Citrus fruits are produced all around the world. They contain healthy nutrition content that works wonders for the body. Citrus fruits act as a fabulous source of vitamin C and a wide range of essential nutrients required by the body. India only represents a mere 4% of global citrus fruit production. But now a day, there is a rise in its cultivation. This rise in citrus production is mainly due to the increase in cultivation areas & the change in consumer preferences towards more health & convenience food consumption & the rising incomes. Citrus fruits have long been valued as part of a nutritious and tasty diet. The flavours provided by citrus are among the most preferred in the world, and it is increasingly evident that citrus not only tastes good, but is also good for people. It is well established that citrus and citrus products are a rich source of vitamins, minerals and dietary fiber (non starch polysaccharides) that are essential for normal growth and development and overall nutritional well being. However, it is now beginning to be appreciated that these and other biologically active, non nutrient compounds found in citrus and other plants (phytochemicals) can also help to reduce the risk of many chronic diseases. Appropriate dietary guidelines and recommendations that encourage the consumption of citrus fruit and their products can lead to widespread nutritional benefits across the population. All citrus fruit is acid fruit. The acid fruits are the most detoxifying fruits and excellent foods. Lemon oil is obtained from the fruits of citrus Limonum, Risso (Rutaceae). Although the majority of commercially available essential oils are extracted from the original botanical material by use of steam distillation, most citrus essential oils are extracted by pressing the rinds of the citrus fruits. The oil of sweet orange is obtained from the fruits of citrus Aurantium Risso and the oil of bitter orange from fruits of citrus Bigaradia Risso (Auranciacae). Orange Essential Oil is energizing and is usually well loved by men, women and children. Citrus fruit oils are cheaper than most other essential oils. Lemon or sweet orange oils that are obtained as by products of the citrus industry are even cheaper. Some of the fundamentals of the book are botanical classification, classification of genus citrus, criteria for citrus classification, information on important citrus fruits, subgenus fucitrus (edible citrus fruits), citrus cultivation, citrus fruits, kinnow mandarin, citrus fruit breeding, soil inspection for citrus family, nutrition for citrus world, proper harvesting of citrus, post harvesting of citrus fruits, etc. This handbook on citrus fruits provides relevant information on most citrus crops, the basics of citiculture & production, pre & post harvest management, picking, storage etc. Selected topics on oil extraction of citrus fruits are also given to provide knowledge of the techniques used. This book will be helpful for technocrats, farmers, research scholar, institutions etc.
1. Botanical Classification
Classification of Genus Citrus
Criteria for Citrus Classification
