

Karonda: Under-Exploited Fruit Crop for Dry Land Condition

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Summary

Karonda (*Carissa carandas*), a fruit of dry land which is a widely grown indigenous shrub in India and is able to flourish in marginal and waste land where other crops of commercial importance are unsuitable. Collection, conservation and evaluation, a process of crop improvement for characterization and selection of elite plants, are being successfully performed in different parts of India and standardized its vegetative technique of propagation. Its fruits have been utilized in processed products such as in the preparation of jam, jelly, squash, syrup and chutney and is in great demand in the international market. It is a non-traditional fruit crop which thrives well as a rainfed crop. Once established, the plant hardly needs any care and gives yield with minimum management.

Keywords: fruit products, hedge plant, karonda, rainfed crop, white yellow-pink type fruits

Introduction

Karonda (*Carissa carandas*) which is known as 'Christ Thorn Tree' is a hardy, evergreen, spiny and indigenous shrub widely grown in India. *Carissa carandas* is a species of flowering shrub in the family Apocynaceae. It is found wild in Bihar, West Bengal and South India, Maharashtra (Sawant *et al.*, 2002). It is grown commonly as a hedge plant and in commercial plantations in the Varanasi district of Uttar Pradesh. It is a non-traditional fruit crop which thrives well as a rainfed crop. Once established, the plant hardly needs any care and gives yield with minimum management. It produces berry-sized fruits that are commonly used as a condiment in Indian pickles and spices. It is a hardy, drought-tolerant plant that thrives well in a wide range of soils. It also known as Bengal currant, carandas plum, karonda and karanda. Since karonda is very hardy and drought tolerant, it also thrives well throughout the tropical and subtropical climates. Heavy rainfall and waterlogged

conditions are not desirable. It can be grown on a wide range of soils including saline and sodic soils. Karonda has good nutrition value. It is rich in Iron, The fruits also contains vitamin C and It is antiscorbutic and very useful for cure of anaemia. Karonda fruits are used in many ayurvedic formulations and us to their nutritional values. The extract of root is used for Chest pain. The extract of leaves is used for fever.

Different Names of Karanda

English (Bengal-currants, Carandas-plum, Karanda, Christ thorn, Christ's thorn, Karaunda, Karanda, black currants), Hindi (karaunda, garinga, karonda), Bengali (Koromcha), Kannada (Kauli hannu).

Flower and Fruit description:

Karonda fruits are small berries, averaging 1 to 3 centimeters in length, and have an oval to ovoid shape with curved ends. The berries grow in clusters of 3 to 10 fruits and ripen at different stages, giving the shrub a multi-colored appearance. When young, the fruits are green to white, transitioning into a bright red-pink hue, finally ripening into a dark purple, almost black shade with maturity. The thin but tough skin will also change from taut, smooth, and glossy to slightly wrinkled with some give when ripe. Underneath the surface, the flesh ranges from pale red to crimson, depending on the degree of ripeness, and is aqueous and soft, encasing 2 to 8 flat, brown seeds. When harvested, the fruits may also emit a milky white latex that should be removed before eating. Fruits are sour and astringent in taste, and are a rich source of iron and vitamin C.



Flowers and fruits of Karonda

Its fruit is used in the ancient Indian herbal system of medicine, Ayurvedic, to treat acidity, indigestion, fresh and infected wounds, skin diseases, urinary disorders and diabetic ulcers as well as biliousness, stomach pain, constipation, anemia, skin conditions, anorexia and insanity. Ripe fruits are sub-acidic to sweet in taste with a peculiar aroma and can be used in the preparation of fruit products such as jelly, sauce and Carissa cream or jellied salad. The unripe fruits are sour and astringent and can be used for pickles, sauces and chutneys. The roots serve as a stomachic, an anthelmintic medicine for itches and also as insect repellents. The biggest use of this fruit is as a faux cherry in cakes, puddings and other preparations. It is easily available in the market in bottled form as pitted cherries after processing it like traditional candied murabba.

Nutritional value of karonda

Nutrients	Nutritional value (100 gram)	
	Fresh	Dry
Energy (Calorie)	42	364
Moisture (%)	91	18.2
Carbohydrate (%)	2.9	67.1
Fat (%)	2.9	9.6
Mineral (%)	-	2.8
Calcium (mg)	2.1	160
Phosphorus (mg)	28	60
Protein (%)	1.1	2.3
Iron (mg)	-	39
Vitamin –C (mg)	200-500	1

Climatic requirement

Karonda is grown successfully on a wide range of soil types, viz. sandy loams, laterite, alluvial sand, and calcareous soil even it is found growing well in stony, rocky and less fertile soils. But the better growth and higher yield is obtained in alluvial sandy loam

soils with good drainage. The performance of orchards is very poor on clay soil with poor drainage. The can be grown in wide ranges of soil pH ranging from 5.0 to 8.0.

