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Acceleration of CRIPSR/Cas9 breeding using flowering stimulation and precision lighting

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As a renewable resource, the demand for wood products is expected to continue to increase in the future. Compared to annual crop plants, direct genetic modification of trees species has gained little attention, partially because trees have much longer lifecycles and tight regulations opposing transgenic use in the field. The newly developed gene editing technologies, such CRISPR/Cas9 increase the potential for the modification of species. CRISPR/Cas9 has several major advantages over previous transgenic based approaches and can work alongside conventional breeding programs by directly improving known yield related loci or genes. In this work, we target reporter genes in *Arabidopsis thaliana* by using a modified CRISPR/Cas9 system and have added a strong ubiquitous CaMV35S promoter, driving the Flowering Locus T (FT) gene. Ectopic expression of FT accelerates sexual development. To regulate the acceleration of flowering time to get viable flowers, we use precision lighting with different ratios of Blue, Red and Far Red light. The CRISPR/Cas9 mutated plants flower earlier than normal as a result of the ectopic FT expression, resulting in fast recovery of the second generation (F2) in *Arabidopsis*. We will use this technology to accelerate breeding in *arboreus* species.

Biography

Juan Pablo Matte has studied both, Forestry Engineering and Biological Science degree in Pontificia Universidad Catolica de Chile. He has completed his PhD in 2013 and Postdoctoral studies in 2015 from The University of Sydney, Australia. Currently he is an Associate Researcher in the Pontificia Universidad Catolica de Chile, under the PAI project number 82140040 from CONICYT.

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