

Benefits of pruning in custard apple

Custard apple or sugar apple is an important fruit crop of tropical and sub-tropical regions. Due to some cumulative factors like crotch injury, frost injury, senility, gummosis, diseases and pests plant canopy is severely affected. Canopy management in custard apple is necessary operation as fruits are born in current season and some of old season growth. Pruning facilitates proper canopy, structure to the plant and early flowering and fruiting. The intensity and time of pruning is also crucial and is being carried from 45-60 days after harvesting of the fruits. Apart from this, intensity of the pruning should be optimum i.e. 30-40% to maximize the crop yield and quality of the fruits. Moreover, response of plant to intensity and severity of pruning depends upon cultivar, crop age, time of pruning and region. Therefore, judicious pruning could be an effective tool to enhance productivity and quality of custard apple fruits and grower can get higher economic return.

CUSTARD apple belongs to a small group of edible fruits of Annonaceae family which are collectively known as Annonaceous fruits. Out of the several species of *Annona*, five are available in India yielding edible fruits. These are Custard Apple (*Annona squamosa*), Cherimoya (*Annona cherimola*), Soursop (*Annona muricata*), Ramphal (*Annona reticulata*) and Atemoya (*Annona atemoya*). These fruits thrive well in tropical and warmer sub-tropical regions of India. Among Annonaceous fruits crops, custard apple gained the most important position. It is known by different names, such as *Sitaphal* or *Sharifa* in India. Generally, it is classified as a semi-wild fruit (due to its spontaneous growing habit in forest), grown at small scale and mainly marketed in local or national trade. In India custard apple growing regions include Maharashtra, Madhya Pradesh, Rajasthan, Uttar Pradesh, Andhra Pradesh, Telangana and Tamil Nadu. In India custard apple is grown over 0.38 lakh hectare area with production of 3.20 lakh tonnes in India (NHB, 2019). It is a climacteric fruit. Fruit pulp is the edible portion of fruit, which is creamy, granular with an excellent blend of acidity and sweetness. The pulp of the fruit can be used in pharmaceutical industries because of high phenolics and anti-oxidant properties. It is usually eaten as a dessert fruit and finds a huge application in the preparation of different value added products

such as jam, nectars, ice creams etc. Developing a desirable plant ideotype is an important practice for custard apple trees for manageable tree sizes and improved yield. Judicious removal of crop load in terms of shoot pruning and fruit pruning (called as thinning) is necessary to enhance productivity and quality of the produce. Orchard with unhealthy plant produces fruits with minimum quality standards and do not fetch good market price either due to unmarketable size and shape or poor colour. In fruit plants, the older age, plants tend to decline yield and produce inferior quality fruits. Some of diseased and pest affected twigs and branches boost up infestation in healthy plants. Orchard factors are most important to give final shape to yield and fruit. However, increased temperature, elevated pollution, mechanical damage, poor rootstock, improper cultural management, dense canopy, diseases, pests and frost damage are crucial factors which affect quality as well as quantity of production. Overcrowding of branches make dense canopy which affect light interception and may not fulfill the demand of proper carbohydrate nitrogen ratio and also reduce supply of photosynthates. Therefore, pruning plays an important role in regulating growth, flowering and fruiting of custard apple trees.



Profuse fruiting after pruning

Why to prune

Custard apple flowers are

borne in current season as well as previous season growth. Due to its deciduous (sometime semi-deciduous in humid areas) nature custard apple sheds its leaves during stress period to avoid moisture losses from plant through transpiration, which make it most appropriate fruit crop for rainfed areas. Main objective of pruning in custard apple are given here.

- Custard apple bears flower on both new and old shoots. Therefore, pruning may help in increasing number of flowers per branch.
- Old age plants tend to frame dense and overcrowded canopy which affects light interception and poor translocation of nutrients, which can be overcome by pruning.
- Disease and pest infected twig and branch may affect health of branch, therefore to remove those branches pruning is necessary step.
- Pruning helps in elevating high carbohydrates and nitrogen ratio, which is needed to enhance fruit quality, thus ultimate enhance fruit quality attributes like size, sugars, antioxidants and phenols.
- High vigorous trees are difficult to maintain and need extra culture operations, resources like fertilizers and nutrients which can be reduced by pruning.
- Pruning helps in efficient remobilization of nutrients as many older and senescent leaves are removed, therefore provide source sink of metabolites for new shoots and developing fruits.
- Pruned tree maintains a balance between branches and tends to synthesize more hormones, secondary metabolites and other phytonutrients which need to boost up inherent quality and shelf life of fruits.

How to prune

Pruning in custard apple involves the removal of broken branches, water sprouts and shoots, the cuts should be smooth and even with the branch or trunk. The large cuts are made first, which are made to remove broken branches, to thin out or to prevent the lower branches of adjacent trees from overlapping. Undesirable smaller branches and shoots are removed next, unproductive wood is removed. This includes both excessively vigorous shoots, such as water sprouts and upright shoots and weak branches that hang down and are always in shade. Thorough pruning completes this job. It is done on main shoot and subsequent secondary and tertiary shoots on whole plant. The pruning at 45-50 days after harvesting is beneficial in custard apple in sub-tropical regions. In these regions harvesting of custard apple is completed in the end of November or sometime upto the mid December. Hence, pruning in sub-tropical regions should be done in the 1st week of February.



