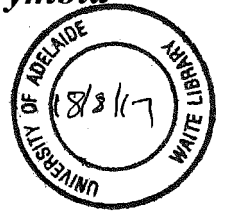


**Epigenetic analysis of an early flowering phenotype in *Corymbia*
ficifolia induced by *in vitro* micropropagation**



By

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Abstract

Abstract

During development, plants go through a period of vegetative growth (juvenile phase) followed by a period of reproductive growth period (adult phase). In perennial woody species, such as the ornamental eucalypt species *Corymbia ficifolia*, the juvenile phase can last for four or more years making breeding programs expensive, challenging and time consuming. This prolonged juvenile phase makes the production of early flowering lines desirable. Previous studies in model plants have suggested that phase change is regulated by genetic and/or epigenetic mechanisms. During the development of a micropropagated *C. ficifolia* hybrid line, it was observed that some clones exhibited an early phase change, resulting in the production of flowers 24-30 months after deflasking, as opposed to the usual four years (48 months). To understand the underlying molecular mechanism of this early phase change, the methylation sensitive amplified polymorphism (MSAP) method was used to analyse changes in DNA methylation patterns between three *C. ficifolia* phenotypes early flowering (EF), normal flowering (NF), and unknown (UK). This method studies genome wide methylation, however it is limited to the recognition sites of the *HapII* and *MspI* restriction enzymes. Interestingly, our results show that the main contributor to the variation in DNA methylation patterns among *in vitro* propagated plants was the environment in which plants were grown after *in vitro* culture. Additionally, higher levels of epigenetic somaclonal variability in EF clones than in their NF counterparts suggests that such changes could be linked to the early flowering phenotype observed.

Key Words Epigenetics, *Corymbia ficifolia*, DNA methylation, Somaclonal Variation

Key Message **Higher levels of variability in early flowering samples could be linked to epigenetic changes that are affecting different flowering related loci.**