

OBTENÇÃO DE PLANTAS DE MACIEIRA (*MALUS* × *DOMESTICA*) COM SUPRESSÃO DE DORMÊNCIA ATRAVÉS DE EDIÇÃO GENÔMICA

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Abstract:

Apple (*Malus x domestica*) is a temperate fruit tree with great economic importance in Brazil and in the world. Among the main abiotic factors that limit the productivity of Brazilian orchards is the need for enough chilling exposure to break bud dormancy. The main dormancy-maintaining genes are the MADS-box-type transcription factors called DAM "Dormancy-associated MADS-box". In peach (*Prunus persica*), *EVERGROWING* "EVG" mutants show total absence of dormancy due to deletion of *DAM* genes. This trait allowed the understanding, in an analogous way, of the dormancy control mechanisms in apple. Thus, in order to obtain apple varieties with suppressed dormancy we employed a CRISPR/Cas9-mediated gene editing approach to generate combinations of site-specific deletions in the *DAM* genes loci. Eight sgRNAs were designed with the purpose of generating combined deletions in *DAM* gene loci (*DAM1-2-4-b*, *DAM1-4*, *DAM1-b* and *DAM2-b*), which have the potential to generate dormancy-suppression phenotypes (attenuation or absence of dormancy). We have established the *in vitro* culture of the new Purple Gala genotype and optimized a genetic transformation protocol. In a first trial, one thousand explants were transformed with a combination of sgRNA targeting *DAM1-2-4-b*. Selection and genotyping of potential edited events are in progress. Obtaining of this kind of genetic variation is expected to reduce the dormancy period, representing a potential biotechnological innovation for the sustainability of the apple tree production chain, within the context of the climate change impacts in the main cultivation regions in the South of Brazil.

Key-words: DAM; CRISPR/CAS; DORMANCY; ENVIRONMENTAL STRESS; FRUITCULTURE

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