Pruning provides a strong framework to custard apple

Time and intensity affects yield and quality

The extent/intensity of pruning on the same tree varies from year to year, depending upon the growth of the tree, its bearing habit and season. The time of the year at which the different plants are pruned depends chiefly upon their growth status. The best time for pruning for most of the deciduous trees is at the end of the dormant season, i.e., about a month before the commencement of flowering. The time of pruning for evergreen tree is during December-January when growth is at minimum (likely to dormancy) compared to dry and flowering seasons. Dormant pruning is an invigorating process. Heavy dormant pruning also promotes excessive vegetative vigour. Summer season pruning is practiced during summers during May-June month. Its severity is much less, less common, more specific and selective. Eliminates an energy or food producing portion of the tree and results in reduced tree growth. For most purposes, summer pruning should be limited to removing the upright and vigorous current season's growth; only thinning cuts should be used. Custard apple should be pruned after 40-60 days of fruit harvesting depending upon area and cultivar. Intensity of pruning also hampers tree vigour and fruit quality. Light pruning (20-30 cm tip portion) improves light penetration into the plant canopy and decreases tree height with reduction in cost. Pruning stimulates photosynthetic activity of leaves and reduces the transpiring area. A light pruning maintains tree spread, density and gives a proper framework to the tree required for easy spraying, fruit harvesting and other cultural operations. The ideal tree should have 3-4 main branches which are oriented in such a manner which gives it a proper shape.

Increased yield and quality

Custard apple flowers born on new growth pruning encourage the development of new vegetative shoots. Those shoots can replenish the tree's carbohydrate reserve, flower and bear the coming season's crop. A severe pruning reduce total yield however, yield from mild pruned custard apple trees is higher than yield from non-



Pruning facilitates early flowering and fruiting

pruned trees. Pruning improves fruit size by increasing the amount of leaf area per fruit. The fruit quality is greatly improved by post-harvest pruning treatments in custard apple.

Case study: An investigation was initiated at College of Agriculture, Dhule, (MPKV, Rahuri, MH). The eight year old custard apple cv. Balanagar trees pruned 45 days after harvesting and pruning done on main shoot, subsequent secondary and tertiary shoots on whole plant from top to end with different intensities i.e. control, tip pruning, pruning at 30 cm, 45 cm, 60 cm, 75 cm and 90 cm. It was found among different pruning intensities that the yield and yield contributing parameters were higher in 30 cm pruning intensity while large size fruits were obtained from severe pruning of 90 cm intensity (Table 1).

Table 1. Pruning influences fruit yield and quality of custard apple

Pruning intensity	Number of fruits /tree	Yield (kg/ tree)	TSS (°Brix)
Control	82.53	12.31	46.84
Tip pruning	77.49	15.02	20.29
Pruning at 30 cm	88.97	18.82	21.46
Pruning at 45 cm	71.85	15.96	22.82
Pruning at 60 cm	62.19	14.85	23.96
Pruning at 75 cm	53.68	13.19	19.26
Pruning at 90 cm	42.54	11.50	18.83

Aftercare

After pruning there is need to fulfill the dose requirement of plants. As pruning reduces some crop load

by removing the branches and twigs which limits the supply of nutrients. The trees should be fed with recommended dose of manure and fertilizers followed by light irrigation (Table 2). Fertilizers and irrigation are required to reduce the load of pruning and prepare plant for regrowth and flowering. Manures, fertilizers and irrigation should be applied in the well prepared rings in the periphery of tree and away from tree trunk. Fertilizer may be given in two spilt doses. Before onset

of monsoon there is strict requirement of fertilizer to the plants for fruiting. Light irrigation should be given just after fertilizer. The cut edges of bark around the pruning of broken branches should be pasted with Bordeaux mixture or Blitox, immediately after pruning to avoid any external infection of disease at the cut portion. Regular plant protection measures should be followed to control pest and disease infestation.

Table 2. Recommended dose of fertilizers for bearing trees

Age of tree (year)	Fertilizer requirements (g/tree)			
	FYM (kg/ tree)	N ₂	P ₂ O ₅	K ₂ O
1-2	25	120	109	84
3-5	35	240	217	167
Full bearing trees	50	400-600	300-500	600-800

SUMMARY

Pruning plays crucial role in rejuvenating senile and old orchard as well as to increase fruiting branches. Pruned tree yielded many fold higher number of fruits with enhanced quality. For getting regular high yield custard apple growers are recommended to do pruning at the intensity of 30% which was found most suitable in Maharashtra area.

For further details, please contact to:

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Flowers always make people better, happier, and more helpful; they are sunshine, food and medicine for the soul.

- Luther Burbank