

International differential system to protect the rice production against rice blast diseases

Production

Demonstration

Item: Rice

Chemical pesticide reduction

Outline

An international differential system for rice blast control was developed by combining "standard differential strains" and "standard differential rice cultivars" collected and cultivated in collaboration with research institutes in Asia and Africa. By using this system, it is possible to identify the distribution of rice blast strains that are prevalent in a target area and rice cultivars with appropriate resistance, leading to a reduction in the amount of agricultural chemicals used.

Background/effect/note

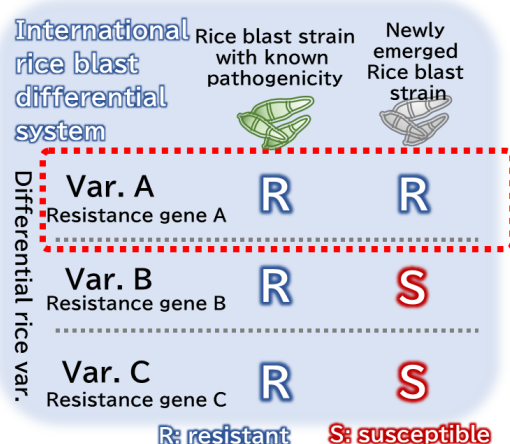
Rice blast is a serious disease that reduces rice production by 30-60% without proper control. For rice blast control, we collected and selected standard strains of rice blast in Asia and Africa. We also developed 23 standard rice cultivars with resistance genes in collaboration with the International Rice Research Institute (IRRI). The international rice blast differential system combines the standard strains and the standard cultivars.

The system can ascertain pathogenicity of a newly emerged rice blast (Fig. 1). It can also clarify effective resistance genes, which can be used for breeding resistant cultivars.

Though each country restricts imports of rice blast fungi across borders in terms of plant protection, the standard differential rice cultivars can be shared.

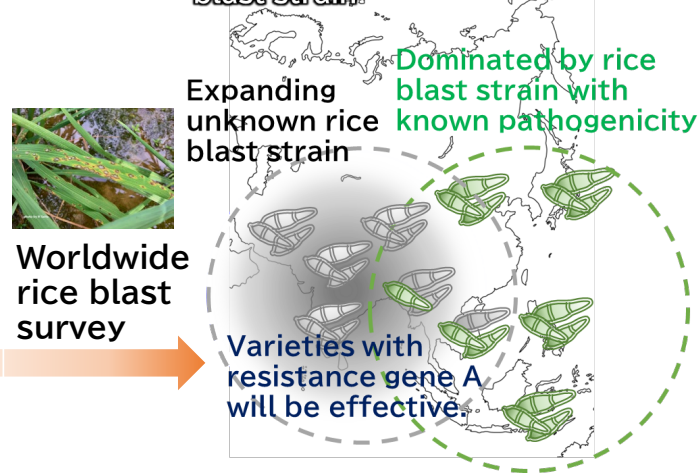
In Indonesia, Vietnam, Laos, and Bangladesh, "rice blast differential strains" have been selected and the system is available.

Clarification of pathogenicity of newly emerged rice blast strain



The differential system identifies an effective resistance gene. For a known rice blast strain, resistance gene A, B, and C are effective. For a newly emerged rice blast strain, only gene A is effective.

Monitoring newly emerged rice blast strain



Based on the information from the differential system, distribution of a newly emerged rice blast strain can be grasped, which will enable proactive measures against rice blast.

Fig. 1. An example of effective utilization of the international rice blast differential system



Technical details:
https://www.jircas.go.jp/en/publication/research_results/2020_b11
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