



FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

Botanical name: *Manilkara zopota/M.achras, Achras sapota*

Family : Sapotaceae

Chromosome number : $2n=26$

Preamble

- Sapota is one of the important tropical fruits in India.
- India is the largest producer of sapota in the world, though it is considered as a minor fruit in area.
- In the year 1898 sapota was introduced to India particularly in Maharashtra in a village called Gholkward.

Origin and Distribution

- Sapota is native of tropical America and is believed to have originated in South Mexico or Central America cultivated in West Indies, Philippines, Malaysia, Indonesia, Srilanka and India.
- In India, Sapota cultivation was taken up for the first time in Maharashtra in 1898 in a village named Gholkward. India is considered to be the largest producer of sapota in the world though, Sapota is considered to be a minor crop in India. (65,000 ha + 5.7 lakh tones). Karnataka+ 6000 ha.
- In India , Sapota is commercially grown in Karnataka ,Gujarat, AP, WB, Maharastra and TN.

Importance and Uses

- Sapota is good source of sugars, protein, fat, fiber and minerals (Ca, P, Fe).
- Sapota is a delicious dessert fruit.
- The latex from stems and immature fruits is used in the preparation of chewing gum.
- Fruits can be dried and made into nutritious powder which can be used in Milk shakes and sweets.
- In countries (Indonesia) Young leafy shoots are used in salads or as vegetable.
- Sapota is supposed to be medicinal also seeds as diuretic, bark as tonic, antipyretic, febrifuge and in curing biliousness and febrile attacks.

Climate and Soil

- Sapota is a tropical fruit and can be grown up to 1200 M.
- But at higher altitudes and in subtropics it produces only one crop an year with reduction in quality and quantity.
- Annual rainfall 125-250 cm are best.
- Optimum temperature range is 11°C to 34°C .
- High temperature 41°C causes drying of stigmatic surface.
- Dry and strong winds also damage Sapota.
- Sapota can be grown in a wide variety of soils.
- Deep Sandy loams or alluvial soils or medium black soils are best.

- Calcareous soils (pH 6-8) give good crops of Sapota.

Species, types and cultivars

- Sapota cultivars are grouped into 4 types based on nature of branches and colour of foliage as follows.
- Trees with erect growing habit: Branches appearing in whorls, leafy dark green, broad and oval, fruits large and superior.
- Trees with drooping habit: Branches in whorls, leaves light green narrow and elliptical, fruit small, inferior.
- Trees with spreading habit: Branches irregular, leaves dark green, broad and oval, fruits medium to large, superior.
- Trees with spreading habit: but with inferior quality fruits.

Cultivars

- **Kalipatti**- commercially grown in Maharashtra, Gujarat, North Karnataka. Has spreading branches, oval shaped fruits, fruits appear singly-superior.
- **Chhattri**: Similar to kalipatti with dropping branches in whorls.
- **Dhola Diwani**: Whitish oval fruits with superior quality
- **Long**: Has narrow and small leaves, fruits long poor bearer.
- **Bhuri** or Bhuripatti Medium bearer, fruits large superior.
- **Jingar**: Medium sized tree, small leaves ,fruits in clusters.
- **Vanjeet**: Slow growing ,knots on stems shy bearer,superior.
- **Pala**: Popular in AP and TN fruits small, oval, heavy bearer in clusters.
- **Kirthibarthi**: Popular in AP. Fruits small to medium with 4-5 ridges, oval, superior, withstands long transport.
- **Dwarapudi**: Popular in AP. fruits round like cricket ball, superior.
- **Cricket ball**: Popular in TN ,Karnataka, Maharastra, WB AP. Fruits large,round,superior, shybearer.
- **Oval**: Fruits small to medium ,oval ,inferior shy bearer.
- **Vanivalasa**: AP, fruits oval, medium sized, medium quality.
- **Calcatta Round**: WB, Karnataka, AP fruits large, medium quality.
- **Jonnaivalasa-1**: AP fruits medium, ovate, superior and no ridges
- **Jonnaivalasa-2**: AP, fruits medium, ovate, depression at stalk end, whitish flakes on skin eight ridges superior.
- **Baramasi**: WB,Bihar,UP fruits medium, round medium quality.
- **Pot Sapota**: Fruits small, oval, superior , bears in pots itself
- **Gavarayya**: AP,TN fruits small with varied shoulders 8-10 ridges, superior.
- **Thagarampudi**: TN fruits medium sized, round or oval, superior, good for export.
- **Ayyangare**: TN fruits medium to large, round or obovate, rose scented, superior.

