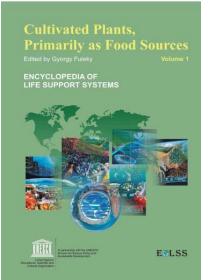
# **CONTENTS**

## **CULTIVATED PLANTS, PRIMARILY AS FOOD SOURCES**



Cultivated Plants, Primarily as Food Sources -Volume 1 No. of Pages: 372 ISBN: 978-1-84826-100-6 (eBook) ISBN: 978-1-84826-550-9 (Print Volume)

Cultivated Plants, Primarily as Food Sources -Volume 2 No. of Pages: 440 ISBN: 978-1-84826-101-3 (eBook) ISBN: 978-1-84826-551-6 (Print Volume)

For more information of e-book and Print Volume(s) order, please **click here** 

Or contact : eolssunesco@gmail.com

## CONTENTS

## **VOLUME I**

## **Cultivated Plants, Primarily as Food Sources**

György Füleky, Szent István University, Gödöllö, Hungary

- 1. Introduction
  - 1.1. Cultivation
  - 1.2. Which Crops Feed the World?
  - 1.3. Protein Problem
- 2. History of Crop Production
  - 2.1. Gathering People
  - 2.2. What Do Gatherers Eat?
    - 2.2.1. Grass Seeds (Potential Cereals)
    - 2.2.2. Legumes
    - 2.2.3. Root and Tuber Plants
    - 2.2.4. Oil Plants
    - 2.2.5. Fruits and Nuts
    - 2.2.6. Vegetables and Spices
  - 2.3. Types of Agriculture
  - 2.4. Diffusion of Crops
- 3. Land Used for Agriculture
  - 3.1. Land Use Categories
  - 3.2. Agricultural Land Use
  - 3.3. Reserve of Productive Agricultural Land
- 4. Cropping Systems
  - 4.1. Cropping Systems
    - 4.1.1. Shifting Cultivation
    - 4.1.2. Wet-Rice Cultivation
    - 4.1.3. Agroforestry
    - 4.1.4. Grasslands
    - 4.1.5. Mixed Farming
    - 4.1.6. Plantation Crops
    - 4.1.7. Large-Scale Grain Production
  - 4.2. Integrated Agriculture
  - 4.3. Modern Agricultural Revolution
  - 4.4. Major Agricultural Systems
- 5. Future Trends
  - 5.1. Traditional Plants in Future
    - 5.1.1. Cereals and Pseudocereals
    - 5.1.2. Legumes
    - 5.1.3. Edible and Industrial Oils
    - 5.1.4. Non-Wood Fiber
    - 5.1.5. Industrial Crops
    - 5.1.6. Energy Crops
    - 5.1.7. Fruits and Nuts
    - 5.1.8. Vegetables
    - 5.1.9. Aromatics, Culinary Herbs, and Medicinals
    - 5.1.10. Ornamentals
  - 5.2. Human Health and Plant Food Nutrition
    - 5.2.1. Plant Food Composition
    - 5.2.2. Protein-Energy Malnutrition
    - 5.2.3. Nutrition Security
  - 5.3. Plant Products of Biotechnology
    - 5.3.1. Conventionally Bred Crops Versus Genetically Modified (GM) Crop
    - 5.3.2. Possible Future Developments

## 5.3.3. Potential Risks

## Rice

42

Krisztina R. Végh, Research Institute for Soil Science and Agricultural Chemistry of Hungarian Academy of Sciences, P. O. Box 35, H-1525 Budapest, Hungary

- 1. Rice in the world living with rice
- 2. Short history
- 3. Growth, morphology and chemistry of the rice plant
  - 3.1. Morphology of rice plant
    - 3.1.1. Root system
    - 3.1.2. Aboveground parts
    - 3.1.3. Rice Grain
- 4. Rice ecosystems
  - 4.1. Rainfed lowland ecosystems
  - 4.2. Upland rice ecosystems
  - 4.3. Flood-prone rice ecosystems
  - 4.4. Irrigated rice ecosystems
- 5. Main constrains to production and environmental consequences
  - 5.1. Water: a factor limiting yield
  - 5.1.1. Solutions for water problems
  - 5.2. Nutrient management: principles and practices
    - 5.2.1. Nitrogen management in rice ecosystems
    - 5.2.2. Management of P and K in rice fields
    - 5.2.3. Silicon management for sustainable rice production
  - 5.3. Weeds, pests and diseases
  - Development of plant genotypes for stabilized high yields for each ecosystem.
  - 6.1. New rice varieties planned
  - 6.2. Rice genome has been mapped
  - 6.3. Genetic engineering in rice improvement
  - 6.4. Hybrid rice
- 7. Eating rice

6.

