

## Abstract

# Breaking and Flowering: The Budding Story of Macadamia <sup>†</sup>

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**Abstract:** Macadamia is the only Australian native crop tree. Unlike some model crop trees like apple or peach trees, the understanding of the physiological mechanisms regulating bud break and flowering in macadamia has never been investigated. We have recently attempted to fill this gap by improving the genetic resources available for macadamia. We identified several components involved in flowering and bud break, including the FLOWERING LOCUS T (FT). FT is a mobile protein, synthesized in the leaves which triggers flowering in terminal and axillary buds. In macadamia, we found two *FT*-related genes, *FTa* and *FTb* namely. *FTa* and *FTb* are differentially regulated; *FTa* being more abundant in axillary buds than leaves, which is unexpected based on the studies performed in model plants. Analysis of the promoter sequences of *FTa* and *FTb*, revealed that the *FTa* regulation may be closer to *FT* regulation in the model plant *Arabidopsis thaliana*. Gene expression in buds revealed that the expression of *TERMINAL FLOWER1 (TFL1)*, a gene previously reported to inhibit flowering, was induced prior to bud break and flowering. The patterns of marker gene expression in buds highlighted that the bud dormancy decreased before May, after which flowering induction occurs. Altogether these results shed light on the regulation of bud break and flowering in macadamia and demonstrate that some regulatory mechanisms may be different from other models.

**Keywords:** macadamia; flowering regulation; bud break; FLOWERING LOCUS T



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