

2005 Progress Report

TITLE: Examination of resistance stability to rice blast disease

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PRIORITY AREA: Management Strategies for Rice Pests

STATUS: Ongoing (2005)

VALUE OF RESEARCH TO THE RICE FARMER:

Elucidating how the rice blast fungus can overcome an important resistance gene like Pi-ta is critical to allow breeders to develop cultivars with more durable, or long-lasting resistance to the rice blast pathogen in Arkansas. This information could have a great deal of predictive value in assessing the which portion of the rice blast population in Arkansas represents the greatest potential to cause damage on certain cultivars and likely will provide tools for predicting how stable certain resistance gene combinations may be prior to releasing commercial cultivars.

PROGRESS REPORT AND UPDATE:

Ongoing work on the resistance stability to the rice blast pathogen has focused on the molecular mechanism which allows the rice blast fungus to overcome commonly used types of resistance such as that found in the cultivars Kaybonnet and Drew. The resistance is governed by the *Pi-ta* resistance gene and this gene is effective on the majority of the rice blast pathogen population. However, both field and laboratory strains have been identified which can overcome the Pi-ta resistance. A set of field isolates, laboratory strains, and race-shift mutants of *Pyricularia grisea* have been identified and well-characterized in pathogenicity tests on a wide range of rice genotypes and commercial cultivars which contain the Pi-ta resistance. In addition, a specific set of molecular primers have been developed which can be used to specifically examine the gene in the fungus which allows it to overcome the Pi-ta resistance gene in the host. In 2004, a newly recovered set of isolates are being examined for their ability to defeat the Pi-ta resistance gene. These isolates, once characterized, should provide a valuable set of information with regard to the origin and establishment of new races in the state. We are also evaluating cultivars, such as Banks, to determine if the frequency of occurrence of new races is cultivar dependent. This could potential help identify novel sources of important minor genes for resistance.