

Expanded Table of Contents for Volume 1

Preface for Volume 1 and 2.....page 8

Complex, Fascinating Comfrey
Definitions of Words
Finding Botanical Literature
Fair Use and Registration Marks
Legal Disclaimers

PART A: BOTANY OF COMFREY...p. 10

Chapter 1: Taxonomy & Nomenclature of Comfrey...p. 11

Classification of Life (Taxonomy of Comfrey)
Carl Linnaeus, Father of Taxonomy
Taxonomic Classifications Below Genus
 Cultivars
Two Basic Types of Taxonomy (Rank versus Group)
Methods of Determining Proper Taxonomic Relationships
 Morphological Taxonomy
 Chemical Taxonomy
 Cytological Taxonomy
Plant Nomenclature (Naming)
 Examples of Botanical Names
 More Plant Nomenclature Rules
 Illegitimate Botanical Names
Botanical Terminology and Finding Botanical Literature
 Recommended Books about Botany
 Common Botanical Words
 Standard Reference for Botanical Color Identification
 Free Websites to Find Botanical Literature
Organizations Involved in Naming/Cataloging Species
 Databases of Plants

Chapter 2: Borage Family, Symphytum Genus...p. 23

Boraginaceae Family (Borage)
 Plants in the Borage Family
 Chromosomes and Genome in the Borage Family

Symphytum (Comfrey) Genus

Early Botanical History of Symphytum (Botanists)
 (With Examples of How Abbreviations are Used)
 Bauhin 1623, Parkinson 1640, Ray 1686,
 Tournefort 1700, Linnaeus 1753, Gaertner 1788,
 Schreber 1789, Jussieu 1789, Schkuhr 1791,
 Lamarck 1791, Sowerby 1791, Sibthorp 1794,
 Schmidt 1794, Lepechin 1797, Willdenow 1799.
Later Botanical History of Symphytum (Botanists)
 Bieberstein 1808, Lehmann 1818,
 Schimper 1835, G. Don 1838, Fries 1839,
 De Candolle 1846, Ledebour 1847, Steven 1851,
 Bentham 1858, Kerner 1863, Schur 1866,
 Schultz 1875, Boissier 1879, Nyman 1884,
 Bucknall 1912, Tutin 1952, Komarov 1953,
 Popov 1953, Wade 1958, Perring 1962,
 Wickens 1969, Pawlowski 1972, Stearn 1986,
 Elci/Hilger/Erik 2008.

Chapter 3: Symphytum Species...p. 38

Comfrey Names (Ancient, Informal & Foreign Language)
Accepted Latin Names of Symphytum Species
List of All Symphytum Species
Symphytum Species at Herbariums (Dried)
Symphytum Species at Botanic Gardens (Living)
Symphytum Species at Gene Banks (Living)

Chapter 4: Symphytum Species Classifications...p. 53

Overview of Symphytum Species Classifications
1596 Bauhin
1623 Bauhin
1669 Ray
1846 De Candolle
1847 Ledebour
1879 Boissier
1881 Nyman
1887 Kuntze
1910 Kuznetsov
1913 Bucknall
1953 Popov
1967 Gadella and Kliphuis
1969 Wickens
1972 Pawlowski
1975 Perring
1985 Stearn
1990 Sandbrink
1991 Arnold Arboretum
2000 Slavik
2011 Hacıoglu and Erik
2013 Gviniashvili
2019 (Accepted names of common species with
 synonyms and chromosome numbers.)
Taxonomy of Symphytum Species is Always Changing
Methods of Surveying and Collecting Symphytum in Field
Methods of Authentication of Comfrey Species

Chapter 5: Symphytum Genus Description...p. 83

Comfrey Confused with Foxglove
Symphytum Genus Description
Comfrey Leaf Description
 Comfrey Leaves and Pyrrolizidine Alkaloids
Comfrey Root Description
 Using Comfrey Roots to Tell Age of Plant
 Comfrey Root and Pyrrolizidine Alkaloids
Comfrey Flower
 Overview of Parts of a Flower
 Comfrey Flower Overview
 Comfrey Flower Buds, Bloom, Nectar & Pollination
 Comfrey Flower Perforations by Insects
 Comfrey Flower Color Changes Related to Soil Type
 Comfrey Flower and Pyrrolizidine Alkaloids
Comfrey Seed (Fruit)
Comfrey Seedling