## Sorghum and Millets

Irén Léder, Department of Technology, Central Food Research Institute, Hungary

66

- 1. Introduction
- 2. Sorghum (Sorghum bicolor/L./Moench)
  - 2.1. History, Taxonomy and Distribution
    - 2.1.1. History
    - 2.1.2. Taxonomy
    - 2.1.3. Distribution

## 2.2. Chemical Composition (Carbohydrates, Proteins, Lipids, Vitamins and Minerals)

- 2.2.1. Carbohydrates
- 2.2.2. Proteins
- 2.2.3. Lipids
- 2.2.4. Vitamins and Minerals
- 2.3. Anti-nutrients in Sorghum Grain (Tannins, Phytic Acid, Cyanogenic Glycosides)2.3.1. Tannins (condensed polyphenols)
  - 2.3.2. Phytic Acid
  - 2.3.3. Cyanogenic Glycosides
- 2.4. Use
- 2.5. Agronomy, yield and production
  - 2.5.1. Yield and production
  - 2.5.2. Agronomy

## 3. Millets

- 3.1. History, Taxonomy, Distribution
  - 3.1.1. History
  - 3.1.2. Taxonomy
  - 3.1.3. Distribution
- 3.2. Chemical composition (Carbohydrates, Proteins, Lipid, Vitamins and Minerals)
  - 3.2.1. Carbohydrates
  - 3.2.2. Proteins
  - 3.2.3. Lipid
  - 3.2.4. Vitamins and Minerals
- 3.3. Anti-nutrients in millets
- 3.4. Use
- 3.5. Agronomy, yield and production

## Buckwheat, Amaranth and other Pseudocereal Plants

Irén Léder, Department of Technology, Central Food Research Institute, Hungary

84

- 1. Introduction
- 2. Buckwheat
  - 2.1. History and distribution
    - 2.1.1. History
    - 2.1.2. Distribution
  - 2.2. Taxonomy, Morphology and Ecology
    - 2.2.1. Taxonomy, Morphology
    - 2.2.2. Ecology
  - 2.3. Biochemical composition
    - 2.3.1. Protein, Mineral, Vitamin, Fat, and Carbohydrate content
    - 2.3.2. Amino acid composition
    - 2.3.3. Other compounds
  - 2.4. Use
  - 2.5. Agronomy, yield and production
- 3. Amaranth (Amaranthus species)
  - 3.1. History and Use
    - 3.1.1. History
    - 3.1.2. Use
  - 3.2. Taxonomy, Ecology, Morphology
    - 3.2.1. Taxonomy
    - 3.2.2. Ecology
    - 3.2.3. Morphology
  - 3.3. Biochemical composition
    - 3.3.1. Proteins and amino acids
    - 3.3.2. Carbohydrates and Fat
    - 3.3.3. Minerals, Vitamins
    - 3.3.4. Anti-nutritional factors and Nutritive value
    - 3.3.5. Agronomy, yield and production
    - 3.3.6. Future prospects
- 4. Quinoa (Chenopodium quinoa)

## **Nutritional Aspects of Legumes**

Ildikó Schuster-Gajzágó, Department of Technology, Central Food Research Institute, Hungary

- 1. Introduction
- 2. History, taxonomy and distribution
  - 2.1. History
  - 2.2. Taxonomy
  - 2.3. Distribution

- 3. Chemical composition
  - 3.1. Legume seeds as a source of protein
  - 3.2. Legume seeds as a source of carbohydrate and dietary fibre
  - 3.3. Fat content of Legume seeds
  - 3.4. Legume seeds as a source of minor components with major health effects
- 4. Food, feed and non-food uses of legumes
  - 4.1. Food use of legumes
  - 4.2. Feed uses of legumes
  - 4.3. Non-food uses of legumes
- 5. Agronomy, yield and production

#### **Peas and Lentils**

Ildikó Schuster-Gajzágó, Department of Technology, Central Food Research Institute, Hungary

- 1. Pea (Pisum sativum L.)
  - 1.1. Introduction
  - 1.2. History, Taxonomy and Distribution
  - 1.3. Chemical composition
  - 1.4. Use
  - 1.5. Agronomy, yield and production
- 2. Lentil (Lens culinaris Medicus)
  - 2.1. Introduction
  - 2.2. History, Taxonomy and Distribution
  - 2.3. Chemical composition
  - 2.4. Use
  - 2.5. Agronomy, yield and production

