DISSECTING RESISTANCE TO APHIDS (*ACYRTHOSIPHON* SPECIES) USING THE MODEL LEGUME *MEDICAGO TRUNCATULA*

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Aphids, including bluegreen aphid (BGA; *Acyrthosiphon kondoi*), pea aphid (PA; *A. pisum*), and spotted alfalfa aphid (SAA; *Therioaphis trifolii f. maculata*) are important agricultural pests in legume agriculture. Australian breeders have introgressed BGA resistance into three popular cultivars and generated three new resistant lines in the model legume *M. truncatula*. Further characterization showed that each resistance line operates against a number of major legume aphid species. However, the magnitude of resistance varied depending on the *M. truncatula* line and/or aphid species. We have focused on one pair of near isogenic lines, A17 (susceptible) and Jester (resistant) in which single dominant genes condition resistance to BGA, PA and SAA. We have fine mapped two of these resistance genes called *AKR* (*Acyrthosiphon kondoi* resistance) and *TTR* (*Therioaphis trifolii* resistance) and the fine mapping of the third resistance gene termed *APR* (*Acyrthosiphon pisum* resistance) is underway. We have generated very near isogenic lines of *M. truncatula* A17 harbouring these aphid resistance genes, which are powerful tools that essentially eliminates background noise in our transcriptomics and metabolomics experiments. Using these resources, we are making considerable progress on deciphering downstream signalling and defence mechanisms against these aphid species including phytohormone profiling and the identification of transcription factors that may control a successful plant response to aphid attack.