

水稻芒基因 *An-1* 的启动子功能性多态位点鉴定及多基因互作控制芒发育的分子机制的探究

摘要:

亚洲栽培稻 (*Oryza sativa*) 是由普通野生稻 (*Oryza rufipogon*) 经过人工驯化而来的。驯化性状一般受多基因调控, 其调控关系比较复杂; 且驯化基因常常一因多效, 对水稻发育的影响也是多方面的。水稻的芒, 作为典型的驯化性状, 其发育是一个研究复杂性状调控的理想系统。控制芒长的基因目前已经克隆的有 *An-1*、*An2/LABAI* 和 *RAE2/GADI*。其中 *An-1* 是一个主效芒控制基因, 编码一个 *bHLH* 转录因子; 而 *RAE2/GADI* (Os08g0485500) 是另一个主效芒控制基因, 编码一个富含半胱氨酸的分泌蛋白; *An-2/LABAI* 编码一个细胞分裂素合成酶。*An-1*、*An-2/LABAI*、和 *RAE2/GADI* 均能促进外稃尖端的细胞分裂, 导致芒的产生。我们的研究目标是鉴定水稻芒基因 *An-1* 的启动子功能性多态位点, 研究 *An-1*、*An-2/LABAI* 和 *RAE2/GADI* 基因剂量与表型之间的关系, 研究 *An-1*、*An-2/LABAI* 和 *RAE2/GADI* 之间是否存在相互作用, 探究多基因调控芒发育的分子机制, 为进一步阐述水稻驯化机制提供更多分子证据。

关键词:

水稻、 芒、 驯化基因、 功能性多态、 剂量效应、 基因互作

Identification of the Promoter Functional Polymorphic Site of Rice and Its Interaction with Multi-gene Interaction to Control the Molecular Mechanism of Awn Development

Abstract:

Asian cultivated rice (*Oryza sativa*) is artificially domesticated by common wild rice (*Oryza rufipogon*). Domestication traits are generally regulated by polygenes, and their regulatory relationships are more complex; and domestication genes are often due to multiple effects, and the effects on rice development are multifaceted. Rice is a typical domestication trait, and its development is an ideal system for studying the regulation of complex traits. The genes that control awn are now cloned with An-1, An2 / LABA1 and RAE2 / GAD1. Which is a main control vector, encodes a bHLH transcription factor; and RAE2 / GAD1 (Os08g0485500) is another major control gene, encoding a cysteine-rich secreted protein; An-2 / LABA1 encodes a cytokinin synthase. An-1, An-2 / LABA1, and RAE2 / GAD1 all promote cell division at the tip of the lemma, leading to the production of awn. The aim of our study was to identify the functional polymorphic loci of the promoter of An-1, An-2, LABA1 and RAE2 / GAD1, and to study the relationship between An-1, An-2 / LABA1 and RAE2 / GAD1 , An-2 / LABA1 and RAE2 / GAD1, and to explore the molecular mechanism of multi-gene regulation of awn development, and to provide more molecular evidence for further elaboration of rice domestication mechanism.

Key words:

Rice, Awn, Domestication Gene, Functional Polymorphism, Dose Effect, Gene Interaction.