## Beans

Ildikó Schuster-Gajzágó, Department of Technology, Central Food Research Institute, Hungary

- 1. Faba bean (Vicia faba L.)
  - 1.1. Introduction
  - 1.2. History, Taxonomy and Distribution
  - 1.3. Chemical composition
  - 1.4. Uses
  - 1.5. Agronomy, yield and production
- 2. Dry beans (Phaseolus vulgaris L.)
  - 2.1. Introduction
  - 2.2. History, Taxonomy and Distribution
  - 2.3. Chemical composition
  - 2.4. Use
  - 2.5. Agronomy, yield and production

#### Lupin and Chickpea

Ildikó Schuster-Gajzágó, Department of Technology, Central Food Research Institute, Hungary

- 1. Lupin (Lupinus albus, L. luteus, L. angustifolius)
  - 1.1. Introduction
  - 1.2. History, Taxonomy and Distribution
  - 1.3. Chemical composition
  - 1.4. Use
  - 1.5. Agronomy, yield and production
- 2. Chickpea (Cicer arietinum L.)
  - 2.1. Introduction
  - 2.2. History, Taxonomy and Distribution

135

125

- 2.3. Chemical composition
- 2.4. Use
- 2.5. Agronomy, yield and production

## Vegetables and Plants for Edible Starch, Oil, Sugar and Beverage Production

Krisztina R. Végh, Research Institute for Soil Science and Agricultural Chemistry of Hungarian Academy of Sciences, 1022 Budapest, Hungary

- 1. Concept of food security
  - 1.1. Food supply
  - 1.2. Malnutrition
    - 1.2.1. Under-nourishment
    - 1.2.2. Over-nourishment
    - 1.2.3. Micronutrient deficiencies
- 2. Our most important nutrients
  - 2.1. Carbohydrates
    - 2.2. Proteins
      - 2.2.1. Cereal proteins
      - 2.2.2. Pulses a key source of protein
    - 2.3. Fats
  - 2.4. Micronutrients
- 3. Food quality and safety
- 4. Home-gardens for household food security
  - 4.1. Main functions and features of home-gardens
  - 4.2. Technologies improving the efficacy of home gardening
  - 4.3. Home gardens in Asia and Africa
- 5. Growing cities increasing demand for safe food
  - 5.1. Food security and safety in cities
  - 5.2. Urban and peri-urban agriculture
- 6. Water use key function in securing food
  - 6.1. Irrigation and environment
  - 6.2. Water-saving agriculture

## Vegetables: Root Crops

179 C. J. H. S.

144

Krisztina R. Végh, Research Institute for Soil Science and Agricultural Chemistry of the Hungarian Academy of Sciences, Budapest, Hungary

- 1. Vegetables as a part of the diet
  - 1.1. Role in nutrition
  - 1.2. Vitamins in vegetables
  - 1.3. Minerals and their bioavailability
  - 1.4. Dietary fibre
  - 1.5. Taste of vegetables
  - 1.6. Quality concerns
- 2. Root vegetables
  - 2.1. Carrots
    - 2.1.1. Production, role in diet
    - 2.1.2. Cultivation and constraints
  - 2.2. Parsley and parsnip
    - 2.2.1. History and role in the diet
    - 2.2.2. Cultivation and constraints
  - 2.3. Celery and Celeriac
    - 2.3.1. History and role in the diet
    - 2.3.2. Cultivation and constraints
  - 2.4. Salsify
  - 2.5. Beets: redbeet and yellow beet

- 2.6. Turnips and Swedes
- 2.7. Radishes
  - 2.7.1. Origin and role in diet
  - 2.7.2. Cultivation and constraints
- 2.8. Secondary root crops
- 3. Bulb alliums main characteristics
  - 3.1. Onion
  - 3.2. Garlic
  - 3.3. Leeks and shallots
- 4. Leaf vegetables
  - 4.1. Salad greens
    - 4.1.1. Lettuces
    - 4.1.2. Chicories and endives
  - 4.2. Leafy vegetables for cooking
    - 4.2.1. Spinach
    - 4.2.2. Chard, New Zealand spinach, kang kong and others
    - 4.2.3. Sorrel and rhubarb and asparagus
- 5. Cole crops, Brassicas

#### **Vegetables II (Others)**

Krisztina R. Végh, Research Institute for Soil Science and Agricultural Chemistry of Hungarian Academy of Sciences, Budapest, Hungary