Karonda can be grown successfully in tropical and subtropical climate. Plant growth is affected in high rain fall and waterlogged areas. High temperature and arid climate is suitable for karonda cultivation. Temperature climate with high frost and snowfall areas are not suitable for this fruit. As the plants are sensitive for low temperature and frost injury. The water logged areas of tropical and subtropical regions are not suitable for its cultivation.

Varieties

There are no well established varieties of karonda although the cultivated types are classified according to fruit colour as green-fruited, pink-fruited and white-fruited by Singh (1969). Pant Manohar, Pant Sudarshan, Pant Suvarna are pickle type Karonda varieties. The varieties have smaller fruits like 3.5 g weight and acidic in taste while Konkan bold, CHES K-II-7, and CHESK-35 are bold sizes and suitable for table purpose.

Pant manohar

This variety is developed from GBPUA&T Pantnagar (Uttarakhand) in 2007. The plants of this variety are medium-sized dense bushes, fruits are dark pink blush on white background, weighing 3.49g. seeds 3.94 / fruit, flesh 88.27%, dry weight 12.77%, TSS 3.92%, total titrable acidity 1.82% and yield 27 kg / plant.

Pant Sudarshan

This variety is developed from GB PUA&T Pantnagar (Uttarakhand) in 2007. The plants of these varieties are medium-sized dense bushes. Fruits are pink blush on white background. On ripening fruits become dark brown. Average fruit weight 3.46 g, seeds 4.68 / fruit, flesh 88.47%, dry weight 11.83%, TSS 3.45%. total titrable acidity 1.89% and yield 29 kg / plant.

Pant Suvarna

This variety is developed from GB PUA&T Pantnagar (Uttarakhand) in 2007. Plants are upright growing and sparse. Fruits are colour dark brown blush on green background. Average fruit weight 3.62 g, seeds 5.89 / fruit, flesh 88.27%, dry weight 12.39%, total titrable acidity 2.30% and yield 22 kg / plant. On ripening, fruit colour changes to dark brown.

Konkan Bold

This variety is developed from Konkan Krishi VidyaPeeth, Dapoli (Maharashtra) in 2004. The plants are medium in size and vigourous. It flower in the month of Feb.-March and fruit ripe in the month of May-June under Coorg conditions. Fruits are oblong in shape and 12-154g in weight. The colour of fruits is dark purple . The fruits are sweet with 10-12°Brix Total soluble solid. The trees are prolific bearing and produced 2000-2500 fruit per year. This variety is suitable for table purpose.



Konkan Bold Variety of Karonda

CHES- K-II-7

This is promising line indentified from the seedling population at CHES Chettalli .The plants are medium size and flower in the month of Feb.-March and fruit ripe in the month of May-June. Fruits are oblong in shape and 12 -13 g in weight. The colour of fruits is dark blackish violet in colour and thin fruit skin. A four year old trees yield around 1800-2100 fruits per plants per year. Fruits are sweet with TSS 15° Brix and acidity - 1.08%. This is suitable for table purpose and processing.

CHES- K- V-6:

This is promising line indentified from the seedling population at CHES Chettalli. The plants are medium size and it flowers in the month of January-February and fruits in May-June. The average fruit weight around 13-15 g, dark blackish red in colour with red pulp and very less seeds. The Total soluble solids of fruit is around 16°Brix with 1.18percent acidity and 21 mg vitamin-C/100g pulp. A four year old tree yield 1200-1500 fruits per year. Fruit are also rich in Vitamin –B. This variety is suitable for table purpose.

Propagation

Karonda is propagated through seed propagation and vegetable propagation methods such as cutting, layering and budding. Karonda plants can be multiplied through seed very easily. Seed propagation is mostly commonly used methods in Karonda. The seed should be collected immediately after harvesting. The seeds sown immediately after extraction give higher germination. The plant is grown from seed sown in August and September. The first monsoon shower is planting time. Plants raised from seed start bearing two years after planting. Vegetative propagation is practiced in the form of budding and inarching. Cuttings may also succeed. Flowering starts in March and in Northern India the fruit ripens from July to September. Indole-3-butyric acid (IBA) is the maximum widely used root promoting chemical with inside the nursery trade, alongside with 1-naphthaleneacetic acid (NAA), due to the fact it's far dependable over a huge variety of concentrations (Singh *et al.* 2011).