Chapter 6: Symphytum Species Overview...p. 110

Comfrey Chromosomes Overview
 Hybrids, Hybrid Swarms, Introgression
 Overview of Crossbreeding Among Symphytum Species
 Overview of Distribution of Symphytum Species
 Most Frequently Grown Species of Comfrey
 Overview Comparison of Symphytum Species Plus Keys
 Overview Russian Comfrey No.4 vs No.14 vs Officinale

Chapter 7: Details about Symphytum Species:**Asperum or Asperrimum (Prickly Comfrey)...p. 135**

Current Botanical Nomenclature
 S. asperum
 S. asperrimum
 S. armeniacum
 S. echinatum
 S. peregrinum Ledeb.
 S. asperum is Correct Botanical Name
 Subspecies and Varieties of S. asperum
 S. sepulcrale
 S. sylvaticum
 History Prickly Comfrey in Great Britain, Ireland and USA
 Distribution
 Description
 Large Forage Plant
 Growth Patterns and Yield
 Breeds with Other Symphytums
 Chromosomes
 Alkaloids

Chapter 8: Details about Symphytum Species:**Officinale (Common Comfrey)...p. 150**

Current Botanical Nomenclature
 S. bohemicum
 S. patens Sibth.
 S. tanaicense
 S. uliginosum
 S. officinale Subspecies and Varieties
 Herbalist's Shop
 Distribution (Geographic Locations)
 My Common Comfrey
 Description
 More about Flowers and Leaf Wings
 Flower Colors
 Flowers and Pollination
 Hollow versus Solid Stem
 More about Roots
 Chromosomes
 S. officinale (2n=24 or 2n=48) vs (2n=40)
 S. officinale Chromosomes 2n = 40
 S. officinale Chromosomes 2n = 44
 S. officinale Breeding with Itself Overview
 S. officinale Breeds Between Its Purple & White 2n=48
 S. officinale Breeds Between Its Own 2n=40, 2n=48
 S. officinale Rarely Breeds Between Its 2n=24 & 2n=48
 Constituents (Chemicals)
 Alkaloids

Chapter 9: Details about Symphytum Species:**No Asperum, No Officinale, No Hybrids....p. 182**

anatolicum
 Current Botanical Nomenclature
 Description
 Chromosomes
 angustifolium
 armeniacum (see 'S. asperum')
 bohemicum
 Current Botanical Nomenclature
 Description
 Chromosomes
 bornmuelleri (see brachycalyx)
 brachycalyx
 Current Botanical Nomenclature
 Description
 bulbosum
 Current Botanical Nomenclature
 S. zeyheri
 Description
 Chromosomes
 bullatum (see tauricum)
 caucasicum
 Current Botanical Nomenclature
 Description
 Chromosomes
 Alkaloids
 circinale
 Current Botanical Nomenclature
 Description
 coccineum (see rubrum)
 cordatum
 Current Botanical Nomenclature
 Description
 Chromosomes
 creticum
 cycladense
 Current Botanical Nomenclature
 Description
 davisii
 Current Botanical Nomenclature
 Description
 floribundum
 Current Botanical Nomenclature
 Description
 Goldsmith (see grandiflorum)
 grandiflorum
 Current Botanical Nomenclature
 S. goldsmith
 Description
 Chromosomes
 Alkaloids
 gussonei
 Current Botanical Nomenclature
 Description
 hajastanum
 Current Botanical Nomenclature
 Description

