RAMA UNIVERSITY

www.ramauniversity.ac.in

FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

Botanical name.: *Punica granatum* Lin.
Family: Punicaceae
Chromosome No. : 2n= 18
Origin: Iran.

- Pomegranate is one of the ancient and important table fruit in tropical countries. It is grown on large scale in the Mediterranean countries such as Iron, Spain, Morocco and Egypt etc. It is grown all over India and commercially in Maharashtra (more than 60 per cent) followed by Gujarat, Rajasthan, Uttar Pradesh, Andhra Pradesh, Karnataka, Tamil Nadu etc. Besides,
- The edible part of pomegranate is a juicy outgrowth of the seed called the aril. It is liked for the cool refreshing juice and also valued for its medicinal properties. The juice is useful for patients suffering from leprosy. The bark & rind of the fruit are commonly used in dysentery and diarrhea. The dried seeds of pomegranate give important condiment called 'Anardana.' Tannin is obtained from fruit rind leaves stem & root bark. The flowers, yield red dye, which is used for dyeing cloth. One pomegranate fruit supplies about 40% of an adult's daily Vit-C requirement. It is also rich in Riboflavin, protein, fat, sugar, pectin, Ca & Iron content.
- The tree is deciduous in temperate countries, while it is evergreen in tropical and subtropical regions. The fruits are borne terminally on short spurs, arising from mature shoots. Tree is hardy and bushy having a tendency of developing multi-stems

Soil and Climate

Climate

- The best quality fruits can be produced in areas of cool winters and hot & dry summers where rainfall is low; It can be grown in tropical to warm temperate climates and from plains to an elevation of about 1800 m.
- The tree require hot & dry climate during fruit development and ripening.
- It cannot produce sweet fruits unless the temperature is high for considerable period.
- The plants withstand considerable long period. The plant withstand considerable amount of drought but does well if provided with irrigation.

Soil

- Pomegranate can be grown on soils-which are considered unsuitable for most of other fruit crops.
- It can be grown in limy, alkaline and saline soils and also thrives well in shallow rocky gravel soils.
- However best yield & quality of fruits could be obtained in deep heavy, loamy and well drained soil with pH range of 5.5 – 7.5.

Varieties

Paper shell: It is grown in South India. The fruits are medium to large size. The flesh is pinkish and the seeds are soft. The aril has good flavour with very high fruit bearing capacity.

Alandi or Vadki: It is commonly grown in Maharastra and Gujarat. Fruits are of medium size, blood reed or deep pink flesh with sweet, slightly acidic juice. The seeds are very hard.

Ganesh: It is a selection from 'Alandi' The fruit is medium in size. It has soft seeds. The aril is pink, high yielding, with average fruit weight of 325g, sweet and round fruit shape, TSS of 16.47 per cent, Acidity 0.42 per cent.

Jyothi: It is selection from Basin seedless variety developed by University of Agriculture Sciences, Bangalore; Fruits are bigger in size with attractive red colour, with soft seeded and more flesh and TSS of 16 per cent.

Mridula: It is a seedling selection from an open pollinated F2 population of a cross Ganesh and Gul-e-Shan red. Fruits are red in colour and round shape with sweet aril soft seeded fruit.

Jalore seedless – It is a soft seeded variety developed and recommended by CAZRI, Jodhpur for arid regions as the fruit matures early and maximum fruit production is coincided with available soil moisture during monsoon, large fruits (200g) with pink to deep red skin, arils are pink to red having soft seeds with attractive overall appearance of fruit.

Hybrid – Ruby: Ganesh X Kabul X Yercard : Developed by Indian Institute of Horticulture Research, Bangalore. The fruits resembles like Ganesh variety with reddish brown skin with green stripes on skin, soft seeded with bigger size and red coloured arils, heavy yielder (16-18 t/ha).

G-137, Bhagawa: The other varieties popularly grown are – Dholka, Kandhari Kabul, Muscat, Jodhpur red, P-23, P-26.

Propogation and planting

Propagation: Presently, pomegranate is successfully propagated by hardwood stem cutting and air-layering.

Stem cutting: Cuttings are collected from high yielding plants one year old & fully matured shoots. About 25-40cm long cutting should be planted by removing leaves and treating the bottom end of cuttings with rooting hormone (IBA - 2000ppm) and inserted in the soil; Plants will be ready in 55-60 days.

Air layering – Pomegranate may also be propagated by air layering. It should be done during rainy season; The bottom of the uppercut can be treated with IBA 10,000ppm for better rooting

Establishment of orchard:

Planting: Land is prepared thoroughly during onset of monsoon. Pits of 60-75cm3 at a spacing of 5x2m, planting should be done during monsoon season. Planting of 1-2 year old rooted cuttings in center of pits and provide support with staking.

