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Maru Gaurav: New karonda variety

The karonda, Maru Gaurav has been released by Central Arid Zone Research Institute, Jodhpur. It is an extraordinary high yielding variety with more than 40 kg fruits/plant. Mean bush height and canopy diameter is 3.19 m and 3.5 m respectively. It is regular bearer with spreading growth habit, and starts fruiting in fourth year after planting. Its flowering and fruiting occurs during March-April but fruits mature in August-September. Average fruit weight 3.74 g, edible part 88.5%, TSS 9.4° Brix, acidity 2.8%, vitamin C 35.88 mg/100 g, dry matter 12.85%, total sugar 5.63% and reducing sugar 3.56%.

KARONDA *(Carissa carandas)* is an evergreen spiny shrub or a small tree, in the family Apocynaceae. It is very popular as a protective hedge and thrives well in tropical to subtropical climate including arid conditions. It is drought tolerant and can be grown with minimal care and management. Besides the use of plants in bio-fencing, its berry shaped fruits having nutraceutical values can be used in chutneys, pickle and candy making.

Maru Gaurav

Maru Gaurav is an improved high yielding variety of karonda developed by selection from seedling population after long term evaluation (2006-17). The plants are vigorous, spreading type, with dense canopy. Mean plant height 3.19 m, plant spread 3.7 m(E-W) and 3.31m (N-S). Leaves are small (width 2.4 cm, length 4.18 cm), opposite, elliptic or obvate, obtuse often shortly mucronate, glabrous and shining, base subacute petiole. Seed propagated plants start flowering and fruiting in fourth year of planting while air layered or budded plants may start flowering and fruiting in just second year. The peak flowering is during March-April with fruit set during April month. The fruits mature during August-September and mean fruit yield during eighth year onwards is 40 kg/plant or even more. The average fruit weight is 3.74 g, fruit length 2.18 cm, fruit girth 1.63 cm, no. of seeds 6.3, pulp 88.5%, TSS 9.4° Brix, acidity 2.8%, vitamin C 35.88 mg/100g, dry matter 12.85%, total sugar 5.63% and reducing sugar 3.56%.

PRODUCTION TECHNOLOGY

Propagation

Seed

The easiest and most commonly followed method of

Turn to page 30

Continued from Cover II

propagation in karonda is through seeds. The seeds should be extracted from fully ripened fruits which are available during August-September. The fruits turn black at full ripening and drop off. Such fruits can be collected for extraction of seeds. The seeds of karonda are recalcitrant type and loose viability upon storage, therefore, they should be sown fresh immediately after extraction. They should be cleared off pulp and washed in water and surface dried under shade. The seeds can be treated with Bavistin @ 4g/kg before sowing. Seeds should be sown in polybags during August-September. The seeds being small in size should not be sown deeper than one cm. They should be irrigated soon after sowing and over watering should be avoided as it leads to collar rot and other fungal diseases. The seeds start germinating after 20 days of sowing and completed by the end of 40 days after sowing. The seedlings become ready for transplanting after one year.

Maru Gaurav in orchard system

Vegetative Propagation

In case where varietal purity is to be strictly ensured for fruit production or for perpetuating any other quality traits, the plants should be propagated by clonal propagation methods like cutting, air layering or by micropropagation. Karonda is rather difficult plant for vegetative propagation, since propagation of large plants by this method is quite difficult.

Stem Cutting

Propagation by stem cutting is possible option but it is difficult to root species. However, planting the cuttings in polyhouse with mist may help in rooting. Soft and semi-hard wood cutting are more successful under mist. Hard wood cutting treated with 500 ppm IBA in quick dip are reported helpful in rooting. The cutting should be taken from mature shoots about one-year old, 25-30 cm long. Rainy season is the best period for propagation by budding and 8-10 months old rooted cutting can be transplanted in the field.

Air Layering

Air layering is quite successful in karonda using growth regulators. It is done in the beginning of monsoon. A ring of bark of about 5 cm is removed from the branch and treated with 5000 ppm IBA in lanoline paste. The cut portion is wrapped with moist sphagnum moss grass and covered with plastic sheet and tied at both the ends. Frequent water is injected in the layers to keep it moist. The best time of air layering is during July-August months. The rooted layers can be separated from mother plant after 3 months of layering.

