

Tropical, Subtropical Fruits & Flowers Cultivation

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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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Vegetative Propagation
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Growth Substances and Media
Type of Cutting and Growth Substances
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Root Cutting
Layering
Air-Layering
Methods
Effect of Growth Substances
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Type of Scion
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Rootstock
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Disease and Pest Resistant Rootstocks
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9. COCONUT
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Time of Seed-Nut Harvest
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Selection of Nuts
Seed Treatment
Raising of Seedlings
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Method of Planting
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Vegetative Propagation
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Effect of Ringing and Growth Substances
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Effect of Growth Substances
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Grafting
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Micropropagation
11. AVOCADO
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Storage and Viability
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Effect of Growth Substances
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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
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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
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Stage of Maturity
Storage
Seed Development and Growth Substances
Temperature
Seed Treatment
Vegetative Propagation
Ovuli
Sucker
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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
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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
Rootstock for Grafting
Anatomy of Graft Union
Budding
Budding and Grafting
Rootstock
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13. SAPOTA
Seed Propagation
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

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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
Grafting
Method
Season
Storage of Scion
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22. PHALSA

Vegetative Propagation
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Anatomy of Root Formation
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23. MULBERRY

Seed Propagation
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
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Tissue Culture
Corm Dormancy
Cultivation
Land Preparation
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Manuring and Fertilization
Interculture
Irrigation
Harvesting and Postharvest Management
Physiological Disorder

29. JASMINE

Climate and Soil
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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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