Planting:

The soil should be leveled before planting and all the old plants need to be removed. These pits filled with FYM and soil mixture to one by one different time of planting of these June-July. The table purpose variety of Karonda should be planted at 3X3 meter distances in square. The method of planting the pits of 3X3 ft. size should be prepared at least one month before planting. These pits should be filled with equal amount of FYM and soil mixture. The proposed time of planting of this is June-July. The land should be cleaned and leveled with a mild slope in the opposite direction of the water source. The hedge planting of karonda is done at 2 ft distances. The hedge planting trench of 1X 1 feet size is done. The pits of 1x1 feet can be also made instead of trench. For planting of orchards, the planting is done at 3x 3 m distance with square system. The pits of 2x2 feet size should dug before rainy season.

Manure and Fertilizers:

Karonda plants grown as protective hedges require limited fertilization. Manuring however is beneficial. Its plants slowly get exhausted after taking 2 crops and show symptoms of die back. Therefore, 10-15 kg well rotten farmyard manure or compost/plant applied before flowering is useful (Chadha, 2003). Karonda plant life grown as defensive hedge are hardly ever manured or fertilized. Manuring, however, is beneficial. Otherwise, its plant life slowly gets exhausted after taking 2 year and begins displaying signs and symptoms of die back.

Water Management:

Karonda is a hardy plant. The newly planted plants should be given irrigation. Young plants should be irrigated at 10-15 days interval in the winter and 6-7 days in summer season. The basin or flood method of irrigation is normally practiced. However, adoption of drip irrigation has been found to be effective in the economic use of water and enhanced growth. The adults orchards are generally not irrigated. Mulching with dry leaves or residues in the basin helps in moisture conservation.

Training and Pruning:

Regular plantations of Karonda may be trained on single or double stem. Therefore, extra undesirable shoots or laterals are eliminated from time-to-time to present the plant preferred shape. Suckers springing up from diseased dried twigs must be eliminated.

Harvesting and yield:

Karonda plant starts yielding after 3rd year. In Western Ghats flower starts in December to March and fruit mature in the month of April to June. The maturity of fruits is judged on the basis of change in colour. All fruits generally do not mature at one time therefore harvesting is generally done 3-4 times. Harvesting is done manually. The harvesting of fruits with stock helps to minimum the oozing of latex by fruits and enhances quality and storage of fruits. A plants may yields 4-5 kg fruits. The promising lines planted as orchard may yield 10-15 kg per tree. The fruits can be stored for 3-4 days under room temperature. The fruits used for making jam, candy and pickles.

Storage

The fruits harvested at maturity can be stored for a week at room temperature whereas fruit harvested at ripe stage are highly perishable and can only be stored for 2-3 days or for 6 months in SO₂ solution @ 2,000 ppm as reported by Chadha (2003).

Benefits of Karonda

1. Alleviates Abdominal Pain
2. Rich in fibre, the fruit is extremely beneficial for treating abdominal problems.
3. Improves Digestion
4. Reduces Fever
5. Improves Mental Health
6. Strengthens Cardiac Muscles
7. Treats Inflammation



8. The fruit of Karonda is an astringent, antiscorbutic and acts as a remedy for biliousness i.e. bad digestion, stomach pain and constipation.
9. It is also a great cure for anemia.
10. It is also used to treat skin conditions.
11. Traditionally, it has been used to treat anorexia and insanity.
12. Leaf decoction is used to treat fever, diarrhea, and earache.
13. The roots serve as a stomachic, an anthelmintic medicine for itches and also as insect repellents.
14. The unripe fruits are sour and astringent and can be used for pickles, sauces and chutneys as reported by Bose et al. (1999).

Conclusion

Karonda is a dry land fruit crop which require less amount of water. Research information on Karonda is lacking in India as well as abroad. However, these hardy, evergreen, spiny and indigenous shrubs widely grown in India have the richest of iron mineral among the fruit crops. It can be cultivated in wide range of soils. Karonda is help to cure many diseases and also has important nutrient content i.e., Iron. Cultivating high yield varieties gives benefit to the farmer in dry land condition

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