Contents

1. Stubborn and Related Diseases

A Review of Stubborn and Greening Diseases of Citrus. R. E. SCHWARZ .............. 1
Stubborn Disease Symptoms in Grafted Fruit of Citrus and Poncirus. E. O. OLSON ...... 6
Citrus Greening in the Indian Punjab. O. P. GUPTA, J. P. NAURIYAL, and L. C. KNORR ................................................................. 14
Epidemiology of Citrus Leaf Mottling in the Philippines. R. E. CORTEZ and C. S. CELINO ................................................................. 19
On the Transmission and Translocation of the Greening Pathogen in Citrus. A. L. MARTINEZ ........................................................................... 22
Combined Effects of Greening and Seedling-Yellows Pathogens in Citrus. A. L. MARTINEZ ........................................................................... 25
Further Studies on the Complex Causing Likubin of Citrus in Taiwan. H. J. SU and T. MATSUMOTO ........................................................................ 28
Greening and Citrus Decline in India. S. P. RAYCHAUDHURI, T. K. NARIANI, V. C. LELE, and G. R. SINGH .................................................. 35
Observations on 110 Citrus Cultivars Planted in an Area Severely Infested by Leaf Mottling. C. I. GONZALES, R. C. VIÑAS, and L. A. VERGARA .......................................................... 38
Strains of the Greening Pathogen. R. E. SCHWARZ .......................................................................................................................... 40
Heat Requirements for Symptom Suppression and Inactivation of the Greening Pathogen. R. E. SCHWARZ and G. C. GREEN ....................................... 44

2. Satsuma Dwarf

Reaction of Some Citrus and Herbaceous Plants to Satsuma Dwarf Virus Strains. T. MIYAKAWA ........................................................................... 65
Evidence for a Relationship among the Viruses of Satsuma Dwarf, Citrus Mosaic, Navel-Infectious-Mottling, Natsudaidai Dwarf, Citrus Variegation, and Citrus Crinkly Leaf. H. TANAKA and S. YAMADA ........................................................................... 71
Influence of Temperature on the Development of Leaf Symptoms of Satsuma Dwarf Disease. H. KITAJIMA, H. TANAKA, S. YAMADA, and K. KISHI .................................................. 76
PROCEEDINGS of the IOCV

Transmission of Satsuma Dwarf Virus from Herbaceous Plants to Citrus by Approach Grafts. S. Tanaka ................................................... 80
Accentuation of Satsuma Dwarf Symptoms by Seedling-Yellows Virus. K. Kishi. 82

3. Psorosis

Relationships of Viruses of the Psorosis Virus Complex. P. Broadbent. ............ 85
Yield and Mineral Content of Scaly-Bark-Affected Sweet Orange Trees.
J. L. Guardiola, E. González-Sicilia, and F. Martí ............................... 90

4. Exocortis

Gynura as a Host for Exocortis Virus of Citrus. L. G. Weathers and F. C. Greer, Jr. 95
Damage from Exocortis in Japan. S. Yamada and H. Tanaka ...................... 99
A Report on Exocortis Virus in Taiwan. P. Ling .................................. 102
Factors Affecting Mechanical Spread of Exocortis Virus. S. M. Garnsey and
L. G. Weathers ................................................................. 105

5. Tristeza

Reaction of Some New Citrus Hybrids and Citrus Introductions as Rootstocks to
Inoculations with Tristeza Virus in California. W. P. Bitters ...................... 112
Further Study of the Tolerance to Tristeza Virus of Citrus Varieties Suitable for
Rootstocks in Brazil. O. Rodríguez, S. Moreira, A. A. Salibé, and
J. T. Sobrinho ................................................................. 121
Performance of Selections of Trifoliate Orange and Trifoliate Orange Hybrids as
Rootstocks for Citrus in the Presence of Tristeza Virus. A. A. Salibé, S. Moreira,
and O. Rodríguez ............................................................... 124
Studies on Recovery of Citrus Plants from Seedling Yellows and the Resulting
Protection Against Reinfection. J. M. Wallace and R. J. Drake ................ 127
Use of Seedling-Yellows Recovery and Protection Phenomena in Producing
Tristeza-Tolerant, Susceptible, Scion-Rootstock Combinations. J. M. Wallace and
R. J. Drake ................................................................. 137
The Cause of Stem Pitting and Small Fruit in Natsudaidai Trees. H. Omori and
H. Matsumoto ................................................................. 143
Tristeza Susceptibility of Sweet Orange on Troyer Cifrange Rootstock. E. C. Calaván,
R. M. Pratt, B. W. Lee, J. P. Hill, and R. L. Blue ................................ 146
A Decline of Citrus on Trifoliate Orange Rootstock Associated with Tristeza Virus.
A. R. Pujol, R. E. Schwarz, M. V. Fernandez Valiela, and D. S. Rodríguez ... 154
Prebudded Mexican Lime Cuttings for Rapid Indexing for Tristeza. R. M. Pratt and
S. Jorgensen ................................................................. 157
The Tristeza Suppression and Eradication Program in California. R. M. Pratt,
E. C. Calaván, and J. P. Hill ........................................ 158
Comparison of Hassaku Dwarf and Seedling-Yellows Viruses. A. Sasaki .......... 162
Effects of Tristeza Virus Infection on Growth and Yield of Three Citrus Varieties.
R. M. Allen and R. H. Hilgeman ........................................ 167
Reduction in Yield of Galego Lime Avoided by Preimmunization with Mild Strains of
Tristeza Virus. G. W. Müller and A. S. Costa ................................ 171

