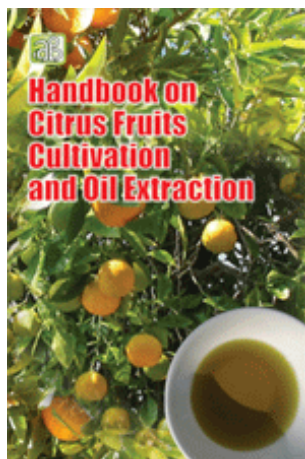


Handbook on Citrus Fruits Cultivation and Oil Extraction



Author: NPCS Board of Consultants & Engineers

Format: Paperback

ISBN: 9788178331256

Code: NI223

Pages: 544

Price: Rs. 1,575.00 **US\$** 150.00

Publisher: Asia Pacific Business Press Inc.

Usually ships within **5** days

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 (Aurantiaceae). 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 citriculture & 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.

Contents

Contents

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 Pennivesiculata Tanaka (Gajanimma)

Orange Group

Citrus Aurantium Linn (Sour, Bigarade or Senville Orange)

Citrus Sinensis Osbeck (Sweet Orange)

Citrus Myrtifolia Raffinesque

Citrus Bergemia Risso (Bargmot Orange)

Citrus Natsudaoides 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 Madaraspata Tanaka

Subgenus Papeda : (Inedible Citrus Fruits)

Eupapeda Citrus

Citrus Macroptera (Metanewsian Papeda)

Papeda Citrus

Citrus Ichangensis

Citrus latipes (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. (Trifoliata 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 (Cit)rus O(range) Kum(quats)
Citrangedins (cit)rus O(range) Calomon (din)
Citrangors
Cleitranges
Citrumelos
Hybrids of Fortunella
Procimequat (Pro(to)C(itrus—L)imequat.
(Fortunella japomica—C.aurantifolia, Cv.â€”Mexican)—F.hindsii.
Limequats (C. aurantifolia—F. japonica)
Orangequats. (C. reticulata Cv. satsuma—F. japonica—F. morgarita Cv. meiwa)
Hybrids of Genus Eremocitrus
Intrgeneric 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
Rajamunday 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
Yield
Post-harvest Handling and Storage

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 (*Diaphornia 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 Salmonicolour* 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 (Xanthomonas 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
Stamens
Pistil
Selection of Parents
Selection of Seed Parent Trees, Branches and Flowers
Bagging the Flowers
Emasculation
Pollination
Fruit Set

12. Suitable Climate

Influence of Climatic Factors
Temperature
Relative Humidity
Rainfall
Winds
Altitude
Climatic Requirements of Different Citrus Species
Sweet Oranges (*Citrus Sinensis* Osbeck)
Mandarin 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 × Grapefruit)
Citranges (*Poncirus Trifoliata* × *Citrus Sinensis*)
Citrangequats (Citrange × Kumquat)
Limequats (Mexican Lime × 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 of 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
Weakly Polyembryonic
Number of Embryos Per Seed
Number of Nucellar Seedlings Per Seed
Horticultural Significance
Significance of Nucellar Embryony in Citrus Breeding
Nucellar Embryony and Heterozygosity
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
Packing

Marketing

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
Anal. Calcd.
Alkali Cleavage of Citra anaxanthin (I).
Reduction of Citranaxanthin
Citranaxanthin (I)
Anal. Caled.

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
Twig Blight
Etiology
Symptoms
Control
Leaf Fall and Fruit-rot
Symptoms
Etiology
Control
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
Stubborn Disease
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 Natsudaiddai 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 Diseases

38. Important Pests of Citrus

Introduction

Root Pests

Stem and Trunk Pests

Borers

Chloridolum Alemene Thomson

Monohanus Versteegi Nitzema (Trunk Borer)

Stein and Bark Borers (*Indarbela* Spp.)

Damage by Borers

Control

Foliage Pests

Lemon Butterfly (*Papilio Demoleus* Linn.)

Papilionidae : Lepidoptera.

Distribution

Host Plants

Life History

Damage

Control

Citrus Leaf-Miner: (*Phyllocnistis Citrelia* Stainton) (Phyllocnistidae: Lepidoptera).

Distribution

Host Plants

Life History

Damage

Control

Citrus Psylla: *Diaphornia 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 : *Pseudococcus* Spp (*Pseudococcidae* : Hemiptera)

Distribution

Host Plants

Life History

Damage

Control

Aphids: Hemiptera Aphididae

Distribution

Host Plants

Life History

Damage

Control

Thrips: (*Scirtothrips* spp, *Heliethrips* spp)

Distribution

Host Plants

Damage

Life History
Control
Scale Insects: (Coccidae: Homoptera)
Damage
Armoured Scales
Unarmoured or Soft Scales
Spread
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 (Noctuididae : 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 Similies)
The Lesion Nematode (Pratylenchus Coffeae)
Root-knot Nematode (Meloidogyne Africana)
The Lance Nematode (Hoplolaimus Indicus)
Poncirus
Fortunella (Kumquats)
Citrus

About NIIR

NIIR Project Consultancy Services (NPCS) is a reliable name in the industrial world for offering integrated technical consultancy services. Its various services are: Pre-feasibility study, New Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Preparation of Project Profiles and Pre-Investment and Pre-Feasibility Studies, Market Surveys and Studies, Preparation of Techno-Economic Feasibility Reports, Identification and Selection of Plant and Machinery, Manufacturing Process and or Equipment required, General Guidance, Technical and Commercial Counseling for setting up new industrial projects and industry.

NPCS also publishes various technology books, directory, databases, detailed project reports, market survey reports on various industries and profit making business. Besides being used by manufacturers, industrialists and entrepreneurs, our publications are also used by Indian and overseas professionals including project engineers, information services bureau, consultants and consultancy firms as one of the input in their research.

NIIR PROJECT CONSULTANCY SERVICES , 106-E, Kamla Nagar, New Delhi-110007, India. **Email:** npcs.india@gmail.com **Website:** NIIR.org

Fri, 18 May 2012 04:47:08 +0530