

Quadrant II – Notes

Programme: B. Sc. (Hons.) Agri.

Subject: Horticulture

Course Code: HORT- 243

Course Title: Production Technology of Fruits and Plantation crops

Module Name: Production technologies for the cultivation of major fruits: Citrus

Module No: 6

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Notes :

Production technologies for the cultivation of major fruits: Citrus

Introduction:

Citrus fruits include oranges, lemons, limes, pummelo and grape fruit. It is third most fruit after mango and banana. Crop has complicated inter specific and inter generic crosses because of which the more variation is evident in nature. It is richest source of the Vitamin C and antioxidants.

Groups of citrus

- **Acid groups:** Citrus aurantifolia, Citrus latifolia, C. limonia, Citrus limon, C. jambhiri, C. Medica, Citrus limetoides
- **Orange group:** Citrus sinensis, Citrus aurantium, C. multifolia, C. natsudaikai
- **Mandarin group:** C. reticulata, C. unshiu, C. deliciosa, C. nobilis, C. tangerina
- **Pummelo and grape fruit group:** C. grandis, C. paradisi, Fortunella sp.
- **Hybrids:** Citrange (Poncirus trifoliata x C. sinensis), Citrangor (Citrange x C. sinensis), Tangelo (Tangerine x grape fruit), Citrangequat (Citrange x kumquat)

Soil and Climate:

It is subtropical region crop that flourishes well in climate with mild winter. It can be grown 500-1500 m above MSL elevation. It is very sensitive to frost. It requires rainfall of 150-250 cm. Soil should be medium or light loam, pH 5.5 to 6.5. It response well in soil condition with good content of macro and micronutrients.

Varieties

1. Kodai Orange (*Citrus reticulata*)
2. Nagpur Santra (*Citrus reticulata*):
3. Coorg (*Citrus reticulata*):
4. Sastuma Mandarin (*Citrus unshiu*):
5. King Mandarin (*Citrus nobilis*):
6. Willow Leaf Mandarin (*Citrus deliciosa*)
7. Kinnow (King x Willow leaf)
8. Dancy Tangerine (*Citrus tangerine*):
9. Khasi Mandrin:
10. Clementine:

Propagation:

It is commercially propagate by T. budding. Seed propagation is adopted for growing root-stocks and breeding programmes.

Planting:

Seedlings and budded plants are done in pit of 60-75cm³ dimensions with incorporation of Manures and fertilizers, during May-June or September-October. Planting is one at Spacing: 6 x 6 m following square or rectangular system of planting

Intercultural operations

Crop Regulation: In this method the plant is motivated for fruiting only in one season in order to get good yield and quality of fruits. This is done before 1-2 months before flowering wherein the following techniques are obtained:

- a. Root exposure by making trench 60-100 cm around the plant
- b. Withholding water and manures 1-2 months before flowering
- c. Heavy water and manures are supplemented
- d. Pruning and training: Water shoots, weak and criss- cross branches are periodically removed and trained to single stem

Harvesting: Grafts commence from 3-5 year. Harvested by clipping or by machines. Expected Yield: 15-20 t/ha/yr. Post harvest ripening using ethylene could be done. It is non climacteric fruit and hence harvesting has to be judged properly. Maturity indices:

- (1) Fruit mature in about 210 to 240 days
- (2) Colour changes from green to pale green or pale yellow (orange) or orange (mandarin)
- (3) Outer rind looks shiny and one can see oil glands on the fruit
- (4) Mandarin 0.4 % acidity and 12 to 14% T.S.S.
- (5) Orange 0.3 % acidity and 12 % T.S.S.

Plant protection: Pest

Pest	Scientific name	Mode of attack	Control
Citrus aphid	<i>Toxoptera aurantii</i>	Sap feeders	yellow sticky trap, Methyl demeton (Metasystox) or dimethoate (Rogar) 2ml /lit, release concinellid beetles and syrphid flies
Citrus psyllid	<i>Diaphorina citri</i>	Sap feeder, secondary infection of sooty mould, "Greening" virus	malathion 0.05% or monocrotophos 0.036% or carbaryl 0.1% or methyl parathion 0.05%. natural enemies and Chrysopids

Mealy bug	<i>Planoccus citri</i>	Sap feeders	methyl parathion 2ml Cryptoleamus montrouzeri 10 per tree
Fruit sucking moth	<i>Otheris materna</i>	Juice sucker/ piercing	malathion 0.05% Traps
leaf miner	<i>Phyllocnistic citrella</i>	Leaf feeder	NSKE 5%
Citrus butterfly	<i>Papilio demolious</i>	Leaf feeder	Trichogramme evanescens and Telenomus sp on eggs Brachymeria sp on larvae and Pterolus sp. on pupae. 1ml DDVP (Nuvan)
Others	White flies, mites, bark eating caterpillar, scales, leaf miners		

Diseases:

Disease	Scientific name	Mode of attack	Control
Powdery mildew	Oidium tingitanium	Patches on leaf surface	Sulphex, Calioxin
Citrus Gummosis	Phytophthora citrophthora	Exudation of gum from the bark, cracks and rot	Proper drainage, Bordeaux paste, 0.2% metalaxyl
Citrus Scab	Elsinoe Fawcetti	fruit, lesions consist of corky projections on leaves	1% Bordeaux, Proper fertiliser dose
Citrus Canker	Xanthomonas Campestris pv. Citri	Cankorous spots on leaves, fruits and twigs	Apply COC during rains
Citrus Tristeza/ Quick Decline	Virus	Defoliated twigs show dieback, necrosis, blossom heavily. Trees with stem pitting are Stunted	Control citrus aphid, Resistant rootstocks
Dieback	Colletotrichum gloeosporoides	Yellowing and death of tree	Pruning the affected parts and Carbendazim (2g/l)

Physiological disorders

Disorder	Symptoms	Control
Citrus Greening	Phytoplasma, Chlorosis, yellowing of leaf, leaf fall, dieback, Insipid fruits	Control citrus psylla injection of antibiotics
Psoriasis	Leaf flecking and spots	Tolerant rootstocks
Cracking	Heavy rains, drought	Light irrigations, K supplement
Exocortis	Spitting barks, yellow patches on stems	Tolerant rootstocks