6. Cristacortis and Impietratura

Effect of Cristacortis on Growth and Productivity of Tarocco Sweet Orange.
E. de Martino, A. Scuderi, and G. Terranova ........................................ 176
Relation of Cristacortis Virus to Other Citrus Viruses. R. Vogel and J. M. Bové 178
Susceptibility of Citrus Cultivars to Impietratura. G. Cartia and A. Catara. .... 184
## CONTENTS

### 7. Xyloporosis and Other Diseases

- Studies on Two Mechanically Transmissible Citrus Viruses. G. MAJORANA and R. E. SCHWARZ .......................................................... 188
- Studies on Xyloporosis of Citrus in Brazil. A. A. SALIBÉ, O. RODRIGUEZ, and S. MOREIRA .................................................................................. 192
- Leaf Variegation with Ring Spots. S. PLANES and F. MARTÍ .............................................................................................................. 194
- Narrow Leaf, a Previously Undescribed Virus Effect on Citrus. F. MARRAS ................................................................................ 197
- A New Type of Decline on Citrus Trees in Brazil, V. ROSSETTI, O. FERREIRA DE MELLO, E. DE CONTI, and T. NAMEKATA ......................... 204
- Investigations on Rumple of Lemon. G. TERRANOVA and A. SCUDERI ......................................................................................... 210

### 8. Purification and Electron Microscopy

- Citrus, a Local Lesion Host of Tobacco Necrosis Virus. D. YOT-DAUTHY, D. LAFLÈCHE, and J. M. BOVÉ ..................................................................... 212
- Electron Microscopy of Satsuma Dwarf Virus in Host Cells. Y. SAITO and H. HIBINO ......................................................................... 217
- Ultrastructural Studies of Chromatic Cells in Tristeza-Diseased Lime. H. SCHNEIDER and P. J. SASAKI .......................................................... 222

### 9. Physiological and Biochemical Aspects

- Biochemical Changes in Healthy and Decline Sweet Orange Trees Associated with Bud-Union Crease. V. P. BHUTAN, J. C. BAKHSI, and L. C. KNORR ............................................................ 229
- Electrophoretic Forms of Citrus-Infectious-Variegation Virus. P. R. DESJARDINS, J. V. FRENCH, and C. L. NIBLETT .............................................. 233
- Localization and Detection of Coumarins in Exocortis-Virus-Infected Citron. A. W. FELDMAN, R. W. HANKS, and S. M. GARNSEY ........................................ 239
- Changes in Amounts of Auxinlike Growth Promoter, Gibberellin, and Inhibitor in Citrus Infected with Exocortis Virus. R. W. HANKS and A. W. FELDMAN ............................................................................................................ 244
- Mode of Action and Properties of a Plant Virus Inhibitor in Citrus Extracts. S. GRASSO, A. CATARA, and G. SCARAMUZZI ........................................ 251
- Heat Tolerance of Preconditioned Citrus Budwood for Virus Inactivation. C. N. ROISTACHER and E. C. GALAVAN .......................................................... 256

### 10. Other Subjects

- Possible Value of Close-planted, Virus-dwarfed Orange Trees. J. K. LONG, L. R. FRASER, and J. E. COX ................................................. 262
- Visual Symptoms of Mineral Deficiencies and Excesses. H. D. CHAPMAN ...................................................................................... 279
- A Leaf Insert Graft Used for Virus Transmission in Citrus. M. COHEN ...................................................................................... 282
- Failure to Transmit Citrus-Exocortis and Crinkly-Leaf Viruses by Nematodes. A. L. MADALUNI, A. SCOGNAMIGLIO, and M. TALAME ............................................................................................................ 285
- Addendum ........................................................................................................................................................................ 287

**Author Index** ........................................................................................................................................................................ 291

**Subject Index** ........................................................................................................................................................................ 293