



DISCOVER KARANDA: THE HIDDEN GEM OF TROPICAL FRUITS

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Introduction:

Karanda (*Carissa carandas* L.) is a berry sized fruit which is often called as Karonda, carandas plum, Christ's thorn, Bengal currant, Indian wild cherry, carvadah, karvanda. It is a sprawling semi-vine shrub native to India. It is an evergreen diffuse, spiny shrub, occurs throughout arid tropics and sub tropics. A fast-growing, dense-growing plant that requires minimal maintenance that is perfect for hedges.

Scientific classification:

Karanda was named and classified by Linnaeus, Carl von (1771).

Kingdom: Plantae

Class: Angiosperms

Order: Gentianales

Family: Apocynaceae

Sub-class: Eudicots

Genus: *Carissa*

Species: *carandas*, *spinarum*, *Congesta*, *paucinervia*, *inermis*

Variety:

Carissa carandas Linn. (1771)

Carissa carandas var. *congesta* (Wight) Bedd.

Carissa carandas var. *paucinervia* (A.DC.) Bedd.

Etymology:

Carissa: In Sanskrit kryshina means dark blue or black.

Caranda: Stony

Vernacular names:

Tamil: Kalakkai, Kala, sirukilaa, Kilaakkaai

Malayalam: Karakka, Klavu, perumklavy, karanta

Telugu: Peddakalavi, vaka

Kannada: Karikayi, Karjige

Bengali: Koromcha, Karamcha.

Marathi: karvand

Hindi: Karond, Jangli karonda, karaunda

Sanskrit: Karamardah, Karmard, Karonda

History:

Karanda is believed to originate in Himalayas and some botanists believed that it is originated in Java islands. It widely spreads from Nepal to Afghanistan and also in the major parts of Northern India. The history of karanda in India was immensely related with British and Anglo-Indian. Karanda plants were used as hedges in the Colonial British India. Britishers maintained a 2500 miles long hedges made up of karanda and other thorny shrubs as live barriers to prevent smuggling of salt. They planted those plants from foothills of the Himalayas down to Orissa, it was detailed

by Moxham in his book 'The Great Hedge of India'. British peoples also love the jams and jellies made out of karanda fruits. Mrs. J Bartley, an Anglo Indian mentioned a recipe for 'Kurwunder Jelly' in her books called Indian Cookery General for Young House-keepers. It is simply made in households by crushing the berries of karanda to extract the juice and then boiling it with sugar. Britishers also consumed as raw berries.

Habitat:

It can survive in a variety of environments and has a high ecological tolerance. naturally occurring in Bangladesh and Afghanistan. These days, it is grown in the Nilgiri Hills, the Western Ghats, and the Siwalik Hills in Bihar and West Bengal. The Konkan region of Maharashtra, Goa, Rajasthan, Gujarat, Bihar, West Bengal, and Uttar Pradesh is sparsely distributed across the northern regions of the country. Its growing range extends from 30 to 1,800 meters, or 98 to 5,906 feet, in altitude. It grows in Sri Lanka's lowland rain forests as well.

Phenology:

Flowering season: Throughout the year. Usually march.

Fruiting season: Throughout the year. Usually October.

Seeding season: Throughout the year. usually December.

Leaves falling: Evergreen foliage.

General habit:

Evergreen deciduous thorny small to big shrub usually with 2-4m tall

Stem:

Stem is rough and woody in nature. It is usually brown in colour. It possesses thorns for their protection from herbivores attacks.

Stem rich in white, gummy latex having sharp spines on the branches. Branches numerous, spreading and forming dense masses with 2 pair (5 cm in length) of simple or forked thorn form at the axils and nodes.

Leaves:

Leaves are 2 inches long. It is simple, bright green coloured above and paler beneath which grows opposite, mostly very dark green in colour, shiny with large spines, coriaceous and glabrous on both sides. It having 2 mm petiole. It secretes milky latex. The shape of the leaf is ovoid-ovate with acute apex and reticulate venation. Simple, opposite, exstipulate, elliptical or ovate, short petioles, acute tip, obtuse base, entire margin, unicostate, reticulate venation, glabrous leaf surface. Leaves are 2 inches long, mostly very dark green in colour, shiny with large spines. It secretes milky latex when it gets injured.

Inflorescence:

Small fragrant white flowers, with rose stalk, are produced from early spring through late fall. Terminal corymbose cyme, dichasial cyme, linear bracts

Flower:

Ebracteolate, pedicellate, bisexual, actinomorphic, pentamerous, hypogynous. Fragrant, whit or pale yellow colour star shaped.

