

## Development of Rice Lines with Blast Resistance Genes Using Marker-Assisted Selection

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### Abstract:

Rice (*Oryza sativa* L.) is a vital crop for food security, particularly in Asia. Rice blast, primarily caused by phytopathogenic fungus *Magnaporthe oryzae*, poses a particular threat. This disease poses a serious threat to rice production, causing yield reductions of 10–30% in normal years and up to 50% during severe epiphytotic.

Donor varieties of the *Pi-1*, *Pi-33*, *Pi-ta* resistance genes, which control resistance to *Magnaporthe oryzae*, have been selected for introgression and gene pyramiding into kazakh varieties. F<sub>2</sub> hybrids were obtained by introducing and pyramiding genes for resistance to *M. oryzae*. New original hybrids were created based on high-yielding kazakh varieties (Bakanasskii, Aisaule, Aru) carrying blast resistance genes. Six lines were pyramided, they contain combinations of two/three genes: 7698/Aisaule suberythroseros, Aru/7702 erythroceros, Bakanasskii/7667 *subjanthoseros*, Bakanasskii/7667 *vulgaris*, Bakanasskii/7701 *vulgaris*, Aisaule/7664 *italica*, which contain two genes for resistance to blast (*Pi-1*, *Pi-ta*), hybrid Aisaule/7689 *zeravschanica* carries three genes for resistance to blast (*Pi-1*, *Pi-33*, *Pi-ta*). Combining several genes in a single genotype has proven to be the most effective strategy for long-term rice blast resistance.

This research supported by the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan Program under IRN BR28712539.