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园艺—研究报告

转基因枳橙中GA20ox1与rol基因互作关系的研究

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摘要:

为分析转rol ABC基因枳橙GA20ox1基因与rol基因表达的互作关系，进一步阐释其矮化性状形成的分子机制。以转rol基因枳橙实生苗为试验材料，研究其对赤霉素的敏感反应，用荧光定量RT-PCR分析GA20ox1基因和rol基因的表达，并检测幼芽中POD酶活性和植物内源激素含量的变化。结果表明转rol基因枳橙既不属于GA缺陷型，也不属于GA不敏感型，喷施GA3能促进其茎伸长生长，但恢复不到野生型水平，幼芽中IAA（P<0.01）、GA1和GA4（P<0.05）显著降低，POD酶活性显著提高（P<0.01）。转rol基因枳橙幼芽中GA20ox1基因mRNA水平相比对照显著下调（P<0.01）。B、D系与野生型嫩茎中无明显差异，B、D系老叶中明显降低，E系中嫩茎和老叶中均明显增加。B、D和E系嫩叶中GA20ox1基因转录表达均较野生型高。在幼芽、嫩茎中，rol C基因与GA20ox1表达负相关。rol基因通过在幼芽中的高表达下调了GA20ox1基因转录表达，进而抑制了活性GAs在幼芽中的合成，顶端分生组织较低量的活性GAs限制植物茎伸长，在转rol ABC基因枳橙矮化性状建成中发挥重要作用。

关键词: 矮化机理

Study on Gene-gene Interactions between GA20ox1 and rol gene in Transgenic Citranges

Abstract:

To examine the gene-gene interactions between GA20ox1 and rol gene so as to elucidate the molecular mechanism of dwarfing morphogenesis in citrange. The potted seedlings of transgenic citrange with rol ABC genes were used as trial materials, the sensitive response to GAs was tested by spraying GA3 regularly, the expression of GA20ox1 and rol A, B and C genes were detected by quantitative reverse transcription PCR, phytohormone content of tender bud were quantified by GC/MS method. The result demonstrated transgenic citrange was neither defective genotype of GA3, nor unsensitive genotype of GA3. However, the spraying of GA3 elongated the internode; it was still shorter than wild type citrange. The content of IAA (P<0.01), GA1 and GA4 decreased (P<0.05) while peroxidase activity increased markedly in the tender bud of transgenic citrange (P<0.01). The GA20ox1 expression quantity markedly decreased in apical bud (P<0.01), while it was similar in tender stem of B, D clones, and decreased in old leaves, compared with that in wild type. However, the expression in tender stem and old leaves were increased. Also its expression in tender leaves was higher than wild type. The expression of rol C gene and GA20ox1 gene reveal negative correlation in tender bud, tender stems. rol gene expression could inhibit synthesis of GAs by down regulating the expression of GA20ox1 gene in bud, lower bioactive GAs could suppress citrange growth, then it played an important role in constructing dwarfing characteristics of transgenic citrange with rol ABC genes.

Keywords:

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