Dale Bumpers National Rice Research Center
USDA-ARS
Stuttgart, Arkansas

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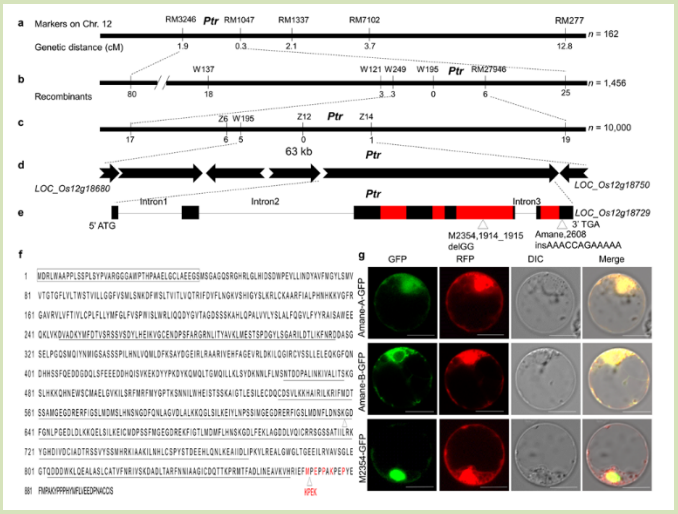
MONTHLY RESEARCH HIGHLIGHTS

For More Information: Dr. Anna McClung, Research Leader/Center Director
anna.mcclung@ars.usda.gov

- **Recent Scientific Publications**

Zhao, H., Wang, X., **Jia, Y**., Minkenberg, B., Wheatley, M., Fan, J., Jia, M.H., Famoso, A., Edwards, J., Wamishe, Y., Valent, B., Wang, G., Yang, Y. 2018. The rice blast resistance gene *Ptr* encodes an atypical protein required for broad spectrum disease resistance. Nature Communications. doi:10.1038/s41467-018-04369-4. Published on May 23.



Blast disease of rice caused by the fungus *Magnaporthe oryzae* is the most damaging rice disease worldwide. Major resistance (*R*) genes are effective in controlling this disease. Most of the cloned blast *R* genes are predicted to encode proteins with nucleotide binding site- leucine rich repeats (NLR), however, the molecular bases of disease resistance mediated by *R* genes are still largely unclear. In the present study, we identified a novel *R* gene, Ptr, that is physically close to another effectively deployed NLR blast *R* gene, *Pi-ta* but it encodes an atypical protein structure. Using fast neutrons, a two base pair deletion was mutated in the protein coding region of Ptr which resulted in a truncated protein and blast susceptibility. Rice germplasm with *Ptr* and *Pi-ta* confer resistance to a wide range of US races/isolates of rice blast fungus. The cloning of *Ptr* will help to further elucidate the complex plant-pathogen molecular mechanism of blast resistance. DNA markers that are linked to *Ptr* will be used to improve blast resistance via a marker assisted breeding strategy.

- **Technology Transfer**

  - ✓ **<u>Interactions with the Research Community</u>**

In support of APHIS interest in understanding the potential host range of Ustilago esculenta on crop species like rice, Dr. McClung provided seed of several rice varieties

that differed in their reaction to another smut species, Ustilaginoidea virens, to Dr. Deb Samac with USDA-ARS in St. Paul, MN.

✓ **Rice Germplasm Distributed**

During May, 765 rice accessions from the Genetics Stocks *Oryza* (GSOR) collection were distributed to researchers in the USA, China, Germany, and the United Kingdom.

- **Stakeholder Interactions**

On May 1st, the DBNRRC hosted USDA Under Secretary for Farm and Foreign Agricultural Service (FFAS), Bill Northey, for a listening session from stakeholders regarding issues important to the USA rice industry. The meeting was attended by some 25 rice growers and millers and representatives of USA Rice.

On May 18th, Drs. Anna McClung, Ming-Hsuan Chen and Georgia Eizenga attended the grand opening of the new rice mill at Ralston Family Farms in Atkins, AR. The event was attended by some 200 people and included remarks from Governor Asa Hutchinson and P. Allen Smith, a well-known TV host, garden designer and cook. Smith has partnered with the Ralstons to launch new specialty rice products, some of which are using varieties developed by Drs. McClung and Chen.