

# Tropical, Subtropical Fruits & Flowers Cultivation

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**Format:** paperback

**Code:** NI123

**Pages:** 600

**Price: Rs.1075US\$ 125**

**Publisher:** NIIR PROJECT CONSULTANCY SERVICES

Usually ships within 5 days

Tropical and subtropical plants grow in tropical jungles around the world. These plants often produce stunning blooms in a range of colors, and bring a unique and exotic feel to their growing environment. Although they hail from moist areas, many tropical and subtropical plants require warmth more than moisture. Some species of tropical plants are therefore quite easy to grow in warm, non tropical areas. One of the great characteristics of tropical plants is that they keep growing all season. There are thousands of tropical and subtropical fruits and flowers. The tropics have the capacity to produce large quantities of fruit and international trade is adding new kinds as rapid shipment possibilities increase. Some tropical fruits such as the banana, mango and pineapple are now as familiar as the apple and pear in temperate regions. Other examples of tropical fruits are grape, papaya, litchi, guava, coconut etc. In comparison with fruits of temperate regions, many tropical species have been much neglected in international markets. Citrus cultivation is carried out on a large scale. Citrus is grown worldwide although they are tropical plants so that most of the commercial groves are in subtropical regions. It is usually grown at sea level where sufficient moisture is readily available, or under irrigation. Any well drained soil, except an extremely sandy one, is suitable. The fruits ripen at different times of the year depending on the species and variety. There are various kind of tropical flowers; Aster (*Callistephus chinensis*), Jasmine (*Jasminum* sp.), Calendula (*Calendula officinalis*), Carnation (*Dianthus caryophyllus*), Lily (*Lilium* spp.), Narcissus (*Narcissus* spp.), Orchids and many more. Flowers require sincere, patient, soft, affectionate as well as expert handling. Most houseplants are tropical plants. That's why they do so well indoors, at temperature levels humans find comfortable in their homes, around 60 F to 90 F. More technically, tropical plants are defined as all vegetation growing in a wide band around the equator between the Tropic of Cancer and the Tropic of Capricorn. Just north and south of that band are the subtropical areas, also rich in plants of interest to our group.

This book basically deals with seed propagation extraction and handling, effect of seed treatment and temperature on germination, vegetative propagation, effect of rootstocks on mineral composition, type of cutting, growth substances and season, postharvest management of fruits and vegetables, factors affecting postharvest life of flowers, postharvest management of flowers, postharvest management of spices, postharvest management of plantation crops, control of ripening process, pelletization, transportation, storage etc.

Plant propagation is an important aspect of agriculture in general and horticulture in particular. This book contains new methods for cultivation of tropical, subtropical fruits and flowers. The book is very useful for agriculture universities library, consultants, new entrepreneurs, plantation

companies, farmers who wants to update their knowledge and adopt new cultivation techniques.