Sapota varieties/ hybrids developed in India

Variety	Parentage	Shape	TSS(Brix)	Fr.weight(g)
CO-1	Cricket Ball x Oval	Oval	18	125
CO-2	Clonal selection from Baramasi	Obovate to Round	23	200
CO-3	Cricket Ball x Vanivallasa	Oval	24.2	-
PKM-1	Selecation from Guthi	Oblong	NA	NA
PKM-2	Guthi x Kirthabarti	Obong	NA	NA
PKM-3	Kalipatti x Cricket Ball	Oblong	NA	NA
PKM-4	Clone of PKM	-	-	-
DHS-1	Kalipatti x Cricket Ball	Oblong	25	150
DHS-2	Kalipatti x Cricket Ball	Round	23	

Propagation and planting

Commercially propagated by grafting on Rayan or khirni (*Manilkara hexandra*) Stocks.

Other stocks used are:

- Sapota seedlings
- Adams apple (*M. kauki*)
- Mahua (*M.latifolia*)
- Mee Tree (*Bassia Longifolia*)
- Star apple (*Chrysophyllum cainito*) and
- Miracular fruit (*Sideroxylon dulcifieum*).

Grafting time/period

- Approach grafting during: February (Jan-March).
- Soft wood grafting during: May-July
- Air layering using 10,000 PPM (1BA + NAA) gives good rooting.
- Budding during May also gives success.

Planting

- Spacing is 8-10, 1m cube pits are dug Pits are filled with mixture of FYM and soils 1.2 Kg bone meal.
- High density planting with 5m x 5m spacing improves yield.
- It is better to have a wind break around the Sapota plot.
- Best season is monsoon season.

Manuring

- Bearing tree of 11 years is given 400 g N, 260 g P and 450 g K per year in addition to 40 kg FYM and graded doses are applied from the beginning according to the growth of the plant.
- Application of more 'N' is reported to increase the yield.
- Manuring should be done in 2 split doses coinciding with the mansoons.

Irrigation

- Sapota can tolerate drought to some extent but irrigations help in improving the yield.
- Regular irrigations should be given from planting till the plant establishes well.
- Later irrigations may be according to need and soil and weather conditions.
- Insufficient irrigations result in dropping of flowers.
- Drip irrigation can be more useful.

Interculture

- Intercrops like banana, papaya, leguminous vegetables can be grown profitably during the pre-bearing period.
- Weeding should be regular.
- Spraying SADH 100 ppm gives good fruit set and (Planofix) NAA 300 ppm gives fruit retention.
- Sprayings are done twice before flowering and again at pea stage.

Pruning and Training

- Better to remove the lower most branches on the trunk up to 60-90 cm as they will be touching the ground and mostly unproductive.
- Stock sports should be removed from time to time.
- No regular pruning is needed for Sapota.

Harvesting and Yield

Sapota may start bearing 2nd or 3rd year but commercial yield can be obtained from 7th year onwards. Sapota takes about 7-10moths from fruitset to maturity depending upon the cultivar season and locality.

Best symptoms of maturity are

1. Milky latex on scratching will be reduced & shows an yellow streak than green streak.
2. Brown scaly material gets reduced.
3. Dried stigma at the tip of the fruit drops easily.
4. Develops dull orange or potato colour

Fruits should be harvested with stalk intact. Peak harvesting periods are Jan-Feb and May-June in Maharashtra and March-May and Sep-October in Karnataka and AP. Sapota normally produces fruit throughout the year.

