

Contents

Contents.....	i
List of Figures	iii
List of Tables	vii
Abbreviations.....	xi
Summary	xiii
Zusammenfassung.....	xv
1. General Introduction.....	1
1.1 The Grapevine (<i>Vitis vinifera</i> ssp. <i>vinifera</i>).....	1
1.2 Grapevine Diseases.....	2
Grapevine Yellows.....	2
Grapevine Viruses.....	4
Grapevine Trunk Diseases.....	6
Disease Management.....	8
1.3 Sensor-based Disease Detection.....	9
Spectral Sensors.....	9
Interaction of Light, Plants, and Pathogens.....	11
Data Analysis.....	16
1.4 Objectives	18
1.5 References.....	19
2. Detection of Two Different Grapevine Yellows in <i>Vitis vinifera</i> Using Hyperspectral Imaging.....	29
3. Detection of Grapevine Leafroll-Associated Virus 1 and 3 in White and Red Grapevine Cultivars Using Hyperspectral Imaging	49
4. Evaluating the Suitability of Hyper- and Multispectral Imaging to Detect Foliar Symptoms of the Grapevine Trunk Disease Esca in Vineyards	79

5.	General Discussion.....	103
5.1	Grapevine Disease Detection – Controlled Conditions	104
5.2	Grapevine Disease Detection – Field Environment.....	107
5.3	Grapevine Disease Detection – Airborne Applications	110
5.4	Optimal Spectral Bands for Grapevine Disease Detection	112
5.5	Influence of Other Diseases, Abiotic Stresses, and Cultivars.....	114
5.6	Detection of Infected but Symptomless Grapevines	117
5.7	Conclusion and Outlook	119
5.8	References.....	121
6.	Acknowledgements	129
7.	Total List of All Publications	130
	Curriculum Vitae.....	133
	Eidesstattliche Erklärung	134