Title	Differential ethylene responses in tomato development resulted from antisense inhibition of ethylene receptor LeETR2
Author	Ying, T. J., Yang, H. Q. and Xiang, Q. N.
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Abstract

The phytohormone ethylene regulates many aspects of plant growth, development, and environmental responses. Our knowledge on biosynthesis of ethylene in plant is quite advanced. Much less is known about the regulation of ethylene action. We transformed tomato (*Lycopersicon esculentum*) plants with a partial antisense sequence from the 3'-nontranslated region of tomato ethylene receptor LeETR2, screened homozygous transgenic lines, and investigated ethylene responses of the plants. PCR, Southern blot and GUS assays confirmed the insertion and activation of reporter and target genes in the tomato genome. Northern blot analysis indicated that LeETR2 mRNA abundance was decreased in LeETR2 antisense transgenic tomato plants. Etiolated seedlings of the antisense LeETR2 plants displayed weak constitutive triple response, and response to exogenous ethylene in an exaggerated manner. Root elongation was strongly inhibited, and root hair formation was completely inhibited. Leaves of antisense LeETR2 plantsdisplayed much less epinasty than WT when exposed to 25 micro l ethylene/litre. The time needed for 50% abscission of petiole explants exposed to 25 micro l ethylene/litre by transgenic explants were more than two times longer than the time needed by WT. Similar results were observed in the experiment with flower petiole explants. Leaf senescence in antisense LeETR2 plants was significantly delayed compared to WT. No significant alterations in fruit ripening and senescence were observed in antisense LeETR2 plants. According to the negative regulation model of ethylene receptors, inhibition of receptor(s) should lead to increased ethylene sensitivity. Apparently, our findings did not always comply with this model. We thus suggest that a specific tomato ethylene receptor may follow different regulation patterns in different organs, tissues or developmental stages. Deeper investigation of this hypothesis would contribute to the establishment of more precise mode of regulation of ethylene action.