## 1. CITRUS

Seed Propagation

Extraction and handling

Viability

Storage

Effect of Seed Treatment and Temperature on Germination

Seed treatment to control Fungal diseases

Polyembryony

Vegetative Propagation

Cutting

Air-Layering

Budding

Methods of Budding

Selection, Preparation and Storage of Budwood

Time of Budding

Age of Rootstock and Height of Budding

Wrapping Material and Lopping

Decline of Dudded Tree

Rootstocks

Suitability of Rootstocks

Effect of Rootstocks on Tree-size, Yield and

Quality of Fruits

Incompatibility

Disease and Pest Resistant Rootstocks

Frost-resistant Rootstocks

Effect of Rootstocks on Mineral Composition

Dwarfing Rootstocks

Rootstock in Relation to Soil

Salt Tolerant Rootstock

Drought Tolent Rootstock

Interstock

Micropropagation

Shoot-tip Grafting

## 2. GRAPE

Seed Propagation

Germination

Effect of Temperature

Effect of Growth Substances and Other Chemicals

Effect of Irradiation

Biochemical Changes

Vegetative Propagation

Cutting

Type of Shoot and Length of Cutting

Effect of Season and Temperature

Effect of Water Treatment

Effect of Growth Substances

Mist and Media

Other Treatments Influencing Root Formation

Storage of Cutting

Biochemical Changes During Root Formation

Anatomy of Root Formation  
Single-Bud Cutting  
Layering  
Grafting  
Methods  
Effect of Rootstock on Graft Union  
Effect of Season  
Effect of Growth Substances and Other Chemicals  
Stratification  
Use of Paraffin  
Other Factors Influencing Graft Union  
Storage of Graft  
Biochemical changes  
Top Working  
Budding  
Methods  
Effect of Season  
Effect of Rootstock  
Storage of Bud  
Effect of Methods of Propagation  
Source of Scion  
Rootstock  
Adaptability of Soil and Climate  
Disease and Nematode Resistant Rootstock  
Effect of Rootstock on Growth, Yield and Quality  
Effect of Rootstock on Mineral Composition  
Incompatibility  
Micropropagation  
Anther Culture  
Ovule and Embryo Culture  
Protoplast Culture  
Microcutting  
Growth Variation  
3. BANANA  
Seed Propagation  
Vegetative Propagation  
Suckers, Peepers and Corms  
Micropropagation  
4. MANGO  
Seed Propagation  
Polyembryony  
Storage  
Germination  
Vegetative Propagation  
Cutting  
Part and Age of Plant  
Effect of Forcing, Ringing and Etiolation  
Effect of Bottom Heat  
Effect of Growth Substances and Other Chemicals  
Effect of Age of Cutting, Bottom Head and  
Growth Substance  
Life of Cutting  
Biochemical Changes

Layering  
Air-Layering  
Etiolation  
Media  
Effect of Growth Substances  
Biochemical Changes  
Stooling  
Grafting  
Method  
Effect of Stock and Scion on Graft Union  
Effect of Season  
Effect of Growth Substances  
Anatomy of Graft Union  
Budding  
Methods  
Budding in Situ  
Effect of Stock and Scion  
Season  
Growth Substance  
Storage of Budwood  
Anatomy of Bud-Union  
Effect of Different Methods of Propagation  
Rootstock

Effect of Rootstock on Growth and Yield

Salt Tolerance

Anatomical Screening

Micropopagation

5. PINEAPPLE

Seed Propagation

Germination

Vegetative Propagation

Type of Planting Material

Size and Weight of Planting Material

Storage of Planting Material

Micropropagation

6. PAPAYA

Seed Propagation

Storage

Germination

Vegetative Propagation

Cutting

Grafting

Micropropagation

7. LITCHI

Seed Propagation

Germination

Vegetative Propagation

Cutting

Humidity

Effect of Growth Substances

Layering

Air-Layering

Media  
Season  
Growth Substances  
Wrapping Material  
Biochemical Changes  
Stooling  
Grafting  
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Germination  
Vegetative Propagation  
Cutting  
Type of Cutting  
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Effect of Growth Substances  
Growth Substances and Media  
Type of Cutting and Growth Substances  
Biochemical Changes  
Root Cutting  
Layering  
Air-Layering  
Methods  
Effect of Growth Substances  
Stooling  
Grafting  
Type of Scion  
Season  
Budding  
Methods  
Season  
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Effect of Rootstock on Growth and Yield  
Disease and Pest Resistant Rootstocks  
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Germination  
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Storage of Nut  
Selection of Nuts  
Seed Treatment  
Raising of Seedlings  
Time of Planting  
Method of Planting  
Watering  
Seedling Growth  
Vegetative Propagation  
Layering  
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Seedling Growth  
Vegetative Propagation  
Cutting  
Effect of Growth Substances  
Effect of Ringing and Growth Substances  
Layering  
Air-Layering  
Effect of Growth Substances  
Stooling  
Grafting  
Methods  
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Top Working  
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11. AVOCADO  
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Germination  
Seedling Growth  
Vegetative Propagation  
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Etiolation and Ringing  
Effect of Growth Substances  
Clonal Variation  
Type of Cuttings and Humidity  
Growth Substances and Temperature  
Type of Cutting and Temperature  
Type of Cutting Temperature and Media  
Type of cutting, Growth Substances and Humidity  
Type of Cutting Etiolation and Growth Substances  
Endogenous Growth Substances  
Leaf Cutting  
Layering  
Air-Layering  
Grafting  
Methods  
Storage of Scion  
Anatomy of Graft Union  
Top Working  
Budding  
Methods  
Comparison between Grafting and Budding  
Rootstock  
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Effect of Vigour and Yield  
Salt Tolerance  
Resistance to Chlorosis  
Resistance to Diseases  
Interstock  
Control of Sprout from Rootstock

