

Transferring scab resistance to susceptible apple cultivars by viral-derived episomal plant plasmid expression

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Apple (*Malus x domestica*) is an important fruit crop and Brazil is the largest producer of Gala and Fuji cultivars. The apple scab, caused by the fungus ascomycete *Venturia inaequalis*, is a major disease in this culture. The *Vf* gene, derived from clone 821 of wild species *Malus floribunda*, is capable of conferring resistance to scab disease and has been widely used in breeding programs. The goal of this study is to transfer scab resistance to susceptible cultivar of apple (Fuji and Gala) using a non-transgenic transient system registered as TraitUP™ by Morflora Inc. The system is based on an episomal and asymptomatic plant plasmid stably maintained in plant cells. The *Vf2* gene was cloned in the expression plasmid p-IR and the purified DNA was co-administrated to Maxi Gala and Fuji Supreme plants with a helper plasmid. Overall 120 plants were treated and successful transfections are being screened by PCR. The *Vf2* expression will be monitored by RT-qPCR. Plants that show detectable *Vf2* expression levels will be challenged with several varieties of *V. inaequalis* to determine the effectiveness of this technique in conferring acquired resistance to Fuji and Gala varieties. The outcome of these experiments will allow us to evaluate the applicability of viral-derived plant plasmids for fast transferring important agronomical traits to perennial crops and deliver biotechnological solutions to breeders immediately.

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