- 1. Introduction
- 2. Tomato
  - 2.1. Description of tomato
  - 2.2. Cultivation and constraints
- 3. Green pepper: Capsicum annuum
  - 3.1. Description of green pepper
  - 3.2. Nutrients in green pepper
  - 3.3. Cultivation of green pepper
- 4. Eggplant (Solanum melongena)
  - 4.1. Description
  - 4.2. Cultivation of eggplant
- 5. The gourd family: Cucurbit crops
  - 5.1. Watermelon
  - 5.2. Cucumber
  - 5.3. Melon
  - 5.4. Gourds, squashes
  - 5.5. Cultivation of melons, cucumber and squash
- 6. Vegetable legumes
  - 6.1. Pea
    - 6.1.1. Nutrients in green peas
    - 6.1.2. Quality vs. processing
    - 6.1.3. Cultivation of green peas
  - 6.2. Green beans
    - 6.2.1. Nutrients in green bean
    - 6.2.2. Cultivation
  - 6.3. Faba bean
    - 6.3.1. Nutrients in Faba bean
    - 6.3.2. Cultivation of Faba bean
  - 6.4. Soybean
    - 6.4.1. Soybean as vegetable
    - 6.4.2. Soybean cultivation and constraints
  - 6.5. Pigeon pea
    - 6.5.1. Nutrients in pigeon pea
    - 6.5.2. Cultivation of pigeon pea

- 6.6. Cowpea
  - 6.6.1. Role of cowpea in nutrition
  - 6.6.2. Cultivation and constraints
- 6.7. Mung bean
  - 6.7.1. Consumption of mung beans
  - 6.7.2. Cultivation of mung beans
- 6.8. Secondary significant legume crops

#### **Starch Bearing Crops as Food Sources**

253

Krisztina. R. Végh, Department of Plant Nutrition, Research Institute for Soil Science and Agricultural Chemistry of Hungarian Academy of Sciences, P.O. Box 35. H-1525 Budapest, Hungary

- 1. Starch bearing plants as the source of dietary energy
  - 1.1. Starch constituents
  - 1.2. Gelatinisation of starch
- 2. Starch in cereals
  - 2.1. Starch in wheat
  - 2.2. Starch in maize
  - 2.3. Starch in rice
  - 2.4. Starch in sorghum
  - 2.5. Starch in millets
- 3. Root and tuber crops
  - 3.1. Potato: production and use
    - 3.1.1. History of potato cultivation
    - 3.1.2. Growth and morphology of potato plant
    - 3.1.3. Food constituents in tubers
  - 3.2. Cassava: production and use
    - 3.2.1. History of cassava cultivation
    - 3.2.2. Growth and morphology of cassava plant
    - 3.2.3. Food constituents in cassava
    - 3.2.4. Cultivation, its constraints and consumption of cassava
  - 3.3. Sweet potato: production and use
    - 3.3.1. History of sweet potato cultivation
    - 3.3.2. Growth and morphology of sweet potato plant
    - 3.3.3. Food constituents in sweet potato
    - 3.3.4. Cultivation, constraints and consumption of sweet potato
  - 3.4. Yams and taros: production and use
    - 3.4.1. History and description of yams
    - 3.4.2. Consumption of yams
    - 3.4.3. History, description and consumption of taros
- 4. Other starchy plants

## **Protein Bearing Crops**

M. Hajos-Novak, Department of Genetics and Plant Breeding, Faculty of Agricultural and Environmental Sciences, Szent István University, Gödöllő, Hungary

- 1. Protein bearing plants and the world's food supply
  - 1.1. Proteins and nucleic acids
  - 1.2. Structure and properties of proteins
- 2. Protein sources
  - 2.1. Protein in wheat
  - 2.2. Protein in maize
  - 2.3. Protein in rice
  - 2.4. Protein in barley
  - 2.5. Protein in oat
  - 2.6. Protein in legumes with special reference to the soybean

2.7. Protein in forages

## Index

About EOLSS

## **VOLUME II**

## Plants as Sources of Oil

Katalin Perédi Vásárhelyi, Technology Department, Central Food Research Institute, Budapest, Hungary József Perédi, Department of Grain and Industrial Plant Technology, Szent István University, Budapest, Hungary

