

A single-nucleotide polymorphism causes smaller grain size and loss of seed shattering during African rice domestication

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Abstract

Grain size is one of the most important components of grain yield and selecting large seeds has been a main target during plant domestication. Surprisingly, the grain of African cultivated rice (*Oryza glaberrima* Steud.) typically is smaller than that of its progenitor, *Oryza barthii*. Here we report the cloning and characterization of a quantitative trait locus, GL4, controlling the grain length on chromosome 4 in African rice, which regulates longitudinal cell elongation of the outer and inner glumes. Interestingly, GL4 also controls the seed shattering phenotype like its orthologue SH4 gene in Asian rice. Our data show that a single-nucleotide polymorphism (SNP) mutation in the GL4 gene resulted in a premature stop codon and led to small seeds and loss of seed shattering during African rice domestication. These results provide new insights into diverse domestication practices in African rice, and also pave the way for enhancing crop yield to meeting the challenge of cereal demand in West Africa.

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