

Genetic diversity and variability in graft success in Australian Macadamia rootstocks

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Rootstocks in tree crops play a vital role in the crop performance by regulating resource supply through translocating water and nutrients; and signaling for developmental processes to the scion. We developed macadamia (*Macadamia* sp.) seedling and cutting rootstocks of a wide range of genotypes and investigated the genetic diversity and the variability of graft success in different groups of macadamia rootstocks. We propagated 30 genotypes of rootstocks comprising 6 high performing rootstock cultivars; 3 elite cultivars with high breeding values for harvest index; 6 cultivars with high yield efficiency; 5 potential dwarf genotypes from the Australian breeding program; 1 Abnormal Vertical growth (AVG) resistant cultivar; 8 wild germplasm including 3 *Macadamia jansanii*, 3 *M. ternifolia* and 2 *M. tetraphylla*; and were grown in a water controlled mist house and shade house for one and a half years. Diversity array technology platforms were used to investigate the genetic diversity of 27 rootstock genotypes. A commercial cultivar “HAES741” was grafted onto the rootstocks and observed until planting. Graft success varied depending on the genetic background and the size of the stem diameter. We identified seedling and cutting rootstock genotypes showing extraordinary graft success with “HAES741” scion. Inclusion of wild germplasm and dwarf genotypes increased the genetic variability in the macadamia rootstocks and this wide genetic diversity can be utilized in future rootstock breeding. The extent to which this genetic diversity in rootstocks will lead to variations in scion architecture is unknown.