- 1. Introduction
- 2. Soybean
  - 2.1. Biology, morphology
    - 2.1.1. Climate- and soil demand
    - 2.1.2. Agrotechnics
    - 2.1.3. Varieties
  - 2.2. Characteristics of the seed
    - 2.2.1. Major components
    - 2.2.2. Minor components
  - 2.3. Characteristics of the oil
    - 2.3.1. Major components
    - 2.3.2. Minor components
  - 2.4. Characteristics of the meal
  - 2.5. Utilization of the products
- 3. Oil Palm Fruit and Kernel
  - 3.1. Biology, morphology
    - 3.1.1. Climate- and soil demand
    - 3.1.2. Agrotechnics
    - 3.1.3. Varieties
  - 3.2. Palm fruit
    - 3.2.1. Characteristics of the fruit
    - 3.2.2. Characteristics of palm oil
      - 3.2.2.1. Major components
      - 3.2.2.2. Minor components
    - 3.2.3. Utilization of the oil
    - 3.2.4. Utilization of by-products
  - 3.3. Palm kernel
    - 3.3.1. Characteristics of the kernel
    - 3.3.2. Characteristics of the oil
      - 3.3.2.1. Major components
      - 3.3.2.2. Minor components
    - 3.3.3. Characteristics of the meal
    - 3.3.4. Utilization of the products
- 4. Rape
  - 4.1. Biology, morphology
    - 4.1.1. Climate- and soil demand
    - 4.1.2. Agrotechnics
    - 4.1.3. Varieties
  - 4.2. Characteristics of the seed
    - 4.2.1. Major components
    - 4.2.2. Minor components
  - 4.3. Characteristics of the oil

301 309

1

viii

- 4.3.1. Major components
- 4.3.2. Minor components
- 4.4. Characteristics of the meal
- 4.5. Utilization of the products
- 5. Sunflower
  - 5.1. Biology, morphology
    - 5.1.1. Climate- and soil demand
    - 5.1.2. Agrotechnics
    - 5.1.3. Varieties
  - 5.2. Characteristics of the seeds 5.2.1. Major components
    - 5.2.2. Minor components
  - 5.3. Characteristics of the oil
    - 5.3.1. Major components
    - 5.3.2. Minor components
  - 5.4. Characteristics of the meal
  - 5.5. Utilization of products
- 6. Peanut
  - 6.1. Biology, morphology
    - 6.1.1. Climate- and soil demand
    - 6.1.2. Agrotechnics
    - 6.1.3. Varieties
  - 6.2. Characteristics of seeds
    - 6.2.1. Major and minor components
  - 6.3. Characteristics of the oil
    - 6.3.1. Major components
    - 6.3.2. Minor components
  - 6.4. Characteristics of the meal
  - 6.5. Utilization of products
- 7. Olive
  - 7.1. Biology, morphology
    - 7.1.1. Climate- and soil demand
    - 7.1.2. Agrotechnics
    - 7.1.3. Varieties
  - 7.2. Characteristics of fruits
    - 7.2.1. Major components
    - 7.2.2. Minor components
  - 7.3. Characteristics of the oil
    - 7.3.1. Major components
    - 7.3.2. Minor components
  - 7.4. Utilization of products
- 8. Corn
  - 8.1. Biology, morphology
  - 8.2. Constituents and main components of the grain
  - 8.3. Methods of degermination
  - 8.4. Characteristics of the oil
    - 8.4.1. Major components
    - 8.4.2. Minor components
  - 8.5. Characteristics of the meal
  - 8.6. Utilization of products
- 9. Flax
  - 9.1. Biology, morphology
    - 9.1.1. Climate- and soil demand
    - 9.1.2. Agrotechnics
    - 9.1.3. Varieties
  - 9.2. Characteristics of seeds
    - 9.2.1. Major and minor components
  - 9.3. Characteristics of the oil

- 9.3.1. Major components
- 9.3.2. Minor components
- 9.4. Characteristics of the meal
- 9.5. Utilization of products
- 10. Castor plant
  - 10.1. Biology, morphology
    - 10.1.1. Climate- and soil demand
    - 10.1.2. Agrotechnics
    - 10.1.3. Varieties
  - 10.2. Characteristics of the seed
  - 10.2.1. Major and minor components
  - 10.3. Characteristics of the oil
    - 10.3.1. Major components
    - 10.3.2. Minor components
  - 10.4. Characteristics of the meal
  - 10.5. Utilization of products
- 11. Pumpkin
  - 11.1. Biology, morphology
    - 11.1.1. Climate- and soil demand
    - 11.1.2. Agrotechnics
    - 11.1.3. Varieties
  - 11.2. Characteristics of the fruit
  - 11.3. Characteristics of the seed
    - 11.3.1. Macro and micro components
  - 11.4. Characteristics of the oil
    - 11.4.1. Major components
    - 11.4.2. Minor components
  - 11.5. Characteristics of the cake
  - 11.6. Utilization of products

