Morphogenesis, Anatomical Observation and Primary Genetic Analysis of a Multi-glume Floral Organ Mutant in Rice [PDF]

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摘 要：A multi-glume (mg) mutant was obtained by screening the T-DNA inserted mutant pool. Anatomical observation revealed that the florets of the mutant showed elongated leafy paleas/lemmas and palea/lemma-like structures, just like multi-glumes. Among the 215 observed florets of the mutant, 14.27% were failed to produce pistil and stamens, 23.72% showed extra floret generated on the same rachilla, while 62.01% consisted of one to nine stamens and one to three pistils in a single floret. On the other hand, in some cases the transparent bulged vesile-like tissue could be observed at the basis of filament. The mutant showed glumaceous lodicules, which prevented the florets from opening in natural conditions, while the absolute male and female sterility was an obvious character of the current mutant. Observation on the process of floral organ morphogenesis by a scanning electron microscopy (SEM) indicated that no phenotype difference in floret primordia was found between the wild-type and the mutant. Meanwhile, for the mutant, the beginning of stamen and pistil primordial differentiation was later than the wild type and the palea/lemma-like structure continued to differentiate after the formation of normal palea and lemma. Furthermore, in the mutant the asymmetrical division of floral primordial caused variation in the number of stamens and pistils. Therefore, the genetic analyses indicated that the mutation phenotype was a recessive trait controlled by a single gene and co-segregated with the T-DNA. Based on the phenotypic characteristics, it could be deduced that the mutant was the result of homeotic conversion from the function of the class E genes in ABCD model.

关键词：rice (Oryza sativa); multi-glume mutant; anatomical structure; morphogenesis; genetic analysis

Rice Science. 2006, 13(4): 227-233

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