Different Classification
Subgenus Eucitrus (10 Species)
Subgenus 2. Papeda (6 Species)
Subgenera 1. Archicitrus (5 Sections, 98 Species)
Subgenera 2. Meta Citrus (3 Sections, 46 Species)
Others of Somewhat Doubtful Classification
Information on Important Citrus Fruits
Subgenus Fucitrus (Edible Citrus Fruits)
Acid Group
Citrus Medica Linn. (Citron)
Citrus Lemon Burm (Lemon)
Citrus Aurantifolia Swingle (Acid Lime)
Citrus Latifolia Tanaka (Tahiti or Persian Lime)
Citrus Limettioides Tanaka (Sweet Lime)
Citrus Jambhiri Lush (Rough Lemon; Jambiri)
Citrus Limetta Risso (Limetta of the Mediterranean)
Citrus Karna Raff (Kharna Khatta)
Citrus Limonia Osbeck (Rangpur Lime)
Citrus Pennivesculata Tanaka (Gajanimma)
Orange Group
Citrus Aurantium Linn (Sour, Bigarade or Soville Orange)
Citrus Sinensis Osbeck (Sweet Orange)
Citrus Myrtifolia Raffinesque
Citrus Bergemia Risso (Bargmot Orange)
Citrus Natsudaidai Hayata
Pumelo-Grapefruit Group
Mandarin Group
Citrus Reticulate Blance (loose skinned orange or Santra of India)
Citrus Unshiu M (Satsuma Mandarin)
Citrus Deliciosa Tenore
Citrus Nobilis Loureio (King Mandarin)
Citrus Reshni Tanaka (Spice Mandarin)
Citrus Medurensis Lou (Calamondin)
Citrus Madaraspatana Tanaka
Subgenus Papeda : (Inedible Citrus Fruits)
Eupapeda Citrus
Citrus Macroptera (Metanewsian Papeda)
Papeda Citrus
Citrus Ichangensis
Citrus Iatipes (Khasi Papeda)
Kumquats
Fortunella Margarita Swingle (Nagami or Oval Kumquat)
Fortunella Japonica Swingle (Marumi or Round Kumquat)
Fortunella Crassiflora Swingle (Meiwa Kumquat)
Fortunella BINDSII Swingle (Hong Kong wild Kumquat)
Poncirus Trifoliata L. (Trifoliate Orange)
Citrus Relatives
Aegle Marmelos Linn. (Bael)
Feronia Limonia (Linn) Swingle (Wood apple)
2. Citrus Cultivation
Sweet Oranges
Citrus Sinensis Osbeck
Batavian
Hamlin
Jaffa
Malta Blood Red
Mosambi
Pineapple
Sathgudi
Shamouti
Valencia Late
Washington Navel Oranges
Mandarin Oranges
Citrus Reticulata B.
Calamondin (Citrus Madurensis Lou)
Cleopatra (Spice Tangerine) C. reshni T.
Coorg Orange
Dancy Tangerine
Desi Mandarin (Pathankot)
Khasi Orange
King Mandarin
Kinnow Mandarin
Nagpur Santra
Satsuma Orange (C. unshiu M.)
Temple Mandarin
Lemon C. limon Burm
Eureka Lemon
Lisbon Lemon
Lucknowseedless
Hill Lemon (Galgal) C. pseudolimon Tanaka
Malta Lemon
Meyer Lemon
Napali Oblong
Villafranca
Lime
Acid Lime (Citrus aurantifolia Swingle)
Tahiti (Persian) Lime (C latifolia Tanaka)
Rangpur Lime (Citrus Limonia Osbeck)
Sweet Lime (Citrus Limettioides Tanaka)
Pummelo (C. Grandis Osbeck)
Nagpur (Chakotra)
Grapefruit (C. Paradisi Macf)
Duncan
Foster
Marsh Seedless
Ruby
Shaharanpur Special
Thompson (Pink Marsh)
Citrus Hybrids
Inter Generic Hybrids
Hybrids of Poncirus
Citranges
Citrangequats (Citrus O(range) Kum(quats)
Citrangeins (cit)rus O(range)Ä—Calomon (din)
Citranges
Cleitranges
Citrumelos
Hybrids of Fortunella
Procimequat (Pro(to)C(itrusĂ—L)imequat.
(Fortunella japomicaĂ—C.aurantifolia, Cv.â€”Mexican)Ă—F.hindsii.
Limequats (C. aurantifoliaĂ—F. japonica)
Orangequats. (C. reticulata Cv. satsumaĂ—F. japonciaĂ—F. morgarita Cv. meiwa)
Hybrids of Genus Eremocitrus
Intrangeneric Hybrids