## **Sugar Bearing Crops**

75

M. Hajós-Novák, Department of Genetics and Plant Breeding, Faculty of Agricultural and Environmental Sciences, Szent István University, Gödöllő, Hungary

- 1. The present status of carbohydrate consumption
  - 1.1. The role of carbohydrates in nutrition and feed
  - 1.2. Definition and classification of carbohydrates
  - 1.3. Properties and derivatives of sugars
- 2. Sugar crops
  - 2.1. Sugar Beet
    - 2.1.1. Origin and history
    - 2.1.2. The sugar beet plant
    - 2.1.3. Cultivation and uses
  - 2.2. Sugar Cane
    - 2.2.1. Origin and history
    - 2.2.2. The sugar cane plant
    - 2.2.3. Culture and uses
  - 2.3. Sweet Sorghum
    - 2.3.1. Cultivation and uses
  - 2.4. Jerusalem Artichoke
- 3. Sugar crops as source of ethyl alcohol and fuel

## Plants Used for the Production of Beverages

F. G. Pandi, Department of Industrial Development, Central Food Research Institute, Hungary

1. Introduction

- The importance of spices and herbs in the production of beverages 2. 3
  - Plants used for the production of beverages
  - 3.1. Allspice (Pimenta officinalis)
  - 3.2. Anise (Pimpinella anisum)
  - 3.3. Cassia (Cinnamomum cassia)
  - 3.4. Cinnamon (Cinnamonum sp.)
  - 3.5. Cloves (Eugenia caryophyllata)
  - 3.6. Coriander (Coriandrum sativum)
  - 3.7. Cumin (Cuminum cyminum)
  - 3.8. Ginger (Zingiber officinale)
  - 3.9. Hops (Humulus lupulus)
  - 3.10. Juniper (Juniperus communis and other species)
  - 3.11. Mint (Mentha sp.)
  - 3.12. Thyme (Thymus spp.)
  - 3.13. Vanilla (Vanilla planifolia)

## Plants Used for the Production of Stimulants

Jenő Bernáth, BKA University, Department of Medicinal and Aromatic Plants, Budapest, Hungary

- 1. Introduction
- 2. Species used for stimulation
- 3. Characterization of the species
  - 3.1. Tea
  - 3.2. Coffee
  - 3.3. Kola
  - 3.4. Coca
  - 3.5. Maté
  - 3.6. Guarana
  - 3.7. Yoko
  - 3.8. Cacao

## **Spices**

Éva Németh, BKA University, Department of Medicinal and Aromatic Plants, Budapest, Hungary

- 1. Introduction
- 2. Spices of the temperate zone
  - 2.1. Basil, Ocimum basilicum L. (Lamiaceae). (See Figure 1).
  - 2.2. Caraway Carum carvi L. (Apiaceae)
  - 2.3. Dill, Anethum graveolens L. (Apiaceae)
  - 2.4. Mustard, Sinapis alba and Brassica species (Brassicaceae)
  - 2.5. Oregano, Origanum vulgare L. (Lamiaceae)
  - 2.6. Sweet marjoram, Majorana hortensis Mönch. (Lamiaceae)
- Spices of the tropics 3.
  - 3.1. Cinnamon, Cinnamomum zeylanicum Nees, syn. C. verum J.S.Presl. (Lauraceae)
  - 3.2. Clove, Syzyngium aromaticum L syn. Eugenia caryophyllata Thunb. (Myrtaceae)
  - 3.3. Ginger, Zingiber officinale Roscoe (Zingiberaceae)
  - 3.4. Pepper, Piper nigrum L. (Piperaceae)

## Fruit and Nuts

Béla Berényi, Szent István University, Gödöllő, Hungary

- 1. Introduction Classification of fruits according to the horticultural scientist 2.
- How botanists classify fruits 3.
- How botanists define nuts 4
- ©Encyclopedia of Life Support Systems (EOLSS)

145

108

## Fruit in Northern Latitudes

Béla Berényi, Szent István University, Gödöllő, Hungary

- 1. Apples
  - 1.1. History
  - 1.2. Distribution of different varieties of apples
  - 1.3. Description of varieties
  - 1.4. Popular varieties of apple1.5. Rising apples and one of important disease
  - 1.6. Harvesting and processing
- 2. Pear
  - 2.1. History
  - 2.2. Methods of cultivation
  - 2.3. Popular varieties of pear
- 3. Plum
  - 3.1. Classification of plums:
  - 3.2. Methods of cultivation
- 4. Blackberry
  - 4.1. Methods of cultivation
- 5. Blueberry
- 6. Cranberry
  - 6.1. Methods of cultivation
- 7. Currants /Black and Red/
- 8. Gooseberry
- 9. Raspberry
  - 9.1. Methods of cultivation

