

Complete chloroplast and ribosomal sequences for 30 accessions elucidate evolution of *Oryza AA* genome species

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Abstract

Cytoplasmic chloroplast (cp) genomes and nuclear ribosomal DNA (nR) are the primary sequences used to understand plant diversity and evolution. We introduce a high-throughput method to simultaneously obtain complete cp and nR sequences using Illumina platform whole-genome sequence. We applied the method to 30 rice specimens belonging to nine *Oryza* species. Concurrent phylogenomic analysis using cp and nR of several of specimens of the same *Oryza AA* genome species provides insight into the evolution and domestication of cultivated rice, clarifying three ambiguous but important issues in the evolution of wild *Oryza* species. First, cp-based trees clearly classify each lineage but can be biased by inter-subspecies cross-hybridization events during speciation. Second, *O. glumaepatula*, a South American wild rice, includes two cytoplasm types, one of which is derived from a recent interspecies hybridization with *O. longistaminata*. Third, the Australian *O. rufipogon*-type rice is a perennial form of *O. meridionalis*.