FACTORS UNDERPINNING RESISTANCE AGAINST THE GALLING PEST, *LEPTOCYBE INVASA* IN *EUCALYPTUS GRANDIS*

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The blue gum chalcid, *Leptocybe invasa* is considered a serious threat to the production of Eucalyptus species and clones in plantations. This pest induces galls on the midrib, petiole, and shoot tip of young Eucalyptus leaves leading to deformation, stunting and in severe cases, tree death. We adopted a multi-pronged approach to uncover factors contributing to resistance in *E. grandis*. We performed a genome wide association study for resistance against the insect pest, in a breeding population of *E. grandis*, and identified seven genomic regions. Transcriptomics in resistant and susceptible interactions with the pest showed the expression of several candidate genes within 50Kb windows of the significantly associated SNP markers, including putative R-genes. We also investigated whether plant specialized metabolites such as the terpenes would be associated with resistance against the insect pest. Based on near infra-red spectral models we could predict specific terpene content with a prediction ability of 0.67. The terpenes α-pinene, γ-terpinene and iso-pinocarveol were important for predicting *L. invasa* infestation. Susceptibility was associated with increased γ-terpinene and α-pinene. Resistance was associated with iso-pinocarveol. The attractant or repellent properties of these terpenes remain to be tested in *E. grandis*. In the next phase of our study, the markers will be translated to other *E. grandis* populations for breeding purposes and we will focus on characterizing the functional role of the candidate genes. Together, these findings contribute to improving resistance against *L. invasa*.

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