Calyx:

5 sepals, gamosepalous, valvate or imbricate aestivation, fused from the base showing separation at tip.

Corolla:

5 petals, united, gamopetalous, salver shaped, twisted or imbricate aestivation, pubescent.

Androecium:

5 stamens, epipetalous, basifixed, ditheous, introse dehiscence longitudinally

Gynoecium:

Bicarpellary, syncarpous, superior ovary, 2 locules with 2 ovules in each locules, axile placentation, filiform style, bifid stigma

Fruit:

Fruit is berry. The fruit is ovoid-ellipsoid, 1 cm long and 8 mm wide. Before ripening it is greenish white in colour and it turns to dark blackish purple red after ripening. It grows as clusters and it ripen from May through October. Plants raised from seed start bearing two years after planting. Fruits are variable in size, resembles grapes. It contains usually 4 seeds. The fruits harvested after the commencement of rains are not preferred for fresh consumption by customers.

Seed:

Oblong, concave fleshy endospermic.

Pollination and dispersal:

Entomophilous.

Chemistry

Many terpenoids have been extracted and reported in karanda fruit. Terpenoids namely sesquiterpenes, carissone and carindone (novel type of C31 terpenoid). Pentacyclic triterpenoid carissin are also reported.

Propagation

Simplest and common method is propagation through seed. Usually seeds sown in August and September. Nowadays it is propagated through Vegetative propagation. Softwood grafting is commercially used

method. Air layering, stem cutting, soft wood grafting, budding and inarching are also used. For cuttings, first monsoon shower is the right planting time. Growing through seeds are meagrely practiced. It requires 12 hours of seeds soaking before sowing. The growth of grafted Karonda plants is very slow at nursery stage and it also leads to heavy mortality rate. Hence, for commercialisation it requires care. Under mist chamber, treatment of IBA (3000 ppm) will help in better rooting. Cuttings can be obtained from one-year-old plants and rainy season is the best suitable season for the cutting's preparation.

Spacing:

2 X 2 m

Soils:

Semiarid coastal locations that are higher in moisture, such as the bases of hills or flood out zones, and have fine-textured soils, such as clays and clay-loams. It may grow in a variety of soil types, from dry to wet, although all types of soil require good drainage.

Climate:

Tropical and subtropical climates. It is most suited in Konkan region, Khandala Ghat and Gujarat state. Full exposure of sun needed throughout the year. But it is more tolerant to cold.

Nutrient management:

There is no specified nutrient recommendation as it is a minor and underutilised crop. Hence, nutrient management maybe based of soil testing recommendations. Application of 10-15 Kg FYM/Plant/Year is recommended.

Irrigation:

No need of proper irrigation as it is a dry plant. Water requirement for the plants is

very less. The irrigation after planting and manuring is recommended. It can survive even in the areas having less than 300 mm rainfall.

Pests and diseases:

As it is a hedge and underutilised plant, the pest and diseases attacks were very less. The incidence records of pests and diseases are also very less in the literature sources. Fungus diseases like algal leaf spot and green scurf caused by *Cephaleuros virescens*; twig dieback from *Diplodia natalensis*; and stem canker induced by *Dithiorella* sp are recorded in Florida.

Post-harvest:

Freshly-picked ripe fruits can be kept at room temperature only 3 or 4 days. Then it can be post harvested to prepare various products as mentioned prior. Fruits can be preserved upto 6 months if it is stored in SO₂ Solution of 2,000 PPM.

Varieties:

There used to be thought to be two different varieties: *C. carandan* var. *amara*: oblong, acid flavoured fruits with dark-purple to crimson flesh & *C. carandas* var. *dulcis*: round, maroon to pink flesh with a flavour that is sweet and slightly acidic. Nevertheless, these and other differences in seedling populations were noted by David Sturrock, a Florida horticulturist who had a special interest in the karanda.

Breeding method

Chromosome number $2n = 22$. It is highly heterozygous, cross-pollinated fruit crop. Karanda is an underutilized tropical fruit, which many breeding works has not been implemented. Initially, the breeding works was based on natural selection and evaluation of seedling population.

Cultivars

Pant Suvarna

Based on selection in 1986 and released by G.B. Pant University of Agriculture and Technology, Pant Nagar. thick, upright plant with scant growth. Fruit is greenish-purple in color, with an average yield per plant of 22 kg.

Pant Manohar

Released by G.B. Pant University of Agriculture and Technology, Pant Nagar based on selection breeding method in 1991. Dense bushy leaf with medium size plant. Dark pink colour fruit with average yield of 27 kg/plant.

