

List of Figures

Figure 1.1. Schematic showing strategies and extent of the plant immune system.....	12
Figure 1.2. Schematic representation showing structure of primary plant cell wall.....	16
Figure 1.3. Phylogenetic relationship between different accessory plant CWDEs.....	20
Figure 1.4. Schematic representation of plant cell wall containing feruloylated heteroxylans crosslinking hemicellulose chains by ester-linked monomeric ferulic acid and 5, 5'-diferulic acid, forming network with cellulose microfibrils.....	22
Figure 1.5. Infection (asexual) cycle of <i>Magnaporthe oryzae</i>	29
Figure 1.6. Schematic representation of biotrophic host invasion by <i>M. oryzae</i>	31
Figure 1.7. Schematic representation of <i>M. oryzae</i> Abm-mediated disabling of JA-defense signalling in rice.....	33
Figure 2.1. Schematic representation of the capillary DNA-transfer-setup for Southern blot hybridisation.....	50
Figure 2.2. A schematic representation of the Yeast Secretion Trap strategy used to study presence of a signal peptide in Fae.....	56
Figure 3.1.1. Multiple sequence alignment of putative Fae sequences from <i>M. oryzae</i> , <i>A. oryzae</i> and <i>N. crassa</i>	68
Figure 3.1.2. A similarity heatmap depicting % identity among the Fae protein sequences in <i>M. oryzae</i>	68
Figure 3.1.3. Phylogenetic analysis of Fae sequences from 18 fungal species representing four classes.....	73
Figure 3.1.4. Phylogenetic tree depicting combined analysis of Fae sequences in host-specific <i>M. oryzae</i> isolates.....	78
Figure 3.1.5. Phylogenetic trees depicting analysis of individual Fae sequences from host-specific blast fungal isolates.....	79
Figure 3.1.6. Prediction of signal peptide by SignalP tool.....	80
Figure 3.1.7. <i>M. oryzae</i> feruloyl esterases are secretory in nature.....	84
Figure 3.1.8. <i>M. oryzae</i> feruloyl esterases are induced by host leaf extract.....	86
Figure 3.1.9. Analysis of total RNA, cDNA and primers' specificity for qRT-PCR.....	88

Figure 3.1.10. Differential expression of feruloyl esterase genes under different culture conditions.....	90
Figure 3.1.11. Analysis of RNA and cDNA samples for qRT-PCR.....	92
Figure 3.1.12. Differential expression of feruloyl esterase genes during pathogenesis in <i>M. oryzae</i>	93
Figure 3.2.1. Schematic representation of double-joint PCR approach.....	96
Figure 3.2.2. Generation of <i>FAEI</i> -deletion cassette by double-joint PCR approach and its confirmation.....	97
Figure 3.2.3. Molecular characterization of the <i>FAEI</i> -deletion (<i>fae1Δ</i>) strain.....	101
Figure 3.2.4. Vegetative growth of the <i>fae1Δ</i> mutant.....	102
Figure 3.2.5. Asexual development (conidiation) of <i>fae1Δ</i> mutant.....	103
Figure 3.2.6. Pathogenic (appressorial) development in the absence of Fae1 function in <i>M. oryzae</i>	104
Figure 3.2.7. Plant infection assay depicting blast disease outcome.....	105
Figure 3.2.8. The <i>fae1Δ</i> strain shows defects in host invasion and colonisation.....	107
Figure 3.2.9. Host penetration assay by aniline blue staining.....	108
Figure 3.2.10. Generation of construct for genetic complementation and molecular analysis of <i>fae1Δ/FAEI</i> strain.....	111
Figure 3.2.11. Infectivity of the WT, <i>fae1Δ</i> or <i>fae1Δ/FAEI</i>	112
Figure 3.2.12. Host invasion ability of the WT, <i>fae1Δ</i> or <i>fae1Δ/FAEI</i> strains.....	113
Figure 3.2.13. Exogenously added glucose or ferulic acid support host invasion in the <i>fae1Δ</i> in a dose-dependent manner.....	117
Figure 3.2.14. Assessment of <i>in vitro</i> host invasion and infection ability of the WT or <i>fae1Δ</i> in the presence or absence of different concentrations of glucose and/or ferulic acid.....	119
Figure 3.2.15. Infection and host invasion assay of WT, <i>fae1Δ</i> in the presence or absence of FA or GSH and vegetative growth of the WT <i>M. oryzae</i> on basal medium (BM) with 2% glucose or 0.01% ferulic acid.....	121
Figure 3.2.16. A proposed model of Fae1 function during pathogenesis in <i>M. oryzae</i>	122
