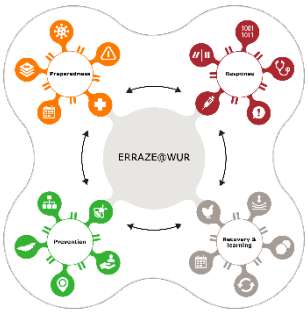
Paradigm Shifts for Global One Health

Greater resilience requires transformation and integration

Book of Abstracts

International symposium
23-25 April 2024
Wageningen, The Netherlands



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Rice blast control drives yield benefits from variety mixture in rice: a global meta-analysis

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Rice blast, caused by the fungus Pyricularia oryzae, is the most important disease of rice globally. Variety mixture has proven potential to reduce the incidence of rice blast and increase yield, but the effectiveness of variety mixture as a disease control method varies, and the general effectiveness and yield benefits of this agroecological practice have not been demonstrated. Here, we present a global synthesis of experimental data on the effect of variety mixture on rice blast. Based on 1255 disease observations from 38 research publications, the relative yield in mixture (yield in mixture divided by yield in monocrop) increased with disease incidence in the monocrop, for hybrid rice from 0.92 to 1.06 as disease incidence in the monocrop increased from 0 to 100%, and for glutinous rice from 0.16 to 0.30. Variety mixture reduced the odds of disease by 68% on average. The average reduction in disease odds was substantially greater in blast-susceptible glutinous rice varieties (80%) than in more blast-resistant hybrid rice varieties (34%), but still substantial and significant in the latter. The disease control effect of fungicides and variety mixture were additive. Blast-resistant hybrid rice varieties became much more susceptible to blast at high than low fertilizer N input but the disease controlling effect of mixture was unaffected by fertilizer N input. The results show that variety mixture is an effective agroecological practice, particularly for the cultivation of indigenous varieties with high market value but low blast resistance.

Keywords: rice variety mixture, yield benefit, disease control, pesticide reduction,