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CITRUS

- India ranks sixth in the production of citrus fruit in the world.
- Other major citrus producing countries are Spain, USA, Israel, Morocco, South Africa, Japan, Brazil, Turkey and Cuba.
- It occupies third position after mango and banana in the production of fruits in India.
- Citrus fruits originated in the tropical and sub tropical regions of South East Asia , particularly India and China.
- North East India is the native place of many citrus species.
- It is of particular interest because of its high content of vitamin C and refreshing juice

Commercially important citrus fruit crops :

1. Sweet orange- *C.sinensis*
2. Tangerine- *C.reticulata*
3. Grapefruit- *C.paradisii*
4. Lemon – *C.limon*
5. Lime- *C.aurantifolia*

And minor cultivars are:

6. *Pumelo – Citrus maxima*
7. *Citron – Citrus medica*



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Climate

- Citrus trees are subtropical in origin and cannot tolerate severe frosts.
- Moisture is also a limiting factor in citrus production, When rainfall is poorly distributed and, it is necessary to supplement moisture by irrigation to ensure that moisture stress do not suppress growth and production.
- Citrus (except lemons) require shorter days and cooler temperatures in winter for a normal production rhythm.
- Flowering should occur almost exclusively in spring, and these spring flowers should produce a large fruit crop 7 to 12 months later, depending on the cultivar

Soil:

- Citrus plants are grown in a wide range of soils ranging from sandy loam or alluvial soils of north India to clay loam or deep clay loam or lateritic/acidic soils in the Deccan plateau and north-eastern hills.
- Citrus orchards flourish well in light soils with good drainage properties.
- Deep soils with pH range of 5.5 to 7.5 are considered ideal.
- However, they can also be grown in a pH range of 4.0 to 9.0.
- High calcium carbonate concentration in feeder root zone may adversely affect the growth.



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Cultivars:

Name of the Citrus fruit	States	Varieties
Sweet orange	Punjab, Rajasthan, Uttar Pradesh	Pineapple, Jaffa, Hamlin, Valencia, Late Campbell Valencia
Mandarin	Maharashtra	Nagpur mandarin
	Madhya Pradesh, A.P., North Eastern region, Punjab, Rajasthan, U.P., West Bengal and Sikkim	Nagpur mandarin Khasi mandarin Kinnow, Nagpur mandarin and local Darjeeling mandarin
	Karnataka and Tamilnadu	Coorg mandarin
Acid lime	Andhra Pradesh, Rajasthan, Karnataka, Uttar Pradesh, Gujarat, Madhya Pradesh, Maharashtra	Kagzi lime, Indore seedling Baramasi, Kagzi lime
Grapefruit	Andhra Pradesh	PKM (Jayadevi)
Lemon	Gujarat, Andhra Pradesh, U.P. Assam	Eureka Hill, Galgal Assam lemon
	Karnataka	Baramasi, Nepali oblong, Italian lemon, Lisbon lemon, Eureka lemon, Seville
Bummalo	Andhra Pradesh, Assam, NEHU	Red flashed, White flashed



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Citrus propagation

- In India citrus trees are propagated both by seeds and vegetative means.
- Seed propagation is still practiced in the case of acid limes and to produce rootstocks for budding purposes. It produce true to type seedlings i.e. polyembroynic seedlings.
- Shield or T budding is the most commonly used method of vegetative propagation.
- Budding is generally done either in spring or in September.

Land preparation:

Land needs to be thoroughly ploughed and levelled. In hilly areas, planting is done on terraces against the slopes and on such lands, high density planting is possible as more aerial space is available than in flat lands.

Since citrus trees are highly sensitive to water logging and water stagnation during rainy season providing drainage channels of 3-4 feet depth along the slopes around the orchard is essential.

Plant density: a. Mandarin (*Citrus reticulata* Blanco) Normal spacing – 6 m x 6 m ; Plant population – 277 / ha b. Sweet orange (*Citrus sinensis* Osbeck) Normal spacing - 5 m x 5 m, 5.5 x 5.5 m; Plant population – 400/330 per ha c. Limes/lemons (*Citrus aurantifolia* Swingle & *Citrus limon*) Normal spacing – 6 x 6 m / 5 x 5 m, Plant population – 277/400 per ha In light soils, spacing will be 4.5 x 4.5 m or 5 x 5 m



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Irrigation:

- Citrus requires critical stage watering in the initial year. It further reduces fruit drop and increases the fruit size.
- Diseases like root rot and collar rot occur in flooded conditions. Light irrigation with high frequency is beneficial.
- Irrigation water containing more than 1000 ppm salts is injurious.
- Quantity of water and frequency of irrigation depends on the soil texture and growth stage.
- Micro irrigation systems not only saves water and nutrients but also ensure good retention of fruits during crucial stages of crop growth in March – April even in situations where water is not a limitation.

Manures & fertilizers:

- Manuring is done in three equal doses three times in a year in February, June and September.
- Recommended FYM @ 40kg/plant and NPK @ 500g: 250g: 250g per plant per year for 6th year onwards.

Interculture:

Ploughing, spading of basins, weed control, etc., are important inter-culture operations for soil aeration and health. Chemical control of weeds with pre-emergence weedicides like diuron (3 Kg/ha), simazine (4 Kg/ha), glyphosate 4 l/ha, paraquat (2 l/ha), etc. may also be adopted.



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Training and Pruning:

- In order to allow the growth of a strong trunk, initially shoots upto 40-50 cm from the ground level should be removed.
- The centre of the plant should remain open.
- Branches should be well distributed to all sides.
- Cross twigs and water suckers are to be removed early.
- The bearing trees require little or no pruning.
- All diseased, injured and drooping branches and dead wood are to be removed periodically.

Important insect-

Pests of citrus are citrus black fly and whitefly, citrus psylla, Citrus thrips, leaf miner, scale insects, bark eating caterpillar/trunk borer, fruit fly, fruit sucking moth, mites, etc.

Other pests attacking citrus particularly mandarin orange, specially in humid climate are mealy bug, nematode, etc.

Diseases-

The important diseases of citrus are Phytophthora gummosis, citrus tristeza virus, citrus greening (HLB-Huang Long Bing), citrus canker, powdery mildew, anthracnose, etc.



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Harvesting

- There are two main crops in mandarins and sweet oranges. One is called as Ambe bahar (mango flowering) the flowering of which occurs in the month of January (at the time of flowering of mango hence the name Ambe) the fruits of which are available in the months of October-December The other crop is Mrig bahar (Monsoon bloom) the flowering of which occurs in the month of June-July and the fruits are harvested during February-April.
- Mandarins and sweet oranges normally take 240- 280 days to arrive at maturity.
- Mature fruits at colour break stage are picked up in 2 - 3 intervals of 10-15 days.
- Limes and lemons take 150-160 days for maturity. There may be 2 or 3 crops in a year in limes and lemons.

Yield:

- Commences from the 5th year with about 50 fruits per tree and stabilises in the 8th year. Average production is about 700-800 fruits per tree after stabilisation.
- Sweet Orange: Commences from 5th year with 40-50 fruits per tree & stabilises around the 8th year. Average production is about 500-600 fruits per tree after stabilisation.
- Lime/Lemon : Commences from the 3rd year with 50-60 fruits per tree & stabilises in the 8th year. Average production is about 1000-1500 fruits per tree after stabilisation.
- Economic life of plantation: 15 to 25 years.