

Title Characterization of ethylene-induced organ abscission in F1 breeding lines of miniature roses (*Rosa hybrida* L.)

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Abstract

Miniature potted roses are sensitive to ethylene and respond to it by bud and leaf abscission, leaf yellowing and/or flower senescence. The goal of this study was to develop a selection strategy for characterization of ethylene sensitivity in rose breeding lines. Two hundred and thirty-three F1 genotypes were obtained from a reciprocal crossing of 'Lavender' and 'Vanilla' cultivars, and evaluated in response to ethylene treatment. Based on ethylene-induced organ abscission, low- and high-sensitive genotypes were selected for physiological and molecular studies compared with the parent plants. After 1 week of ethylene treatment, leaf chroma values and chlorophyll degradation were increased in high-sensitive genotypes, much more than in low-sensitive genotypes. However, after 2 weeks of ethylene treatment, low-sensitive genotypes showed no difference in chroma values, but chlorophyll contents decreased in two out of three genotypes. Expression of ethylene receptor genes (*RhETR1/3*) and signal transduction genes (*RhCTR1/2*) was not correlated with ethylene sensitivity of the investigated genotypes. The relative expression of laccase (*RhLAC*) was evaluated with respect to the relationships of lignin deposition and abscission. Ethylene-induced expression of *RhLAC* in high-sensitive genotypes increased more strongly than in low-sensitive genotypes. The lowest level of *RhLAC* transcript was accumulated in pedicels of genotypes that showed the lowest bud abscission. Enhanced expression of the laccase gene by ethylene may be related to the abscission process.