

Achievement

College of Agriculture and Life Sciences

Learning how Plants Deal with Disease

North Carolina State University's Center for Integrated Fungal Research, directed by Dr. Ralph Dean, professor of Plant Pathology, played an integral role in sequencing, or determining the structure of, the genomes of both rice and a fungus that causes rice blast disease. The genome of *Magnaporthe grisea*, the fungus that causes rice blast, is available online at <http://www-genome.wi.mit.edu/annotation/fungi/magnaporthe/>. Putting this information on the World Wide Web marked the first time the genome of a significant plant pathogen was publicly available.

Scientists at NC State and elsewhere are now working to identify genes in rice and the rice blast fungus and determine their function. They are also studying what happens at the genomic level, which genes are active, when the rice blast fungus infects rice. A better understanding of how a rice plant defends itself may allow scientists to alter the genetic makeup of the plants so they are able to resist the fungus more effectively. That would be a boon to people around the world. Roughly a third of the world's population depends on rice for more than half their caloric intake, while enough rice is lost to rice blast disease annually to feed 60 million people.

And perhaps just as importantly, what researchers learn about rice and rice blast disease may be applicable to other cereal grasses, such as corn, wheat and barley, and other plant diseases. Indeed, knowledge of the genetic structure of rice coupled with knowledge of the genetic structure of the rice blast fungus may be the foundation on which a better understanding of how a range of plants deal with disease is built. That understanding will be particularly important in coming years as the world's population grows. Fungal diseases now reduce crop yields by 20-35 percent annually. Genomic strategies that reduce these losses could play a significant role in increasing world food production.



Dr. Ralph Dean, seen here conducting a workshop for teachers, is working to better understand how plants fight disease.

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