Irrigation: Newly planted orchard requires frequent and regular irrigation, during flowering and fruiting, orchard should be irrigated regularly to avoid cracking of fruits and for better development of fruits.

Intercropping and Intercultivation: Leguminous, vegetables and cereals can be taken during pre-bearing stage. Papaya can be taken as filler plant. Basins should be maintained free from weeds. Deep ploughing should be avoided as it damages the roots.

Manures and Fertilizers

Pomegranate is a hardy plant but it responds well to manure and fertilizers. Following are the fertilizers recommended in major pomegranate growing states of India.

State	N/year	P /year	K/year	FYM/year
Karnataka	200 kg/ha	300 kg/ha	100 kg/ha	12.5 t/ha
Maharastra	625 g/tree	250 g/tree	250 g/tree	----
Tamil Nadu	600 g/tree	500 g/tree	1200 g/tree	30 kg/tree
Rajasthan	230 g/tree	200 g/tree	-----	50 kg/tree
Gujrath	500 kg/ha	250 kg/ha	500 kg/ha	50 kg/tree

The full dose of P, K and 3/4th of N should be given at the time of bahar (flower induction) treatment, remaining 1/4th of N given at 1 ½ months after fruit setting. At the age of 8-10 years this dose should be doubled.

Training and pruning

- Training of pomegranate plant is important to allow certain number of shoots/stems per plant. It may be trained as multi-stemmed and single stemmed tree.
- **Multi-stemmed tree**: This method is preferred in Maharashtra, where in 3-4 stems are retained at a hill and remaining shoots are removed. But yield has not been found to be affected. This will give a bushy frame work to the plant.
- **Single stemmed tree**: Train the plants, remove all the side shoots upto 2-3 feet and single stem is left. This operation begins at the time of planting. The main stem is pinched at a height of 1m results in the formation of branches. Only well distributed 4-5 branches on all sides are allowed to grow.
- Pruning of water shoots, weak crotches dead twigs, old spurs is done regularly. After 10 years, old main stems should be removed by cutting back to make it more productive.

Flowering and fruit set

Flowering- To obtain higher fruit yield during a particular period, the pomegranate plants are given a resting period. It is done by with holding of water for about 60 days in advance of the normal flowering; Roots are exposed and is known as bahar treatment. Flowering is noticed in almost round the year and there are 3 main seasons viz.,

Ambe bahar – Flowering can be induced in February -March – This is taken in the areas where, enough water is available during hot weather.

Mrig-bahar- Flowering can be induced in June-July, coinciding with the outbreak of monsoon, this treatment is taken in the areas where, water is scarce during the hot weather.

Hastha Bahar – Flowering can be induced in September – October, where the trees have to be subjected to stress during August – September. This is rather uncertain because of the monsoon rains that occur during this period.

The tree starts bearing fruits from 3-4th year and continues for about 25 to 30 years. Economic yield is generally obtained from 6th or 7th year onwards.

Harvesting and yield

- Pomegranate fruits become ready for harvesting in 5-7 months after the blossoming.
- Mature fruits become slightly yellowish & further pink to red.
- On tapping, the fruits give metallic sound and when pressed they give a "Crunch" sound and flattened during maturity.
- Yield: The fully grown up tree of about 10 years old produces 80-120 fruits (16-20 Kgs)

Pests and diseases

- **Anar fruit fly/fruit borer**- *Virachola isocrates*

Rotting of fruit & affected fruits fall down

- **Bark eating caterpillar** – *Inderbela tetraonis*

It bores in to the bark & tree becomes weak & do not bear fruits.

Stem borer : *Aleurodes species.*

Fruit rot – *Phomopsis sp.*

Leaf spot – *Colletotrichum gloeosporiodies*

Physiological disorder

Fruit cracking

- It is common in pomegranate and also serious. This disorder is due to the prevalence of high temperature and moisture stress followed by rains cause fruit cracking during fruit development. In the young fruits, it could be due to boron deficiency.
- While in Mrigbahar (July) grown fruits, it might be due to sudden fluctuation in diurnal temperature. Also prolonged dry spell cause hardening of peel, if this is followed by heavy rainfall or irrigation then the pulp grows fast and results in cracking of pulp.
- The cracked fruits are also liable to be invaded by certain fungi and bacteria. The fruits loose their market value and become unfit for human consumption.
- The cultivars like 'Bedana Bosek' 'Jalore seedless' and 'khog' are comparatively tolerant to cracking.

Control measures

- Planting of varieties tolerant to fruit cracking.
- Early harvesting of fruits immediately after maturity
- Maintain optimum soil moisture during Mrig bahar fruiting
- Spray calcium hydroxide on foliage after fruit set.
- If boron deficiency – spray borax at 0.1 per cent to pl/20g/pl/year.
- Spray GA3 at 250ppm in June.
- Plant windbreak around the pomegranate plantation.