11.12 The Role of Salicylic Acid and Systemic Acquired Resistance in the Response of Citrus to HLB

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To study the mechanisms of induced resistance in citrus, we designed microarray experiments to compare the response of citrus types to exogenous application of salicylic acid (SA) and infection with \textit{Candidatus Liberibacter asiaticus}, the etiological agent of huanglongbing (HLB). SA has been shown to induce the expression of genes associated with plant defense and the establishment of systemic acquired resistance (SAR). Our custom Agilent Citrus GeneChip (4x44K format) was used in these experiments to compare treated and untreated grapefruit (\textit{Citrus paradisi}) plants. Functional expression analysis of the microarray data confirmed up-regulation of some genes previously associated with SA/SAR (pathogenesis-related proteins, LRR, lipid metabolic processes, etc.) in treated but not untreated plants. We also evaluated gene expression responses of sweet orange (\textit{C. sinensis}) and rough lemon (\textit{C. jambhiri}) to HLB. In our greenhouse observations, sweet orange developed yellow blotchy mottle symptoms earlier than rough lemon. Plants were also tested by PCR for the presence of HLB and only positive plants were further used in the functional gene expression analyses. More than half of the genes significantly induced by SA were also induced in rough lemon but not sweet orange 27 weeks after inoculation with HLB. These results indicate that HLB induced a response that overlapped in that part of SA. This information could be exploited to improve disease management strategies in the field.