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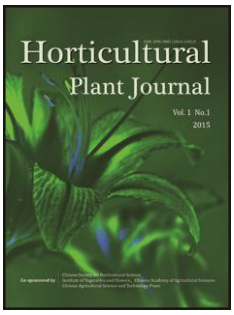

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Mitochondrial Genome of Callus Protoplast Has a Role in Mesophyll Protoplast Regeneration in *Citrus*: Evidence from Transgenic GFP Somatic Homo-fusion

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Abstract

Protoplast fusion has great potential in citrus improvement. Although citrus mesophyll protoplasts usually cannot divide and regenerate, symmetric protoplast fusion of embryogenic callus protoplast + mesophyll protoplast sometimes results in the regeneration of mesophyll-parent-type cybrids. It suggested that mitochondrial DNA (mtDNA) from protoplasts of embryogenic callus parent plays an important role in stimulating division and regeneration of mesophyll protoplasts. Herein, somatic fusion was conducted via electrofusion between callus protoplasts isolated from Valencia orange [*Citrus sinensis* (L.) Osbeck] cell suspension cultures and transgenic GFP-tagged mesophyll protoplasts from the same genotype, i.e. transgenic Valencia orange plants containing the green fluorescent protein (GFP) gene, in an effort to elucidate whether mtDNA of callus line could stimulate the division and regeneration of mesophyll protoplasts from the same genotype. Two embryoids and one plantlet with GFP expression were successfully obtained and subsequent ploidy analysis by flow cytometry indicated that they were all diploids. The regenerated diploid embryoids and plantlet with GFP expression could be considered as ‘cybrids’ with mtDNA from the callus protoplasts of Valencia orange. The result indicated that citrus mesophyll-parent-type cybrid regeneration needed the stimulation of mtDNA from