

Contents

1	Introduction	1
2	Plant Disease Epidemiology and the Scope of Across Comparison.....	5
3	On the Methodology of Comparative Epidemiology	9
3.1	The Importance of a Proper Terminology.....	9
3.2	Data Acquisition for Comparative Epidemiology and Evaluation.....	14
3.2.1	Comparative Experiments Across Pathosystems	15
3.2.1.1	Field Experiments.....	15
3.2.1.2	Experiments Under Controlled Conditions	19
3.2.1.3	Comparative Experiments by Simulation and Model Computation	20
3.2.2	Posterior Analyses Across Studies.....	24
3.2.2.1	Classical Reviews as Qualitative Summaries	26
3.2.2.2	Quantitative Summaries of Published Data.....	27
3.2.2.3	Meta-Analyses, Evaluations of Data Sets from Various Primary Studies	28
3.3	Evaluation Procedures in Comparative Epidemiology	33
3.3.1	Non-statistical Comparisons	33
3.3.2	Overview of Statistical Methods for Comparative Epidemiology ...	35
3.3.2.1	Methods for Statistical Ordination	35
3.3.2.2	The Equivalence of Results	39
3.3.2.3	Classification by Similarities.....	42
4	Comparative Epidemiology at the System Levels Host and Pathogen.....	49
4.1	Relevant Host Criteria.....	49
4.1.1	Host Growth and Development.....	50
4.1.2	Resistance of Host Plants.....	54
4.1.3	Interaction Between Host Growth and Epidemic Development of Disease	56
4.2	Life Cycles of Pathogens	57
4.3	The Infection Cycle or Chain.....	62
4.3.1	The Infection Chain and Factors That Affect It	62
4.3.2	Comparison of Components of the Infection Chain.....	69
4.3.2.1	Infection	70
4.3.2.2	Incubation and Latent Periods	71
4.3.2.3	Lesions	73
4.3.2.4	The Infectious Period	75

4.3.2.5 Dispersal of Inoculum	76
4.3.2.6 Survival	79
4.4 Comparison of Epidemic Competence.....	80
4.4.1 Criteria for Pathogenicity	81
4.4.2 Compensation of Factors	87
4.4.3 Interaction Among Epidemic Competent Pathosystems in a Crop	89
5 Comparison of Temporal Aspects of Epidemics: The Disease Progress Curves	93
5.1 Endemicity	95
5.2 Structural Elements of Disease Progress Curves	96
5.2.1 Criteria for Disease Progress Curves	96
5.2.2 Initial and Maximum Disease Intensities	102
5.2.3 Comparison of Infection Rates	105
5.2.4 The Asymptote and Decline of Progress Curves	111
5.3 Unilateral Disease Progress Curves	119
5.4 Bilateral and Multimodal Disease Progress Curves	128
5.5 Disease Progress Curves of Soilborne Diseases	133
6 Comparison of Spatial Aspects of Epidemics: Gradients and Spatial Distributions.....	135
6.1 Comparison of Spatial Distribution of Diseases	135
6.2 Foci and Gradients of Dispersal and Disease.....	139
6.2.1 Foci	139
6.2.2 Gradients	141
6.3 Long-Distance Spread.....	149
6.4 Comparison of Geophytopathological Aspects.....	152
7 Comparison of Effects of Epidemics	157
7.1 Disease Intensity-Yield Loss Relationships.....	157
7.2 Criteria to Compare the Economics of Control Measures: Cost/Return, Thresholds and Risks	162
7.3 Criteria to Compare Efficiency of Disease Control	168
7.3.1 Comparison of Cultural Practices for Disease Control	168
7.3.2 Comparison of Changes of Pathogen Frequencies in Populations of Hosts	171
7.3.3 Comparison of Chemical Control	175
7.3.3.1 Efficacy of Fungicides.....	175
7.3.3.2 Fungicide Resistance	176
References	179
Subject Index	199