3. Citrus Fruits
Sweet Orange
Climate
Soil
Cultivars
Mosambi
Blood Red Malta
Sathgudi
Pineapple
Washington Navel
Jaffa
Shamouti
Valencia Late
Hamlin
Batavian
Propagation
Raising of Seedlings for Rootstock
Budding
Planting
Manure and Fertilizers
Irrigation
Interculture and Intercropping
Training and Pruning
Bahar Treatment
Fruit Drop
Physiological Fruit Drop
Control Measures
Pathological Fruit Drop
Control Measures
Harvesting
Yield
Post Harvesting Handling and Storage

4. Mandarin
Uses
Climate
Soil
Varieties
Nagpur Santra
Khasi Orange (Mandarin)
Coorg Orange
Desi Mandarin (Pathankot)
Other Varieties
Propagation
Manure and Fertilizers
Yield
Post Harvest Handling and Storage

5. Kinnow Mandarin
Uses
Climate
Soil
Propagation
Planting
Manures and Fertilizers
Irrigation
Interculture and Intercropping
Flowering and Fruiting
Harvesting
Yield
Post Harvest Handling and Storage

6. Sour Lime
Uses
Climate
Soil
Types/Varieties of Lime
Kagzi Lime
Chakradhar Lime
Rangpur Lime (Citrus limonia Osbeck)
Taheti (Persian) Lime (C. latifolia Tanaka)
Propagation
Raising of Seedlings
Planting
Manure and Fertilizers
Irrigation
Interculture and Intercropping
Training and Pruning
Flowering and Fruiting
Harvesting
Postharvest Handling and Storage

7. Sweet Lime
Uses
Climate
Soil
Varieties
Mitha Chikna
Propagation
Planting
Manures and Fertilizers
Irrigation
Training and Pruning
Flowering and Fruiting
Harvesting
Yield
Handling and Storage

8. Lemon
Uses
Climate
Soil
Varieties
Eureka
Lisbon Lemon
Villafranca
Lucknow Seedless
Nepali Oblong
Baramasi
Kagzi Kalam
Hill Lemon. (Galgal) C. pseudolemon Tanaka
Meyer Lemon
Pat Lemon
Italian Lemon
Rajamundary Lemon
European Lemon
Ponderosa Lemon or Japanese Lemon
Malta Lemon
Propagation
Planting
Irrigation
Manure and Fertilizers
Training and Pruning
Improvement in Yield
Harvesting
Yield
Post Harvest Handling and Storage

9. Grapefruit
Uses
Climate
Soil
Varieties
Marsh Feedless
Duncan
Foster
Saharanpur Special
Ruby
Thompson (Pink Marsh)
Triumph
Propagation
Planting
Irrigation
Training and Pruning
Flowering and Fruiting
Harvesting
10. Pummelo

Uses
Climate
Soil
Varieties
Propagation
Planting
Cultural Practices
Harvesting and Yield

Insect-pests of Citrus Fruits
Lemon Butterfly (Papilio demoleus Linn)
Control Measures
Citrus Leaf Miner (Phylloenistis Citrella Stainton)
Control Measures
Citrus Psylla (Diaphorina Citri Kuwayma)
Control Measures
Whiteflies
Control Measures
Control Measures
Aphids
Control Measures
Mites
Control Measures
Scale Insects
Control Measures
Nematodes
Control Measures
Stem and Bark Borers (Indarbela Tetraonis Moore and I. qudrinotata Walker)
Control Measures
Fruit Sucking Moths (Ophideres spp).
Control Measures
Fruit Flies (Daccus spp).
Diseases of Citrus Fruits
Gummosis (Photophthora spp, Diplodia Natalensis Pole Evans)
Control Measures
Ganoderma Root Rot (Ganoderma Lucidum Karst)
Control Measures
Pink Disease (Pellicularia Salmonicour Dastur)
Control Measures
Powdery Mildew (Acrosporium Tingitaninum Subr).
Control Measures
Anthracnose (Colletotrichum Gloeosporioides and Gloeosporium Limethicolum Clausen)
Control Measures
Twig Blight (Diplodia and Fusarium spp.)
Control Measures
Citrus Canker (Xanthomanas Citri Dowsan)
Control Measures
Tristeza Virus Disease (Corium Vialoris)
Control Measures
Xyloporosis

Diseases of Citrus Fruits
Gummosis (Photophthora spp, Diplodia Natalensis Pole Evans)
Control Measures
Ganoderma Root Rot (Ganoderma Lucidum Karst)
Control Measures
Pink Disease (Pellicularia Salmonicour Dastur)
Control Measures
Powdery Mildew (Acrosporium Tingitaninum Subr).
Control Measures
Anthracnose (Colletotrichum Gloeosporioides and Gloeosporium Limethicolum Clausen)
Control Measures
Twig Blight (Diplodia and Fusarium spp.)
Control Measures
Citrus Canker (Xanthomanas Citri Dowsan)
Control Measures
Tristeza Virus Disease (Corium Vialoris)
Control Measures
Xyloporosis
Control Measures
Psorosis
Control Measures
Exocortis or Scalybutt
Control Measures
Citrus Greening
Control Measures
Dendrophthoe
Control Measures
Fruit Cracking
Control Measures
Citrus Decline
Control Measures
Granulation
Control Measures
Fruit Drop
Control Measures
Alternate Bearing
Control Measures