Béla Berényi, Szent István University Gödöllő, Hungary

- 1. Citrus fruit and types
  - 1.1. Relation to soils
  - 1.2. Methods of cultivation
  - 1.3. Fertilizing
  - 1.4. Irrigation
  - 1.5. Cultivated citrus
- 2. Date palm
- 3. Olives
- 4. Pomegranate
  - 4.1. Rate, depth, and methods of planting
  - 4.2. Irrigation
  - 4.3. Harvesting
- 5. Grapes
  - 5.1. Harvesting
- 6. Fig
- 7. Kiwi or Chinese gooseberry
- 8. Persimmon
- 9. Stone fruits: peach nectarine, apricot and plum
  - 9.1. Apricot
  - 9.2. Plum

## **Temperate Fruits**

Béla Berényi, Szent István University Gödöllő, Hungary

- 1. Peach
- 2. Apricot

193

xii

©Encyclopedia of Life Support Systems (EOLSS)

170

- 3. Cherry
- 3.1. Pests and Diseases
- 4. Strawberry

Béla Berényi, Szent István University Gödöllő, Hungary

- 1. Banana
  - 1.1. Varieties
  - 1.2. Ecological characteristics
  - 1.3. Moisture
  - 1.4. Light and soil
  - 1.5. Cultivation techniques
  - 1.6. Preparation of soil
  - 1.7. Preparation for planting
  - 1.8. Rate, depth, and methods of planting
  - 1.9. Time of planting
  - 1.10. Fertilizing
  - 1.11. Irrigation
  - 1.12. Weed control
  - 1.13. Harvesting
- 2. Mango
  - 2.1. Ecological characteristics
  - 2.2. Temperature
  - 2.3. Moisture
  - 2.4. Soils
  - 2.5. Methods of cultivation
  - 2.6. Rate, depth, and methods of planting
  - 2.7. Irrigation
  - 2.8. Harvesting
- 3. Pineapple
  - 3.1. Ecological characteristics and temperature
  - 3.2. Moisture
  - 3.3. Soils
  - 3.4. Methods of cultivation: seedbed preparation
  - 3.5. Mulching
  - 3.6. Planting material
  - 3.7. Rate, depth, and methods of Planting
  - 3.8. Fertilizing
  - 3.9. Weed control
  - 3.10. Harvesting
- 4. Papaya
  - 4.1. Ecological characteristics: temperature
  - 4.2. Moisture
  - 4.3. Soil
  - 4.4. Methods of cultivation: rate, depth, and methods of planting
  - 4.5. Fertilizing
  - 4.6. Harvesting and storage
- 5. Avocado pear
- 6. Guava
  - 6.1. Ecological characteristics
  - 6.2. Soils
  - 6.3. Methods of cultivation: rate, depth, and methods of planting
  - 6.4. Fertilizing
  - 6.5. Irrigation
  - 6.6. Harvesting
- 7. Coconut

xiii

- 7.1. Breeding and selection
- 7.2. Ecological characteristics: temperature
- 7.3. Moisture
- 7.4. Soils
- 7.5. Methods of cultivation: propagation methods
- 7.6. Fertilizing
- 7.7. Rate, depth, and methods of planting
- 7.8. Weed control
- 7.9. Harvesting.
- 8. Passion fruit
- 9. Litchi and longan
- 10. Soursop and other annonas

#### **Nut Plants**

Béla Berényi, Szent István University Gödöllő, Hungary

- 1. Cashew nut
  - 1.1. Ecological characteristics
  - 1.2. Temperature
  - 1.3. Moisture
  - 1.4. Methods of cultivation
  - 1.5. Rate, depth, and methods of planting
  - 1.6. Fertilizing
  - 1.7. Harvesting and storage
- 2. Almond
- 3. Macadamia nut
- 4. Pistachio nut
- 5. Hickory nut
- 6. Pecan
- 7. Chestnut
- 8. Walnut

