregularly fissured. Leaves variable, alternate, in two rows, oblong-elliptic, 2.5-6×1.5-5 cm, with tip rounded or slightly notched base; finely wavy-toothed on edges, shiny green and hairless above; dense, whitish, soft hairs underneath. Flowers have sepals which are dorsally tomentose, a disk about 3 mm in diameter and a two-celled ovary, immersed in the disk. Styles are 2 of 1 mm long and connate for half their length. Flowers tend to have an acrid smell borne in cymes or small axillary clusters. Cymes can be sessile or shortly pedunculate, peduncles 1-4 mm tomentose. Pedicels are also tomentose and are 2-4 mm at flowering and 3-6 mm at fruiting.

NUTRITIVE VALUE

The jujube fruit or red date has been described as the “fruit of life” and is a rich source of vital functional components such as polysaccharides, phenolics, flavonoids and saponins responsible for various biological activities. Amongst these, phenolics serve as powerful antioxidants by virtue of the hydrogen-donating properties of their phenolic hydroxyl groups, as well as by donating electrons to stop free radical chain reactions emerging from oxidative stress. Ber fruits are rich sources of vitamin C, A and B complex, calcium, potassium, bromine, rubidium and lanthanum. In general, the fruit contain 81-83 % moisture, 17.0 % carbohydrates, 0.8 % protein, 0.07 % fats, 0.76-1.8 % iron, 0.03 % each of calcium and phosphorus, apart from 0.02 mg carotene and thiamine, 0.020-0.038 mg riboflavin, 0.7-0.9 mg niacin, 0.2-1.1 mg citric acid, 65-76 mg ascorbic acid, about 22g sugar, about 1.3g fiber, about 0.2g fat per 100g of fruit. Galactose, fructose and glucose are the major sugars found in ber fruit. The p-hydroxybenzoic,



caffeic, ferulic and pcoumaric acids are the most abundant phenolic compounds in ber with concentrations of about 366.0, 31.0, 20.0 and 19.0 mg/kg dry mass, respectively, whereas vanillic acid is the least abundant with a concentration of about 2.5 mg/kg.

In comparison to other fruits, carotenes were found in appreciable amounts (4 to 6 mg/100g on a dry weight basis). Citric, malonic and malic acids were identified as major organic acids in ber. Fresh and mature fruits contain pulp of 81- 97%. The seeds are sedative and are taken some time with buttermilk to halt nausea, vomiting and abdominal pains associated with pregnancy. The root bark infusion is used traditionally in Africa as a remedy for stomach pain and other gastrointestinal tract ailments. It has been used in folk medicine as a demulcent, a stomachic, as astringent for toothaches and as mouth wash.



ANIMAL FODDER AND MEDICINAL VALUE

The different parts of Indian jujube trees are used for different purposes. The leaves and twigs of most species can be used as nutritious fodder for livestock, due to the high dry weight of protein content. The ber tree also has medicinal uses, the fruits are applied on cuts or ulcers, are employed in pulmonary ailments and fevers, indigestion and biliousness. Dried ripe fruit is a mild laxative. They check diarrhoea and poultice on wounds. The leaves are helpful for liver troubles, asthma and fever. Juice of the root bark is used to alleviate gout and rheumatism. Infusion of the flowers serves as an eye lotion.



TIMBER WOOD

The wood of cultivated ber trees may not have much value as timber but the wild type (*Z. rotundifolia*) is moderately durable and can be used in a variety of purposes such as house posts, handles of agricultural implements and other tools, tent pegs, posts of charpai etc.

CULTIVATION PRACTICES

Ber tree can tolerate temperature as high as 49- 50°C though, fruit set is adversely affected if the temperature shoots above 35°C during flowering/fruit setting period. The ber is commercially propagated by budding on to the seedling rootstock of *Z. rotundifolia* or *Z. mauritiana*.

The digging of pits for out planting the budded plants should be done in hot weather during May-June. The layout for planting is generally done on square system. Planting distance of 6-7 m has been recommended. After layout, pits of 60×60×60 cm size are dug and filled with a mixture of topsoil, FYM (about 10-15 kg) along with 50g endosulfan (4%) powder to guard against termites.

In the first year, the plants are allowed to grow until the next spring (March) when it is headed back keeping 1-2 basal buds on the scion portion just above the graft union to induce development of vigorous shoots. One upright growing vigorous shoot is retained from the scion bud. The trunk is kept clean up to a height of 30 cm from ground level by removing all side shoots. From the main trunk, 3-4 properly spaced and favorably

placed branches are allowed to grow. The top of the trunk is again headed back during May to encourage growth of side branches.

During the kharif season, intercrops such as mung bean, moth bean, cluster bean, cowpea, and sesame can be cultivated under rainfed conditions. Chilli can be grown in an irrigated area. Total returns from ber fruits and intercrops is always higher than crops alone.

Fruits must be harvested at the proper stage of maturity in order to maintain their ideal organoleptic quality and prolong their shelf life. When the fruits reach maturity, different varieties will have greenish yellow to golden yellow colors, while the young fruits will remain green in color. The optimal measure for assessing CV Umran's maturity is slightly lower than one with golden yellow skin. Fruits that are either young or too mature have little market value. Overripe fruit loses its natural color and texture—it becomes crisp and juicy—while immature fruits taste caustic and lack the appropriate sweetness. These fruits have a slimy feel and turn red or dark brown in color.



Fig 1. Ber crop after pruning



Fig 2. Harvesting ber fruits