Micropropagation  
12. OLIVE  
Seed Propagation  
Germination  
Stage of Maturity  
Storage  
Seed Development and Growth Substances  
Temperature  
Seed Treatment  
Vegetative Propagation  
Ovuli  
Sucker  
Cutting  
Type of Cutting  
Effect of Growth Substances  
Media  
Type of Cutting and Growth Substances  
Effect of Growth Substance and Fungicide  
Effect of Growth Substances and Nutrients  
Growth Substances and Media  
Growth Substances and Cultivars  
Growth Substances and Season  
Growth Substance and Humidity  
Season  
Season and Temperature  
Season and Media  
Cultivar and Temperature  
Media and Humidity  
Type of Cutting, Growth Substances and Season  
Type of Cutting, Growth Substances and Media  
Type of Cutting, Growth Substances and Humidity  
Cultivar, Growth Substances, Media and Season  
Media, Temperature and Humidity  
Growth Substance, Temperature and Humidity  
Layering  
Grafting  
Methods  
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Anatomy of Graft Union  
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Budding and Grafting  
Rootstock  
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Vegetative Propagation  
Layering  
Etiolation and Girdling  
Effect of Growth Substances  
Metabolic Changes  
Grafting  
Rootstock  
Micro Propagation

#### 14. BER

Seed Propagation

Development of Seed

Germination

Factors Affecting seed Germination

Seed Treatment

Media

Seedling Performance

Vegetative Propagation

Cutting

Effect of Growth Substances

Effect of Temperature

Layering

Air-Layering

Effect of Growth Substances

Stooling

Budding

Top Working

Grafting

Rootstock

Micropropagation

#### 15. FIG

Seed Propagation

Vegetative Propagation

Cutting

Type of Cutting

Type of Cutting and Season

Effect of Growth Substances

Type of Cutting and Fungicide

Micropropagation

#### 16. JAMUN

Seed Propagation

Germination

Vegetative Propagation

Cutting

Type of Cutting

Effect of Growth Substances

Layering

Grafting

Budding

#### 17. JACKFRUIT

Seed Propagation

Germination

Vegetative Propagation

Cutting

Layering

Air-Layering

Stooling

Grafting

Budding

Rootstock

Micropropagation

#### 18. DATEPALM



Seed Propagation  
Germination  
Temperature and Chemicals  
Histochemical Changes  
Vegetative Propagation  
Offshoot  
Micropropagation

#### 19. ANONA

Seed Propagation  
Dormancy  
Germination  
Vegetative Propagation  
Cutting  
Grafting  
Budding  
Rootstock  
Micropropagation

#### 20. POMEGRANATE

Vegetative Propagation  
Suckers  
Cuttings  
Type of Cutting  
Effect of Growth Substances  
Air-Layering  
Top-Working  
Micro Propagation

#### 21. PERSIMMON

Seed Propagation  
Storage and Viability  
Germination  
Seedling Growth  
Vegetative Propagation  
Sucker  
Root Cutting  
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Method  
Season  
Storage of Scion  
Budding  
Rootstock  
Micro Propagation

#### 22. PHALSA

Vegetative Propagation  
Cutting  
Type of Cutting  
Effect of Growth Substance and Fungicides  
Anatomy of Root Formation  
Layering  
Grafting

#### 23. MULBERRY

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Viability  
Germination

Vegetative Propagation

Cutting

Species

Effect of Growth Substances and Nutrients

Anatomy of Root Formation

Layering

Budding

Micropropagation

ORNAMENTAL PLANTS

24. ANNUAL FLOWERS

Classification

Winter Season Annuals

Summer Season Annuals

Rainy Season Annuals

Climate and Soil

Varieties

Acroclinium

Ageratum

Amaranthus

Anchusa

Antirrhinum

Arctotis

Balsam

Calendula

Candytuft

Carnation (annual)

Celosia

China Aster

Chrysanthemum (annual)

