

**LEC.18 CUSTARD APPLE - SOIL, CLIMATE, PLANTING, VARIETIES ,
NUTRIENT AND WATER MANAGEMENT, SPECIAL CULTURAL
OPERATIONS, PHYSIOLOGICAL DISORDERS, PESTS AND DISEASES,
MANAGEMENT PRACTICES**

Custard apple (*Annona squamosa*) can be called as a delicacy of dry region due to its very sweet delicate flesh. It is a deciduous or semideciduous tall woody shrub of about 5-6 meters height having irregularly spreading branches. The fruits are rich in carbohydrate mainly in the form of sugar (23.5%), protein (1.6%), calcium (17mg/100g), phosphorus (47mg/100g) and iron (1.5mg/100g). The custard apple of India the sitaphal or sugar apple of sweet sop has many relatives.

1. Bullock's heart (or) Bull's heart (or) Ramphal: (*Annona reticulata*) Fruits are larger in size, heart shaped, smooth and less seeded but pulp is inferior in quality.
2. Sour sop: (*A. muricata*). The fruits have many soft spines. Fruits are highly acidic.
3. Cherimoye (or) Cherimola (or) Cherimoya (or) Lakshman phal: (*A. cherimola*). Fruits are most the delicious, slightly acidic, sweet with buttery consistency of pulp and low seed content.
4. Atemoya: *A. atemoya* (*A. squamosa* x *A. cherimola*). It is a F₁ hybrid with a better quality of *A. cherimola* and adaptability to high temperature as that of *A. squamosa*.

Besides used as a dessert fruit, custard apple can be used in ice cream and in preparation of jam, jelly etc. Tropical America is considered to be the native home of all home of all Annonaceous fruits.

The probable origin of *A. squamosa* is West Indies and South America, while *A. cherimola* originated in mountains of Ecuador and Peru.

Climatic and soil requirements:

A warm climate (not very hot) with high humidity and mild winter will be the ideal climatic condition for the best growth and yield of most of the *Annona* sp. Except *A. cherimola*. Though they can tolerate extremes of temperature (below freezing and upto 40°C), such extremes won't be ideal for production of flowers and fruits. They can be grown from sea level up to 1000 meters. Where the summer temperature is very high (more than

40°C) and humidity is low there will be no fruitest though the flowering is profuse. An annual rainfall of 500-750 mm is adequate ofr growth and fruiting. Cherimoyer (*A. cherimola*) requires a lower temperature and a subtropical mild climate and it is difficult to be cultivated at very high temperature. Atemoyas (the hybrids between custard apple and cherimoyar) have the superior tastes of cherimoyer can tolerate fai8rly higher temperature just like *A. squamosa*. Ramphal (*A. reticulate*) does not tolerate severe summer when compared to sitaphal.

Annonas can be grown in varied soil right from heavy claly upto sandy one. They can also be grown on rocky, marginal and even waste lands. However for best yield, a well drained fertile soil with neutral pH will be ideal. The plants are shallow rooted anod hence a deep soil is not necessary. They can be grown on slightly alkaline soil and with irrigation water having slight higher pH and salinity.

CULTIVARS:

Balanagar:

It is a cultivar of *A. squamosa*. The fruits are greenish yellow in colour. Each fruit weight 130-140g. TSS is 20.7° brix.

Red sitaphal:

It probably originated as chance seedling. Fruits of this cultivar through belong to *A. squamosa* are pinkish dark with erythrite red pulp. Average fruit weight is 150-160g with 22.3°bix TSS.

Mammoth:

It is a cultivar of *A. squamosa*. The weight of the fruit is about 125g, TSS is 20° brix.

African Pride:

It is a cultivar of *A. atemoya* (*Cherimoya* x sugar apple). It is a popular variety grown in the subtropical region of Australia.

Pink Mammoth:

It is another popular cultivar of *atemoya*. The pulp is similar to *cherimoya*, being juicy with an excellent acidic flavour.