11. Citrus Fruit Breeding
Aims of Citrus Breeding
Related to Fruit Characters
Related to Tree Characters
Related to Rootstocks
Problems in Citrus Breeding
Time
Polyembryony
Sterility
Breeding Method
Introduction
Selection
Hybridization
Mutation Breeding
Choice of the Procedure
Cytogenetics
Blossom Biology in Citrus
Blooming Period
Flower Bud Differentiation
Flower Bud Development
Inflorescence
Sex Ratio
Anthesis
Dehiscence
Stigma Receptivity
Storage, Longevity and Fertility of Pollen
Pollen Germination
Pollination and Fecundation
Fruit Development
Technique of Hybridization
Structure of the Citrus Flower
Calyx
Corolla
12. Suitable Climate
   Influence of Climatic Factors
   Temperature
   Relative Humidity
   Rainfall
   Winds
   Altitude
   Climatic Requirements of Different Citrus Species
   Sweet Oranges (Citrus Sinensis Osbeck)
   Mandrin Oranges (Citrus Reticulata Blanco)
   Acid Lime (Citrus Aurantifolia Swingle)
   Sweet Lime (Citrus Limettioides Tanaka)
   Lemon (Citrus Limon B)
   Grapefruit (Citrus Paradisi Macf)
   Pummelo (Citrus Grandis Osbeck)
   Climate in Different Regions of India

13. Type of Soil
   Water Drainage
   Depth of the Soil
   Nature of the Subsoil
   Soil-reaction
   Salts
   Type and Fertility of the Soil
   Soils Requirement of Different Citrus Species
   Citrus Soils of India
   Citrus Soils of Elsewhere
   Work Done in India
   Citrus Breeding in U.S.A.
   Tangelos (Tangerine Ä— Grapefruit)
   Citranges (Poncirus Trifoliata Ä— Citrus Sinensis)
   Citrangequats (Citrange Ä— Kumquat)
   Limequats (Mexican Lime Ä— Kumquat)
   Hybrid acid Citrus fruit
   Mandarin Types
   Citrus Breeding in U.S.S.R.
   Citrus Breeding in Other Countries
   New Approaches in Citrus Breeding in India

14. Making an Orchard
   Selection Of Site
   Spacing
   Preparation of the Site
   Layout
Selection of Varieties
Digging and Filling of Pits
Planting Season
Planting
Care of Young Plants

15. Cultivation of an Orchard
History
Cultivation
Greenhouse
Orchard House and its Management
Composts, Potting Methods, and Containers
Bark Preparation
Feeding of Orchard Plants
Outdoor Cultivation of Orchards
Growing Orchards in Outdoor Beds
Vegetative Propagation
Raising of Orchards from Seeds
Care of Seedling
Shoot Tip or Meristem Culture
Differentiation of Flower Buds and Induction of Flowering
Resting
Method of Hybridisation
Storing Pollen
Procedure for Pollination
After Pollination
Diseases and Pests
Control Measures for Fungal Diseases
Viral Diseases and their Control
Insect Pests and their Control

16. Propagation of Citrus Fruits
Seed Propagation
Seed storage
Seed Bed
Sowing Time
Sowing
Germination
Shade
Nursery Bed
Care of the Young Seedlings
Asexual Propagation
Budding
Preparation of Stock Seedling
Collection of Budwood
Storage of Budwood
Method of Operation
Height of the Budding
Lopping
Care of Young Budlings in the Nursery
Digging of Budlings
Transporting
Budwood Certification Programmes
Cuttings
Layering
Grafting
Top-Working
Purchasing of Seedlings or Budlings
Care of Plants on Arrival from the Nursery
Propagation of Different Citrus Species
Bud Variation
Causes of Bud Variations
Classification or Variations
Significance of Bud Variation
Bud Selection
Bud Selection Methods
Nucellar Embryony
Origin and Development of Nucellar Embryos
Factors Affecting the Polyembryony
Identification
Inheritance of Nuclear Embryony
Nucellar Embryony in Citrus Species and Cultivars
Strongly Polyembryonic
Weekly Polyembryonic
Number of Embryos Per Seed
Number of Nucellar Seedlings Per Seed
Horticultural Significance
Significance of Nucellar Embryony in Citrus Breeding
Nucellar Embryony and Heterozygosis
Drawback of Nucellar Seedlings
Performance of Nucellar Lines
In Vitro Culture of Nucellar Embryos