Hidcote (see 'Details about Symphytum Species Hybrids')	<i>S. angustifolium</i>
ibericum	<i>S. besseri</i>
Current Botanical Nomenclature	<i>S. bulbosum</i>
Description	<i>S. floribundum</i>
Chromosomes	<i>S. gussonei</i>
Alkaloids	<i>S. leonhardtianum</i>
kurdicum	<i>S. mediterraneum</i>
Current Botanical Nomenclature	<i>S. nodosum</i>
Distribution	<i>S. popovii</i>
Description	<i>S. zeyheri</i> and others
leonhardtianum (see <i>tuberosum</i>)	<i>S. tuberosum</i> Distribution (Locations)
mediterraneum (see <i>floribundum</i>)	Description
naxicola	<i>S. tuberosum</i> Breeds with Other Symphytum Species
Current Botanical Nomenclature	Chromosomes
Description	Alkaloids
nodosum	uliginosum
norfolk (see 'Details about Symphytum Species Hybrids')	Current Botanical Nomenclature
norvicense ('Details about Symphytum Species Hybrids')	Description
orientale	Chromosomes
Current Botanical Nomenclature	uplandicum ('Details about Symphytum Species Hybrids')
<i>S. patens</i> Fries	zeyheri (see <i>S. bulbosum</i>)
Description	
Chromosomes	
ottomanum	Chapter 10: Details about Symphytum Species Hybrid:
Current Botanical Nomenclature	Russian Comfreyp. 263
Description	(uplandicum, peregrinum auct. non Ledeb.)
Chromosomes	Current Botanical Nomenclature
palaestinum	Hybrid Origin and Classification (peregrinum, uplandicum)
patens	Overview
<i>S. patens</i> Fries (and see <i>S. orientale</i>)	Hybrid Origin of Russian Comfrey
<i>S. patens</i> Sibth. (and see <i>S. officinale</i>)	Russian Comfrey Distribution (Locations)
peregrinum ('Details about Symphytum Species Hybrids')	Description
podcubicum	Determining Hybrid Character: Chromosomes, Chemicals
Current Botanical Nomenclature	F1 Hybrid
Description	Flowers
pseudobulbosum	High Yield of Russian Comfrey
Description	Yield of Russian Comfrey No. 4 versus No. 14
rubrum (Red)	Preferred Soil Type and Roots
savvalense	Strains (Cultivars) of Russian Comfrey
Description	Turner Strain (Bocking No. 1, 16, 17)
sepulcrale	Stephenson Strain (Bocking No. 2, 14)
Current Botanical Nomenclature	Bocking No. 14
Description	Webster Strain (Bocking No. 3-11, Bocking Mixture)
sylvaticum	Bocking No. 4
Current Botanical Nomenclature	Gibson Strain (improved Webster Strain)
Description	Other Russian Comfrey Cultivars and Varieties
Alkaloids	Bocking No. 12
tanaicense	Moorland Heather
Current Botanical Nomenclature	Variegated Varieties
Description	Russian Comfrey Chromosomes
Chromosomes	Overview
tauricum	Various Cytotypes
Current Botanical Nomenclature	Cytotype 2n = 34
Description	Cytotype 2n = 36
Chromosomes	Cytotype 2n = 40
tuberosum (Tuberous Comfrey)	Cytotype 2n = 42
Current Botanical Nomenclature	Cytotype 2n = 44
<i>S. tuberosum</i> Subspecies and Varieties	(2n = 36) vs (2n = 40)

Russian Comfrey Alkaloids
Creating New Hybrids of Russian Comfrey
Russian Comfrey Breeds with Other Symphytums

**Chapter 11: Details about Symphytum Species Hybrids:
Not Russian Comfrey....p. 300**

Overview
Goldsmith (see *S. grandiflorum*)
Hidcote Blue and Pink
 Current Botanical Nomenclature
 Description
 Chromosomes
peregrinum (see 'Russian Comfrey')
Hybrids with *S. officinale*
 (excludes Hidcote and Russian Comfrey)
 S. officinale x *S. asperum* x *S. tuberosum*
 S. officinale x *S. bohemicum*
 S. officinale x *S. cordatum*
 S. officinale x *S. peregrinum*
 S. officinale x *S. tuberosum*
Other Hybrids:
 S. tuberosum x *S. cordatum*
 S. tuberosum x *S. bulbosum*
 S. asperum x *S. caucasicum*
 S. asperum x *S. orientale* = *S. norvicense*
 S. caucasicum x *S. orientale*
uplandicum (see 'Russian Comfrey')

