

Allele mining strategies: principles and utilisation for blast resistance genes in rice (*Oryza sativa* L.)

ABSTRACT

Allele mining is a promising way to dissect naturally occurring allelic variants of candidate genes with essential agronomic qualities. With the identification, isolation and characterisation of blast resistance genes in rice, it is now possible to dissect the actual allelic variants of these genes within an array of rice cultivars via allele mining. Multiple alleles from the complex locus serve as a reservoir of variation to generate functional genes. The routine sequence exchange is one of the main mechanisms of R gene evolution and development. Allele mining for resistance genes can be an important method to identify additional resistance alleles and new haplotypes along with the development of allele-specific markers for use in marker-assisted selection. Allele mining can be visualised as a vital link between effective utilisation of genetic and genomic resources in genomics-driven modern plant breeding. This review studies the actual concepts and potential of mining approaches for the discovery of alleles and their utilisation for blast resistance genes in rice. The details provided here will be important to provide the rice breeder with a worthwhile introduction to allele mining and its methodology for breakthrough discovery of fresh alleles hidden in hereditary diversity, which is vital for crop improvement.

Keyword: Allele mining; Allelic variants; Blast resistance; Rice