17. Budded Roots
Qualities of a Good Rootstock
Citrus Rootstocks in India
Citrus Rootstocks of the World
Rootstock Trials in India
Punjab
Uttar Pradesh
Assam
Andhra Pradesh
Maharashtra
Karnataka
Tamil Nadu
Characteristics of Rootstocks
Cleopatra Mandarin: Citrus Reshni T.
Troyer Citrange
Citrus Sinensis — Poncirus Trifoliata
Swingle Citrumelo
Duncan Grapefruit — Trifoliate Orange
Stock and Scion Relationships in Citrus
Effect of Root stock on Vigour of the Scion
Effect on Precocity
Effect on Productivity and Yield
Effect on Fruit Size, Colour and Quality
Effect on Winter Hardiness
Effect on Nutrition
Effect on Disease Resistance
Effect of the Scion on Rootstock
Effect of Interstocks
CITRUS ROOTSTOCK PROBLEMS
Stionic Failures
Viruses
Diseases
Nematodes
Salts

18. Cutting of Weak/Neglected Parts
Pruning of Young and Pre-bearing Plants
Pruning Bearing Trees
Pruning Older Trees
Pruning Neglected Trees
Pruning Overgrown Trees
Hedging
Root Pruning
Pruning Time
Wound Protection
Pruning Different Citrus Species
Pruning Problems

19. Soil Inspection for Citrus Family
Soil Tillage
Different Soil Management Practices

20. Inter Cultivation
Choice of Intercrops in India
Intercropping in Other Countries

21. Nutrition for Citrus World
Mineral Nutrition
Nitrogen
Phosphorus
Potassium
Calcium
Magnesium
Sulphur
Zinc
Iron
Copper
Manganese
Boron
Molybdenum
Combined Nutritional Sprays
Factors Governing the Nutrition
Nutrient Elements Balance
Manuring and Fertilization
Manuring of Young and Pre-bearing Trees
Manuring Bearing Trees
Time of Application
Methods of Application
Foliar Analysis
Soil Vs. Foliar Analysis
The Concept of Foliar Analysis
Factors Affecting Mineral Composition of Leaves
Methods of Leaf Sampling
Preliminary Survey of Orchard and Selection of Initial Sampling Technique
Methods of Analysis
Leaf Analysis Standards
Interpretation of the Leaf Standards of Different Elements

22. Control Irrigation
Irrigation Requirement of Citrus Trees
Time and Frequency of Irrigation
Quality of Irrigation Water
Systems of Irrigation
Basin System
Furrow System
Flood Irrigation System
Check System
Sprinkler Irrigation
Advantages
Disadvantages
Drip- or Trickle-irrigation
Advantages
Disadvantages
Pitcher System
Sub-surface Irrigation
Irrigation to Young and Pre-Bearing Trees
Irrigation to Bearing Trees

23. Unwanted Weed Removal
Control
Weed Control in Nurseries
Weed Control in the Main Field
Herbicidal Effects
Phytotoxic Effects
Other Effects

24. Proper Harvesting of Citrus
Picking Time
Methods of Picking
Handling
Grading
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25. Oil of Bergamot

26. Oil of Lemon

27. Oil of Mandarin
28. Oil of Orange

29. Study of Orange Essential Oils
   Analysis by Infrared Spectroscopy

30. Study of Orange Essential Oils
   Chemical Modifications During Aging

31. Citrus Carotenoids (I) The Structure of Citranaxanthin, a New Carotenoid Ketone
   Experimental
   Isolation of Citranaxanthin I
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   Alkali Cleavage of Citranaxanthin I.
   Reduction of Citranaxanthin
   Citranaxanthin I
   Anal. Calcd.