## **Ornamental Plants**

Gabor Schmidt, Corvinus University of Budapest, Hungary

#### 1. Ornamental plants

- 1.1. Classification of ornamental plants
- 1.2. Floriculture around the World
- 2. Introduction to selected flower crops
  - 2.1. Roses
    - 2.1.1. Breeding centers, varieties (cultivars)
    - 2.1.2. Growing roses for cut-flower production
  - 2.2. Chrysanthemums (Chrysanthemum grandiflorum hybrids, syn. Dendranthemum
    - 2.2.1. Regions of production
    - 2.2.2. Origin and breeding
    - 2.2.3. Environmental requirements
    - 2.2.4. The production of chrysanthemums
    - 2.2.5. Harvesting and post-harvest care
  - 2.3. Dianthus (carnations)
    - 2.3.1. Origin and breeding
    - 2.3.2. The production of carnations
  - 2.4. Gerberas
    - 2.4.1. Origin and breeding
    - 2.4.2. Environmental requirements
    - 2.4.3. Cultivation of cut gerberas
  - 2.5. Tulips

229

- 2.5.1. Classification of tulips
- 2.5.2. Forcing of tulips
- 2.6. Lilies (Lilium)
  - 2.6.1. The forcing of lilies
  - 2.6.2. The way of production
- 2.7. Bedding and balcony plants
  - 2.7.1. Production of bedding and balcony plants

## Pharmaceutical Plants (Plants used in pharmaceutical preparations)

279

304

Jenő Bernáth, BKA University, Department of Medicinal an Aromatic Plants, Budapest, Hungary

- 1. Introduction
- 2. Species processed by pharmaceutical industry
- 3. Characterisation of the species of main importance
  - 3.1. Quinine
  - 3.2. Ergot
  - 3.3. Foxglove
  - 3.4. Pacific yew
  - 3.5. Opium poppy
  - 3.6. Periwinkle
  - 3.7. Thornapple and related species

## **Medicinal Plants**

Éva Németh, BKA University, Department of Medicinal and Aromatic Plants, Budapest, Hungary

- 1. Introduction
- 2. Medicinal plants used against respiratory tract problems
  - 2.1. Cowslip. Primula veris Huds. (Primulaceae)
  - 2.2. Lime tree. Tilia spp. (Tiliaceae)
  - 2.3. Marshmallow. Althaea officinalis L. (Malvaceae)
- 3. Medicinal plants against digestive system problems
  - 3.1. German chamomile. Matricaria chamomilla L. or Chamomilla recutita Rausch.
    - 3.2. Senna. Cassia sp. (Caesalpiniaceae)
  - 3.3. Yellow gentian. Gentiana lutea L. (Gentianaceae)
- 4. Medicinal plants for problems of the cardiovascular system
  - 4.1. Borage. Borago officinalis L. (Boraginaceae)
  - 4.2. Ginkgo tree. Ginkgo biloba L. (Ginkgoaceae)
  - 4.3. Hawthorn. Crataegus species (Rosaceae)
- 5. Medicinal plants in nervous system disorders
  - 5.1. Ginseng. Panax and Eleuterococcus species (Araliaceae)
  - 5.2. St. John's Wort. Hypericum perforatum L. (Hypericaceae)
  - 5.3. Valerian. Valeriana officinalis L. (Valerianaceae)
- 6. Medicinal plants curing urinary tract diseases
  - 6.1. Bearberry. Arctostaphylos uva-ursi (L.) Spreng. (Ericaceae)
  - 6.2. Field horsetail. Equisetum arvense L. (Equisetaceae)
  - 6.3. Goldenrod. Solidago virgaurea L. (Asteraceae)

## **Aromatic Plants**

Jenő Bernáth, BKA University, Department of Medicinal an Aromatic Plants, Budapest, Hungary

- 1. Introduction
- 2. Chemical structures and extraction of essential oils
- 3. Species of main importance used for production of essential oils
- 4. Essential oil producing species of main importance from the tropics 4.1. Lemongrass

- 4.2. Eucalyptus
- 4.3. Melaleuca
- 5. Essential oil producing species of main importance selected from the Mediterranean region
  - 5.1. Bitter orange
  - 5.2. Lavender
  - 5.3. Rose
- 6. Essential oil producing species of main importance from temperate regions
  - 6.1. Peppermint
  - 6.2. Lovage

## **Colouring (Dye) Plants**

Éva Németh, BKA University, Department of Medicinal and Aromatic Plants, Budapest, Hungary

- Introduction 1.
- Alkanet 2.
- 3. Elder
- Greater nettle
  Hollyhock
- 6. Madder
- 7. Safflower
- 8. Saffron
- 9. Woad

## Index

About EOLSS

377

369