Average yield will be

3 year – 100 fruits/plant/year.

5 year-250 fruits/plant/year.

7 year-700, fruits/plant/year.

8 year-800 fruits/plant/year.

10 year- 1000 fruits/plant/year.

11 year-1500 fruits/plant/year.

15 year-2000 fruits/plant/year.

30 year-2500-3000 fruits/plant/year

Large sized cultivars like Cricket ball, Calcutta round give lower no of fruits but will be sold at higher price 15-20 tonne/ha.

Post Harvest Handling and storage

Ripening and storage

- Fruits ripen after harvest in about 4-13 days depending upon cultivar.
- Ripening can be hastened by treating with ethrel (250-750 ppm).
- Between 12-14⁰C fruits ripen slowly and keep well for about 5 weeks, Ripe fruits can be stored at 2-3⁰C and 85-90 % R.H. for 6 weeks and firm fruits for 8 weeks at 3 to 5⁰C and 85-95 % R.H.

Pests and Diseases

PESTS

Stem borer (Isocrata tetraonis)

1. The grub of this small beetle bores into bark of the Sapota trunk and feeds on the living tissue inside the bark. The chewed bark is seen on the hole.

Control measures

2. Kill the insect by thrusting a stiff wire into the tunnel.
3. Plug the hole with a wad of cotton in kerosene at 0.1 percent and plaster with wet mud. This treatment creates suffocation inside the hole or tunnel which results in death of the insect inside.

Leaf minor

- The tiny caterpillar of a greyish moth mines into the surface of young leaves. Affected leaves curl up, mines are seen on the surface of leaves and sometimes caterpillars are found inside the mines. Later on, affected leaves get destroyed, dry up and fall.

Control measures

- Spray once or twice Dimethate (30ml in 18 liters of water) or Malathion (30ml in 18 liters of water)

Mealy bug: (Phenacoccus icerjoides)

- It is sucking insect. It is a small, oval in shape with a cottony white, waxy on the under surface of leaves and base of the fruit near the fruit stalks. They suck the sap and secrete large quantities of sugary substances. Leaves have a black coating which gives them a sickly appearance.

Control measures:

- Spray dimethoate at the rate of 30ml in 18 liters of water.
- Try to keep free sapota plantation from red ants because these help in distributing mealy bugs from one tree to another. Red ants are effectively controlled with a dusting of a mixture of BHC 5 percent with sulphur in the proportion of 2:1.

Scale insects: (*Pulvinaria psidii*)

They suck the sap by infesting along the sides of midrib and surface of leaves and twinges. These scales are green or brown in colour and oval shaped.

Control measures

- Spray Dimethoate or Malathion at 30ml in 18 liters of water.

Fruit borer (*Virachola isocrates*)

Borer attacks on fruits and sometimes buds which can easily be detected by seeing the latex which comes out on the surface of the infested fruits, the latex later crystallizes.

Control measures

1. Spray 0.05 Malathion
2. Spray 0.01% Fenvalerate/0.01% endosulfan.

DISEASES

Leafspot: (*Phoecophleospora indica*)

The causal fungus results in dark brown, the adjacent spots on leaves. When infection is severe, the adjacent spots become large irregular whitish patches. In severe cases, the defoliation of leaves may be noticed.

Control measures:

1. Spray -78 @0.2% at an interval of 30 days.
2. Grow resistant varieties like Co-1, Cricket Ball. The varieties Co-2 & Kalipatti are tolerant, but Calcutta round is susceptible.

Sooty mould

Sooty mould is incited by *Capnodium* spp: The causal fungal disease develops on the honey like excretion by scale insects and mealy bugs.

Control measures

1. Spray Zineb @ 40 g in 18 liters water.
2. Spray starch solution (100 g M in 18 liters of water). Starch forms the flakes which eventually drop off the leaves.