32. Citrus Carotenoids (II) The Structure of Reticulataxanthin

33. Factors Direct Fruit Variety
   Climatic Factors
   Temperature
   Water
   Nutritional Factors
   Nitrogen
   Phosphorus
   Potassium
   Magnesium
   Manganese
   Copper
   Boron
   Rootstock Effects
   Fruit Size
   Colour of Rind
   Juice
   Total Soluble Solids
   Total Acidity
   Ascorbic Acid Content

34. Post Harvesting of Citrus Fruits
   Degreening
   Pre-harvest Treatment
   Post-harvest Application
   Storage
   Waxing
   Polyethylene Covers
   Growth Regulators
   Cold Storage
   Controlling Moulds in Storage

35. New Problems for Citrus Family
   Alternate Bearing
Factors Affecting Alternate Bearing
Control
Resting Treatment
Choice of Bahar
Granulation
Analogy of Granulation
Physico-chemical Characteristics of Granulated Fruits
Incidence and Progress of Granulation
Factors Affecting Granulation
Humidity
Temperature
Light
Tree age
Tree health
Tree Vigour
Tree Aspect
Tree Variation
Fruit Size
Rootstock
Varietal Susceptibility
Control Measures
Irrigation
Effect of Time Sprays
Effect of Growth Regulators
Nutritional Sprays
Citrus Decline
Symptoms
Factors Responsible for Citrus Decline
Soil Factors
Nutritional Factors
Rootstock Factors
Orchard Management Factors
Insect-pests
Nematodes
Fungal Diseases
Viruses
Control Measures
Fruit Drop
Retarding or Inhibiting Factors
Accelerating or Initiating Factors
Temperature
Water
Insect Pests and Diseases
Physiological Factors
Nitrogen
Carbohydrates
Auxins
Embryo Development
Control of Fruit Drop
Mandarins
Sweet Oranges
Grapefruit
Lemons
36. Use of Plant Growth Regulators
   2,4-Dichlorophenoxy Acetic Acid (2,4-D)
   2,4,5-Trichlorophenoxyacetic Acid (2,4,5-T)
   Naphthalene Acetic Acid (NAA)
   Gibberellins
   Cytokinins
   Growth Retardants
   Ethylene
   Limitations

37. Serious Diseases of Citrus
   Diseases Caused by Fungi
   Gummosis
   Symptoms
   Etiology and Spread of Disease
   Varietal Susceptibility
   Control Measures
   Preventive Measures
   Curative Measures
   Diplodia Gummosis
   Symptoms
   Spread
   Control
   Ganoderma Root Rot
   Symptoms
   Control
   Pink disease
   Symptoms
   Control
   Powdery Mildew
   Symptoms
   Etiology and Spread
   Control
   Felt Disease
   Symptoms
   Etiology and Spread
   Varietal Susceptibility
   Control
   Anthracnose
   Symptoms
   Etiology and Spread
   Control Measures
   Scab
   Symptoms
   Etiology and Spread
   Varietal Susceptibility
   Control
   Dry Root-rot
   Symptoms
   Etiology
   Control
   Armillariella Root-rot
Symptoms
Control
Sooty Mould
Symptoms
Damage
Etiology and Spread
Control
Melanose
Symptoms
Etiology and Spread
Control
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Etiology
Symptoms
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Leaf Fall and Fruit-rot
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Etiology
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Sphaeropsis Knots
Limb Breakage
Greasy Spot
Nursery Diseases
Diseases Caused by Bacteria
Citrus Canker
Symptoms
Etiology and Spread
Varietal Resistance
Control
Citrus Blast
Bacterial Root Rot
Diseases Caused by Viruses
Diseases Affecting Certain Stionic Combinations
Tristeza or Quick Decline
Symptoms
Etiology
Transmission of the Virus
Varietal Susceptibility
Control
Saving the Existing Infected Orchards
Avoiding Losses in New Citrus Plantings
Xyloporosis
Symptoms
Virus Diseases Occurring Irrespective of Rootstocks
Psorosis
Symptoms
Etiology
Control
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Symptoms
Etiology
Diseases Caused by Viroids
Exocortis or Scalybutt
Other Miscellaneous Virus Diseases
Budunion Crease
Citrus Mosaic
Infectious Variegation
Yellow-Corky Veins
Blastomania
Leaf-curl-disease
Other Virus-Like Disorders
Creeping Stem
Bark Eruptions
Woody Galls
Young Tree Decline
Gummy Pitting
Tatter Leafâ€”Citrange Stunt Complex
Citrus Mosaic, Navel Infections Mottling and Natsudaidai dwarf
Citrus Greening
Symptoms
Etiology
Transmission
Varietal Susceptibility
Control
Phanerogamic Parasites
Dendrophthoe (Loranthus)
Cassytha
Physiological Disorders
Foam Disease
Symptoms
Cause
Fruit Splitting
Symptoms
Cause
Control
Endoxerosis
Symptoms
Cause
Control
Creasing (Puffiness)
Rough Fruit Disorder
Market for Storage Diseases
Penicillium Moulds
Alternaria Rot
Black Core Rot
Diplodia-Stem-end Rot
Aspergillus Rot
Miscellaneous Rot