Cineraria

Clarkia

Coreopsis

Cornflower

Cosmos

Daisy

Dianthus

Dimorphotheca

Eschscholzia

Gaillardia

Garden Poppy

Gazania

Godetia

Gomphrena

Gypsophila

Helichrysum

Hollyhock

Larkspur

Limonium

Linaria

Lupin

Marigold

Matricaria

Mignonette  
Myosotis  
Nasturtium  
Nemesia  
Nicotiana  
Nigella  
Pansy  
Petunia  
Phlox  
Portulaca  
Primula  
Rudbeckia  
Salvia  
Scabiosa  
Schizanthus  
Stock  
Sunflower  
Sweet Alyssum  
Sweet Pea  
Sweet Sultan  
Sweet William  
Venidium  
Viola  
Wall Flower  
Zinnia

Propagation

Cultivation

Planting

Manuring and Fertilization

Growth and Flowering

Aftercare

Irrigation

Harvesting and Postharvest Management

## 25. ANTHURIUM

Climate and Soil

Varieties

Red

Orange

White

Pink

Obake Types

Propagation

Cultivation

Planting

Manuring and Fertilization

Aftercare

Irrigation

Harvesting and Postharvest Management

## 26. CARNATION

Climate and Soil

Varieties

Propagation

Growing Structures

Cultivation  
Planting  
Pinching  
Flower Regulation  
Supplementary Lighting  
Growth Regulators  
Nutrition  
Aftercare  
Irrigation  
Harvesting and Postharvest Management  
Harvesting Stage  
Grading  
Conditioning of Flowers  
Packaging and Transportation  
Physiological Disorders

## 27. CHRYSANTHEMUM

Climate and Soil  
Varieties  
Garland Purpose  
Cut Spray  
Propagation  
Seeds  
Suckers  
Cuttings  
Cultivation  
Training  
Manuring and Fertilization  
Aftercare  
Irrigation  
Harvesting and Postharvest Management

## 28. GLADIOLUS

Climate and Soil  
Varieties  
Propagation  
Seeds  
Tissue Culture  
Corm Dormancy  
Cultivation  
Land Preparation  
Planting  
Manuring and Fertilization  
Interculture  
Irrigation  
Harvesting and Postharvest Management  
Physiological Disorder

## 29. JASMINE

Climate and Soil  
Varieties  
J. sambac  
J. grandiflorum  
J. auriculatum  
J. multiflorum  
J. arborescens

J. calophyllum  
J. flexile  
J. humile  
Propagation  
Cultivation  
Planting  
Pruning  
Manuring and Fertilization  
Aftercare  
Irrigation  
Harvesting and Postharvest Management  
Physiological Disorders

### 30. ORCHIDS

Climate and Soil  
Varieties  
Propagation  
Cultivation  
Planting  
Manuring and Fertilization  
Aftercare  
Irrigation  
Harvesting and Postharvest Management  
Physiological Disorders

### 31. ROSE

Climate and Soil  
Varieties  
Propagation  
Cultivation  
Planting  
Pruning  
Manuring and Fertilization  
Irrigation  
Weeding  
Mulching  
Disbudding and Pinching  
Suckers  
Harvesting and Postharvest Management

### MANAGEMENT OF DISEASES

#### 32. DISEASES OF FRUITS

#### 33. MANAGEMENT OF PESTS

Biological Control  
Mechanical Control  
Physical Control  
Cultural Control  
Chemical Control  
Inorganic Insecticides  
Organic Insecticides  
Naturally Occurring  
Uses of Some Common Insecticides  
Specific Control Measure to Important Pests of  
Some Common Crops