Arka Sahana:

It is an *interspecific hybrid* developed at IIHR, Bangalore. Fruits are big (210g) skin is light green in colour with waxy bloom, moderately thick with large flat eyes. Fruits have improved shelf life viz., take 7 days to ripen, 4 days more than 'Mammoth'. The creamy white flesh is juicy with mild pleasant aroma and tender with sparse seeds (9/100g of fruit weight). The fruit of this variety is also characterized by large segments or flakes and many of which are seedless. Flesh is very sweet (30° brix) compared to 24° brix in Mammoth. Average yield is 12 tonnes/ha.

APK (Ca)-1:

It is a clonal selection from a high yielding type in State Horticultural Farm, Courtallam of Tirunelveli District of Tamilnadu developed at Regional Research Station, Aruppukottai. It is a high yielder in rainfed vertisol (Black soil) 14.90 kg/tree, 30.7% more than Balanagar. Each fruit weighs 207g. Average number of fruits would be 72/tree. TSS 24.5° Brix, acidity 0.2%. Adapted to semiarid plains.

Propagation and planting:

Annona is propagated commonly by seeds. Fresh seeds germinate in 20-30 days. Seed propagation results in variability in plant vigour, prolonged juvenility and inferior fruit quality. Vegetative propagation by budding or inarching on owoon seedlings and *A. reticulata* ensures genetic uniformity. Budding is usually done in early spring or in the autumn. Inarching should be carried out in early spring using one-year old mature scion and more than one-year old root stock.

A spacing of 5Mx5M is recommended for annonas. At planting, 50g. phosphobacterium +150g of Vesicular Arbuscular Mycorrhiza are inoculated on the roots and the plants are planted in the pits filled with 10kf of FYM and top soil. This helps in rapid growth of roots and better establishment of plants, especially in dry regions.

Since Annonas are mostly cultivated on poor soils, manuring is necessary for production of good crops. Application of 10 kg Farmyard manure, 250g N, 125g P₂ O₅ and 250g K₂ O is recommended per tree. The fertilizers should be applied at the commencement of rainy season. Black polythene mulch is most effective in reducing the irrigation requirement in anola cv. N.A 7 (60.86%) with an annual water requirement of 777.6 litres per tree.

Intercultivation:

Intercrops like groundnut, minor millets, crowpea and linseed can be grown in the initial years of planting.

The problem of poor fruit set in custard apple can be overcome to a large extent by application of GA at a concentration of 50ppm. Dipping of freshly opened flowers in GA ensures better fruit-set, better fruit retention, increased fruit size and weight with less seed. The crop can be sprayed with NAA 20 ppm four times at weekly interval during flowering (March – April) to encourage fruitset. Irrigation and mulching during summer season also helps to prevent fruit drop.

Plant protection:

Pests:

Mealy bugs: (*Ferrisia virgata*, *Maconellicoccus hirsutus*)

These cause blemishes on fruits and the pest can be controlled by spraying 0.05 per cent dichlorvos. Refer : previous sections for newer insecticides.

DISEASES:

Leaf spot:

Affected leaves drop down prematurely. This can be controlled by fortnightly sprays of 0.05% carabendazim commencing from the appearance of the disease symptom.

Anthracnose: (*Glomerella cingulata*)

Infection begins at blossom-end of the fruit and later spreads on entire fruit surface, affected fruits shrivel and they may cling to the tree or fall down.

Management:

Spray Indofil M.45 (0.02%) at 15 days interval.

Harvest and storage:

The fruits are to be harvested at correct stage of maturity. Light green fruit colour, yellowish white colour between the carpels and initiation of cracking of the skin between the carpels may be taken as maturity indices. The fruits are hand picked. The peak harvest period is October – November. A sugar apple tree usually produces 80-100 fruits per tree after 4 to 5 years.

The custard apples ripen within a few days after harvest. The mature fruits can be stored at 15° to 20°C with RH of 85-90% and low oxygen and ethylene but with 10% CO₂. Under such storage conditions, the fruits can be kept intact for 12-18 days.

Additives like Saccharified starch (1:1), high voltage treatment and packing under nitrogen gas cover, sugar (1:2) were quite effective in extending the storage of pulp at 4°C (45 days) and –18°C (90 days) temperature.