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Screening of African Rice Accessions (*Oryza* spp.) for Strong Resistance against Blast Disease in Benin

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Abstract

Blast disease caused by *Magnaporthe oryzae* is worldwide a major constraint to rice (*Oryza* spp.) cultivation. The spread of damage caused by rice blast has been widely reported in Africa including Benin where blast threats could become more important in the future, because of the popularity of certain susceptible cultivars and the spontaneous development of recently documented new pathogenic races. Screening rice varieties with strong resistance to the disease is known to provide farmers with efficient and low-cost blast management alternatives. The objective of the present study was to identify rice accessions with strong resistance to nine blast isolates that represent a diversity of blast pathotypes occurring in Africa. For this purpose, twenty-one rice accessions originating from West Africa were screened using a set of *M. oryzae* isolates collected in Benin. All experiments were done in a greenhouse. High differences in our germplasm responses were observed. Overall, 66.67 % were resistant to at least five isolates, whereas 19 % were susceptible to all isolates tested. Six rice accessions (WAB0029182, WAB0029194, WAB0032298, WAB0032497, WAB0015703, WAB0002143, and WAB0008956) were found to be particularly resistant to all Beninese blast pathotypes tested. Analyses of resistance inheritance to pathotype BN0252 in the best-resistant accessions WAB0029194, WAB0008956 and WAB0032298 crossed with the susceptible accession WAB0030263, revealed a Mendelian segregation ratio 3:1 (Resistant:Susceptible). The chi-squared values (0.14, 1.04 and 3.07) indicated that resistance is most likely controlled by (one) single dominant gene. We suspect that the observed resistance may be controlled by genes other than the resistance genes known so far in rice. Accession WAB0030263, which was shown to be highly susceptible to all 9 Beninese blast isolates was found to carry the gene DTY3.1 for drought tolerance. Also, we found that accession WAB0032298 which has a strong resistance to all blast pathotypes tested possesses a gene responsible for submergence tolerance as well. This study revealed new information that supports the existence of valuable sources for breeding rice varieties for tolerance/resistance to multiple stress factors, including blast resistance.

Keywords: Benin, blast, intraspecific lines, rice