Budding

Propagation of karonda by patch budding is also successful. One-year-old seedling rootstock may be used for budding during July-August months.

Planting

Maru Gaurav or any other variety can be planted on farm boundary as live fence. It is also suitable for block plantation as well as for hedge row plantation for live fencing. For block plantation, field should be cleared off wild bushes and levelled by ploughing and planking. The orchard can be laid out in square or rectangular system. In hedge planting, distance varies from 0.90 to 2.0 m., while for block plantation, it can be kept 4-5 m apart. The variety Maru Gaurav is somewhat spreading type, so spacing of 5 × 5 in square planting method should be kept. The pits of 2 × 2 × 2 feet size should be dug one month before planting and filled with a mixture of soil and well rotten FYM in the ratio of 6:1. After planting, watering should be done immediately and repeated at 3-4 days interval till the plants are established. July is the best month for planting but it can also be planted in February-March if irrigation facility is available. At the time of planting, each plant is supported with the help of a wooden stake so that it remains in erect position.

Manures and Fertilizers

One-year-old plants should be applied with 2 kg FYM, 20 g N, 10 g P and 10 g K/plant. It can be increased every year in same proportion up to 10 years. Therefore, a full grown up bush requires 20 kg FYM, 200 g N, 100 g P and 100 g K. The full quantity of FYM, P and K and half dose of nitrogen should be applied during July while remaining nitrogen may be applied in end of August for utilization of growing fruits. The manures and fertilizers should be thoroughly mixed in the entire canopy area.

Canopy Management

The growth of the bushes can be managed at the desired size and shape by canopy architecture. Initially the young plants should be allowed 3-4 well spaced

Maru Gaurav

branches to develop into main scaffold structure of the plants. The bearing plants usually do not require much of the pruning, however, shoots coming from basal portions should be pruned during March-April. Over the years the bushes become very compact, which is desired for boundary plantation but for block plantation meant for fruit production some of the shoots should be thinned out to provide light and air in the canopy to improve fruit quality. Diseased or broken twigs are removed. Old hedge may be headed back to induce new growth.

Water Management

Karonda once established does not need much water as it behaves as xerophytic plant. New plantations need to be irrigated weekly in summer and fortnightly in winter for optimum growth. In arid regions, irrigation at fortnightly interval should be given to well established plantation during March to June for survival and better retention of flower and fruits and later on it can be left rainfed.

Interculture and Weed Control

The interspaces of the plant should be kept weed free by frequent harrowing during monsoon season. The basins of the plants are generally kept weed free by manual intercultural operation.

Diseases and Pest Management

In harsh climatic condition of hot arid region, no severe disease or pest have been observed. However, in other regions leaf eating caterpillars and hairy caterpillars are reported to eat new leaves and may cause mortality of young plants. The caterpillars may be controlled by spraying nuvacron (0.05%) or methyl parathion (0.04%). Among the diseases, anthracnose caused by *Colletotrichum inamdarii* may inflict damage to leaves. The fungus produces brown spots which results in the premature death of leaves and thin twigs. This can be controlled by spraying the plants with Blitox-50 or Fytolan (0.2%). Wounds on the branches may be pasted with Bordeaux paste. Dieback is another fungal disease caused by *Phytophthora* sp. and *Rhizoctonia solani.* The fungus is soil inhabitant and produces symptoms of dieback disease in trees through rotting of rootlets and defoliation. The disease can be controlled by summer ploughing and drenching with Benomyl or Carbendazim (0.25%).

Harvesting

Mature fruit is maroon colored on one side (facing light) while the other side of the fruits remain light green. The peak maturity is attained after middle of August onwards, while fully ripened fruits are available at the end of September. The matured fruits may be harvested for chutney, pickle and candy preparation, while those of ripened fruits may be used for extraction of juice for beverages and for extraction of seeds for multiplication.

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