38. Important Pests of Citrus
Introduction
Root Pests
Stem and Trunk Pests
Borers
Chloridolum Alemene Thomson
Monohanmus Versteegi Nitzema (Trunk Borer)
Stein and Bark Borers (Indarbela Spp.)
Damage by Borers
Control
Foliage Pests
Lemon Butterfly (Papilo Demoleus Linn.)
Papilionidae : Lepidoptera.
Distribution
Host Plants
Life History
Damage
Control
Citrus Leaf-Miner: (Phyllocnistis Citrelia Stainton) (Phyllecnistidae: Lepidoptera).
Distribution
Host Plants
Life History
Damage
Control
Citrus Psylla: Diaphorina Citri Kuwayama
Distribution
Host Plants
Life-history
Damage
Control
Whiteflies (Aleurocanthus Spp, Dialeurodes Spp)
Distribution
Host Plants
Life History
Damage
Control
Weevils: (Myllocerus Discolor BOH)
Mealy Bugs : Pseudocoecus Spp (Pseudococcidae : Hemiptera)
Distribution
Host Plants
Life History
Damage
Control
Aphids: Hemiptera Aphididae
Distribution
Host Plants
Life History
Damage
Control
Thrips: (Scirtothrips spp, Heliothrips spp)
Distribution
Host Plants
Damage
Life History
Control
Scale Insects: (Coccidoe: Homoptera)
Damage
Armoured Scales
Unarmoured or Soft Scales
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Control
Mites: (Tetranychidae: Acarina)
Distribution
Life History
Damage
Citrus Rust Mite: Phyllocoptruta Oleivorus Ashm
Six-spotted Mite: Tetranychus Sexmaculatus Riley
Control
Minor Pests
Hairy Caterpillars Euprotctis Fraterna M
The Citrus Leaf-roller (Psorosticha Zizyphi Staintor)
Orange Hair Streak: (Taraucus Theophrastus)
A Grass Hopper: Poekilocerus Pictus Fab
Cricket: Braehytrypes Portentosus Light
Longhorn Beetle: Oberea Mangalorensis
Flower Pests
Citrus Flower Moth: Prays Citri Milliers
Cacoecia Epicyrta Meyrick
Blossom Midge Sayneura Citri G & P
Fruit Pests
Fruit Sucking Moths (Noctudidae: Lepidoptera)
Calpe Emarginata
Distribution
Host Plants
Life History
Damage
Control
Fruit Flies
Distribution
Host Plants
Life History
Damage
Control
Fruit Sucking Bugs
Distribution and Host Plants
Life History
Damage
Control
Citrus Rind Borer: Prays Endocarpi Meyrick.
General Control Measures

39. Nematodes of Citrus
Citrus Root Nematode
Tylenchulus Semipenetrans Cobb. 1913
Host Range
Control Measures
Cultural Control
Biological Control
Resistant Rootstocks
Reniform Nematode (Rotylenchulus Reimformis)
Burrowing Nematode (Radopholus Similis)
The Lesion Nematode (Pratylenchus Coffeae)
Root-knot Nematode (Meloidogyne Africane)
About NIIR

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