Pant Sudarshan

It was developed by selection at G.B. Pant University of Agriculture and Technology, Pant Nagar in 1991. Whit pink colour fruit with a yield of 29 kg/plant

Konkan Bold

Developed at Fruit Research Station, Vengurla, Maharashtra. Sweet type variety with high fruit weight of 16.23g. Fruits are dark black round bear in cluster, with pulp 92% and vit. C- 361mg/ 100g. Average weight of fruit is 12-16 g. Seeds are soft hence can be consumed. Average yield is between 3-5 kg/tree.

CHESK-K-2

Promising genotype developed at Central Horticultural Experiment Station, Godhra. Variety yields 10 kg/plant with weight of 5.10g/fruit.

CZK-2011

Developed at Central Arid Zone Research Institute, Jodhpur, Rajasthan by selection. Green purple blush coloured fruit with an average weight of 3.74g.

CZK-2022

Developed at Central Arid Zone Research Institute, Jodhpur, Rajasthan by selection. Pink coloured fruit with mean weight of 4.18g.

CZK-2031

Developed at Central Arid Zone Research Institute, Jodhpur, Rajasthan by selection. Half white half pink coloured fruit with mean fruit weight of 5.01g

CISH Kr-11

Superior genotype developed at Central Institute of Subtropical Horticulture, Lucknow. Average fruit weight of 6.0g

CHESK - V-6

Choosing seedlings from the Konkan area. Plant, 2-3 m tall, medium-bushes. Every node has two thorns on it. In February and March, flowers. White flowers bloom, and spherical fruits ripen between May and July. Fruit with a dark red color and a typical weight of 13–15 g that has few to no seeds.

Thar Karnal

Developed at ICAR-CIAH. Suitable for hot semi-arid region with an average yield of 10 kg/plant. Useful for candy making. Duration of 55-65 days.

Importance and commercial use:

In Ayurveda it is widely used as medicine in Ayurvedic system of medicinal practice. It is used to treat acidity, indigestion, ulcer, constipation and other stomach problems. It is also used to treat several skin diseases, wounds, urinary disorders anorexia, insanity, diabetes, biliousness and anemia. It is also believed as a blood sugar stabilizer and guard against liver damage.

Commercially it is used in the making of jellies, syrups, nutrient mixture as it is rich in

vitamin A, vitamin C, calcium, iron, and phosphorus. Most of us must have eaten without realizing. It is the so called cherries which topped on the cakes nowadays. Hence it is commercially called as wild cherry.

In Household karanda fruit is used to make pickles at homes. It is also used to prepare delicious chutney to make a delicious combo with dosa and idly. Ripe fruits of Karanda exude a white latex which is used to make jelly, jams and syrups in British colonial period of India. The branches and leaves of Karanda used to prepare homemade decoction which is effective medicine to treat fever, earache, diarrhea, headache and dysentery. Homemade wine can be produced from the karanda fruits which contains 14.5 to 15% alcohol and is widely very much liked by wine drinkers.

In Medicine the boiled root extracts can be also used to treat mouth ulcers, chest pain, indigestion, diarrhoea, typhoid fever, nose bleeding, lower abdominal pains in pregnant mothers, headache and fever in children stomach problems, skin problems including itches and allergies as it having anthelmintic properties. It is also used as household insect repellents. Fruit can be eaten as dry in desserts. Mature fruits contain high amount of pectin hence it is used in the preparation of jellies, jam, syrup, squash, sherbet, curries, tarts, puddings and sauce.

Nutritional value per 100g of karanda fruit	
Energy(cals)	42
Sugar (%)	11.48
Moisture(%)	73.89-91
Protein(gm)	0.39-1.1

Fat(gm)	2.5-4.63
Mineral(gm)	1
Fibre(gm)	0.62-1.81
Carbohydrates(gm)	0.51-2.9
Calcium(mg)	21
Phosphorous(mg)	38
Iron(mg)	39.1
Vitamin A	1619 IU
Ascorbic Acid	1.6-175 mg

Other uses:

The roots of karanda plants are heavily branched it is used to reduce the erosion in the hilly areas and slopes. It having the properties of antiparasitic, antifungal, antimicrobial, diuretic, purgative, antiviral, antibacterial, anti-plasmodial, febrifuge, hypotensive, antioxidant, astringent, antiscorbutic, analgesic, anti-inflammatory and cardiogenic. It is commonly used for fencing mango, cashew orchards in Konkan region. The milky latex is good adhesive. It is used as plaster to keep off the flies, pounded with horse urine, lime juice and camphor as remedy for itch (Watt, 1972). The wood of Karonda plant is used for making spoons and combs. Powder of roots used in cattle's wounds to kill worms.