PART B: HISTORY OF COMFREY

**Chapter 12:
Prehistory, Ancient Times, Middle Ages and Comfrey
....p. 309**

History of the Word 'Comfrey'
Prehistory of Comfrey
400 BC - 400 AD: Ancient Times
 Herodotus, 484-425 BC, Greek
 Nicander of Colophon, 200-101 BC, Greek
 Pliny the Elder, 23-79 AD, Roman
 Pedanius Dioscorides, 40-90 AD, Greek
 Galen of Pergamon, 130-200 AD, Greek
401 - 1400 AD: Middle Ages
 Johnson Papyrus, early 400s AD, Greek
 Aetios or Aetius, 500 AD, Greek
 Aegineta, 625-690 AD, Greek
 Anglo-Saxon Leech Books, 900-1000+ AD
 Christian Monasteries, 340-1400 AD, Europe
 Hildegard of Bingen, 1098-1179 AD, German
 Gilbert Anglicus, 1230-1250 AD, English

Chapter 13: Renaissance & Comfrey 1400-1600s....p. 322
Overview of Renaissance

1401 - 1600: Early Renaissance
 Paracelsus, 1493-1541, Swiss
 Otto Brunfels, 1488-1534, German
 Jean Ruel, 1536, 'De Natura Stirpium', French
 Jean Fernel, 1542, 'Naturali Parte Medicinæ', French
 Hieronymus Bock 1552 'De Stirpium', German
 William Turner, 1551-1568, 'A New Herball', English
 Rembert Dodoens, 1578, 'A New Herball', Flemish
 John Gerard 1597 'Herball or General Historie', English
1600s: Renaissance
 John Parkinson 1640 'Theatrum Botanicum', English
 North American Colonists, 1649
 Johann Bauhin, 1651, 'Historia Plantarum', Swiss
 Nicholas Culpeper 1653 'Complete Herbal', English

**Chapter 14:
Age of Enlightenment and Comfrey 1700s....p. 335**
 Joseph Tournefort 1700 French botanist, defined genus
 William Salmon 1710 'Botanologia, The English Herbal'
 Carl Linnaeus 1753 'Species Plantarum', Swedish
 J. Busch 1771 sent Symphytum from Russia to England
 I. Lepechin 1774-1802, described plant species, Russian
 W. Withering 1787 'Systematic Arrangement British Plants'
 Thomas Christy 1790 'Forage Plants', English
 James Sowerby 1791-1814, 'English Botany' books
 William Woodville 1794 'Medical Botany', English

**Chapter 15:
Age of Revolutions and Comfrey 1800s....p. 341**
 William Curtis, early 1800s, 7 Symphytums in England
 Prickly Comfrey becomes popular in England.
 Many writings in Great Britain and USA about Comfrey
 Thomas Christy promotes Prickly and Russian Comfrey
 De Candolle 1846 classifies Symphytum species
 Carl von Ledebour 1847 classifies Symphytum species
 Henry Doubleday, late 1800s, developed Russian Comfrey

Chapter 16: The 1900s and Comfrey....p. 355
 Webster Nurseries 1900 grows Russian Comfrey
 Cedric Bucknall 1912 classifies Symphytum species
 Vernon Stephenson 1942 grows Russian Comfrey
 Lawrence Hills 1948 grows Russian Comfrey
 Peggy Greer 1952 grows Russian Comfrey
 Newman Turner 1952 Comfrey as veterinary medicine
 Russian Comfrey goes to Canada and Africa 1953
 Tom Tutin 1952-1980 wrote about British & Europe Flora
 Lawrence Hills 1953 wrote book 'Russian Comfrey'
 Henry Doubleday Research Association founded 1954
 Russian Comfrey goes to Japan and Australia late 1950s
 Alkaloids found in Common Comfrey 1968
 Lawrence Hills 1975 wrote book 'Comfrey Report'
 Lawrence Hills 1976 'Comfrey: Fodder, Food, Remedy'
 Australia 1984 puts Comfrey on 'Poison Schedule'
 Germany & European Union 1992 regulate Comfrey
 United Kingdom 1993 bans some internal use of Comfrey
 United States 1994 begins regulation of Comfrey