Fruits

### 34. POSTHARVEST MANAGEMENT OF PLANTATION CROPS

Coconut  
Dry Processing of Coconut  
Copra Production  
Oil extraction  
Copra Moisture Meter  
Copra Storage  
Extraction of Oil from Copra  
Coconut Oil  
Edible Copra  
Wet Processing of Coconut  
Desiccated Coconut  
Coconut Cream  
Coconut Milk Powder  
Virgin Oil  
Medium/low-fat, Desiccated Coconut  
Coconut Cheese  
Coconut Syrup  
Coconut Honey  
Tender coconut water  
Coconut Byproducts  
Coconut Water  
Husk  
Natural Fibre Extraction  
Mechanical Extraction  
Arecanut  
Chali  
Kalipak  
Scented Supari  
Other Uses of Arecanut  
Oil Palm  
Sterilization  
Stripping  
Digestion  
Pressing  
Clarification  
Purification  
Nut Recovery  
Cashew  
Cashew Nut Processing  
Shelling  
Kernel Drying  
Peeling  
Grading and Conditioning  
Packaging of Kernels  
Cashew Nut Shell Liquid (CNSL)  
Value-added Products of Cashew Apple  
Cocoa  
Primary Processing  
Storage of Dried Beans  
Final Processing  
Press System  
Expeller System  
Chocolate Processing

## 35. POSTHARVEST MANAGEMENT OF SPICES

Black Pepper

Despiking

Drying

Drying Surface

Dry Recovery

Value-added Products

Cardamom

Curing

Value-added Products

Turmeric

Ginger

Value-added Products

Clove

Value-added Products

Cinnamon

Value-added Products

Nutmeg and Mace

Value-added Products

Allspice

## 36. POSTHARVEST MANAGEMENT OF FLOWERS

Causes of Deterioration of Harvested Flowers

Growing Condition

Mechanical Injury

Bacterial and Fungal Infections

Plugging of Xylem Vessels of cut Flowers

Moisture Content

Water Quality

Ethylene Gas

Heat Damage

Factors Affecting Postharvest Life of Flowers

Stage of Harvesting

Water Relations

Respiration

Relative Humidity

Growth Regulators

Preservative Solutions

Precooling and Storage

Packing and Transporting

Home Care of Cut Flowers

Care And Management of Different Types of

Flowers Loose Flowers

Aster (*Callistephus chinensis*)

Crossandra (*Crossandra undulaefolia*)

Jasmine (*Jasminum* sp.)

Tuberose (*Polianthes tuberosa*)

Cut Flowers

*Alstroemeria* spp.

*Amaryllis* and *Hippeastrum*

*Anthurium* (*Anthurium andreanum* and

*A. scherzerianum*)

*Antirrhinum* or Snapdragon (*Antirrhinum majus*)

Bird-of-paradise (*Strelitzia reginae*)

Calendula (*Calendula officinalis*)  
Carnation (*Dianthus caryophyllus*)  
Freesia (*Freesia refracta*)  
Gerbera (*Gerbera jamesonii*)  
Gladiolus (*Gladiolus* spp.)  
Gypsophila (*Gypsophila paniculata*)  
Lily (*Lilium* spp.)  
Narcissus (*Narcissus* spp.)  
Orchids (*Arachnis*, *Aranda*, *Aranthera*, *Ascocendra* and *Epidendrum*)  
Cattleya  
Cymbidium  
Dendrobium  
Odontoglossum and Oncidium  
Paphiopedilum  
Phalaenopsis  
Rose (*Rosa hybrida*)  
Tuberose (*Polianthes tuberosa*)  
Zinnia (*Zinnia elegans*)

### 37. POSTHARVEST MANAGEMENT OF FRUITS AND VEGETABLES

Preharvest Factors  
Selection of Varieties  
Cultural Operations  
Preharvest Treatments  
Maturity  
Harvesting  
Postharvest Factors  
Curing  
Degreening  
Pre-cooling  
Washing and Drying  
Sorting and Grading  
Disinfestation  
Postharvest Treatments  
Waxing  
Control of Ripening Process  
Ripening of fruits  
Pre-packaging in Plastic Films  
Packaging  
Pelletization  
Transportation  
Storage  
Irradiation

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projects, Successful Business Plan, Industry Trends, Market Research, Manufacturing Process, Machinery, Raw Materials, project report, Cost and Revenue, Pre-feasibility study for Profitable Manufacturing Business, Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Business Opportunities, Investment Opportunities for Most Profitable Business in India, Manufacturing Business Ideas, Preparation of Project Profile, Pre-Investment and Pre-Feasibility Study, Market Research Study, Preparation of Techno-Economic Feasibility Report, Identification and Section of Plant, Process, Equipment, General Guidance, Startup Help, Technical and Commercial Counseling for setting up new industrial project and Most Profitable Small Scale Business.

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Sat, 17 May 2025 10:11:20 +0000