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论文

郑麦9023春化基因*VRN-1*的组成及表达

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摘要：

以郑麦9023叶片为材料，利用序列特异性PCR扩增技术克隆了春化基因*VRN-1*，并通过0～2℃冰箱模拟春化处理0、10、20和30 d，对该基因在一叶期至九叶期叶片中的表达进行了分析。PCR分析表明，*VRN-1*基因在郑麦9023的A和D基因组中均为隐性，在B基因组中为显性，基因等位类型为*vrnA1VrnB1vrnD1*。在克隆*VRN-A1*、*VRN-B1*和*VRN-D1*基因序列的基础上，设计了3个等位基因的特异引物，并利用该特异引物进行半定量RT-PCR分析。结果显示，在未经春化处理的条件下，一叶期*VRN-A1*和*VRN-D1*均未检测到表达，而*VRN-B1*已有较低水平的表达；从三叶期开始，3个等位基因都有较高水平的表达，并一直持续至开花期。在春化处理10、20和30 d条件下，*VRN-1*的3个等位基因在一叶期就出现较高水平的表达，并保持至开花期。

关键词： 郑麦9023 春化基因*vrn-1* 基因克隆 半定量RT-PCR

Allelic Composition and Expression of Vernalization Gene *Vrn-1* in Wheat Cultivar Zhengmai 9023

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Abstract:

Zhengmai 9023 is an elite winter wheat (*Triticum aestivum* L.) cultivar grown in a large scale in China, and often injured by coldness when it easily starts reproductive growth before winter because of its weak vernalization characteristic. Vernalization gene *VRN-1* is one of the key genes controlling the conversion from vegetative growth to reproductive growth in wheat. To explore the regulation mechanism of vernalization in Zhengmai 9023, the *VRN-1* gene was cloned from leaf tissues using gene-specific PCR amplification technique, and its expressions were analyzed under simulated vernalization at 0–2°C for 0, 10, 20, and 30 d. The gene-specific primers were designed for semiquantitative PCR analysis based on the sequences of the *VRN-A1*, *VRN-B1*, and *VRN-D1*, which were cloned from Zhengmai 9023. The results showed that the genotype of *VRN-1* was *vrnA1VrnB1vrnD1* with the unique dominant allele in B genome of Zhengmai 9023. Under the treatment of 0 d vernalization, the expressions of *VRN-A1* and *VRN-D1* were not detected at one-leaf stage, whereas *VRN-B1* expressed at a low level and the expressions of the three *VRN-1* alleles were all at relative high levels from three-leaf stage to flowering stage. However, under the treatments with 10 to 30 d vernalizaion, the three alleles of *VRN-1* gene showed high-level expressions throughout the period from one-leaf to flowering stages.

Keywords: Zhengmai 9023 Vernalization gene *VRN-1*;Gene cloning Semiquantitative RT-PCR

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