PART C: GARDEN USES AND NUTRITIONAL VALUE

Chapter 17: Garden Uses of Comfrey:

- Compost, Fertilizer, Potting Mix....p. 369
- Comfrey Roots Break Up Hard Soil
- Comfrey As Mulch
- Grow-It-Yourself Fertilizer
- Minerals in Comfrey Overview (see 'Nutritional Value')
 - Comfrey as Potassium Fertilizer
- Comfrey as Liquid Manure (Liquid Fertilizer)
 - How to Make Liquid Fertilizer with Water (Comfrey Tea)
 - Make Liquid Fertilizer with No Water (Concentrate)
 - How to Use Liquid Fertilizer
- Making Compost with Comfrey
 - How to Make Compost
 - Deep Roots Reach Nutrients
 - Mix Comfrey with High Carbon Material
 - Comfrey is a Compost Activator
- Potting Mixture with Leaf Mold
 - How to Make Non-Comfrey Leaf Mold
 - Make Potting Mixtures with Leaf Mold and Comfrey

Chapter 18: Garden Uses of Comfrey:

- Growing Vegetables & Fruit with Comfrey Fertilizer
....p. 383
- Growing Potatoes with Comfrey as Fertilizer
 - Putting Comfrey Compost in Soil for Potatoes
 - Timing Planting of Potatoes with Comfrey Growth
 - How Much Comfrey Per Row, and Type of Comfrey
 - How to Use Comfrey in Potato Rows
 - Digging Potatoes in the Fall
 - Preparing Potato Patch in the Fall
- Growing Vegetables with Comfrey as Fertilizer
 - Cabbage, Bean, Fruit, Lettuce, Onion, Potato, Etc.
 - Fermented Extracts from Comfrey Help Plants Grow
 - Tomatoes and Comfrey
 - Onions, Garlic and Comfrey
 - Beans / Peas and Comfrey
 - Wheat Seedlings Helped by Comfrey
 - Vegetable Crops Not Helped
 - Large Dose of Comfrey Reduces Growth of Lettuce
- Fruit and Comfrey (Small Plant, Bush, Tree)
 - Small Fruiting Plants and Bushes
 - Fruit Trees and Other Trees
 - Fruit Trees, Calcium and Comfrey
- Comfrey Heals Other Plants
- Protects Plants from Insects, Slugs and Snails
- Comfrey as Plant Antifungal
- Permaculture and Forest Gardens
 - Permaculture Polycultures
- Dynamic Accumulator and Soil Improver
- Comfrey as Weed Barrier
- Comfrey as Wind Barrier
- Aquaponic Food Production
- Beneficial Insects and Comfrey
 - Bees and Comfrey

Chapter 19: Nutritional Value of Comfrey....p. 407

- Dry Matter
- Nitrogen-Phosphorus-Potassium (NPK)
- Protein (Crude Protein)
 - Amino Acids in Comfrey
- Fiber (Crude Fiber)
- Minerals (Ash) (see 'Garden Uses of Comfrey')
 - Potassium
- Vitamins in Comfrey
 - Vitamin B12
 - Doubts About Vitamin B12 in Comfrey
- Mucilage in Comfrey
- Fat, Protein, Carbohydrate, Fiber, Ash, Miscellaneous
 - Fructans (Fructose Polymers)
- Other Constituents including Phenolic Acids
 - Overview
 - Rosmarinic Acid (Phenolic Acid)
 - Caffeic Acid Polyether (Phenolic Acid)
 - Choline
 - Chlorophyll
- Digestibility of Comfrey Leaf
 - Definitions of Digestibility Terms
 - Digestibility Overview
 - Nutrition and Digestibility of Leaves/Stems & Maturity
 - Digestibility of Protein
 - Digestible Dry Matter (DDM)
- Energy: Gross and Metabolizable



1. Latin: **Symphytum flore pallido**
 2. Latin: **Symphytum maius flore purpureo**
 3. Latin: **Symphytum maius flore rubro**
 Fol. 110 in Hortus Eystettensis (Garden of Eichstatt)
 by Basilius Besler, 1640, Nuremberg, Germany