

A team of Texas Agricultural Experiment Station scientists will soon begin genome sequencing a disease-fighting fungus used to protect crops, which has implications for both agriculture and the pharmaceutical industry.

The fungus, *Trichoderma virens*, is used to protect field crops from various plant diseases. Researchers say the genome sequencing work may uncover chemical compounds and beneficial genes useful in producing new human and animal antibiotics.....

The sequencing project is a collaborative effort with the Department of Energy Joint Genome Institute. Experiment Station plant pathologists are Drs. Charles M. Kenerley, Daniel J. Ebbole, Heather H. Wilkinson and Michael Thon. Also working on the project is Dr. Alfredo Herrera-Estrella, from the Center for Research and Advanced Studies in Mexico.

"There's both pharmaceutical and agricultural implications," said Kenerley, who is the lead researcher on the project. "We're going to get a view of all of the genes that might be responsible for producing antibiotics and potentially discover novel antibiotics used in therapy for humans or animals.

"We know some of the genes responsible for known antibiotics, however, there are additional genes in *Trichoderma* responsible for producing uncharacterized compounds that might be novel antibiotics."

By sequencing the fungus, researchers say they will be able to develop new versions of the fungus to protect field crops from diseases. This would decrease the amount of pesticide and other chemicals applied throughout a growing season.

"You also might be able to more effectively employ sustainable practices such as low till agriculture," said Wilkinson, who is researching the ecological aspects of the fungus. "You've got *Trichoderma* present to combat the pathogens that remain in the soil when you incorporate low till. In theory, it would be cost-effective for many producers.

"By placing the disease-fighting fungus directly onto the seed, it would continue to protect the plant throughout the growing season and spread throughout the root system."

Finding unique genes involved in inducing plant resistance could also aid the greenhouse industry that encounters problems with seedling rot in different plant varieties.

"In the nursery industry where you transplant from smaller to larger containers, you can incorporate the fungus as a potting mix amendment that would protect against root-rotting fungi," Kenerley said.

Ebbole said their research will "provide resources for the entire scientific community," noting all of the analysis will be shared with other scientists to further other projects.

"Texas A&M researchers will have priority in annotating the sequence and publishing the findings," Ebbole said.

The project is one of 40 new genome projects announced Thursday by the Department of Energy Joint Genome Institute.

"Through the Community Sequencing Program, we are leveraging the dramatic advances in genomic technology accrued since DOE launched the Human Genome Project nearly 20 years ago," said Dr. Raymond L. Orbach, director of the Department of Energy's Office Of Science. "Our ability to generate DNA sequences, particularly over the last three years, has approached Moore's Law of proportions - in effect doubling every 18 months. These advances have led DOE JGI to emerge as one of the preeminent contributors to microbial and plant genomics."

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