Plant Pathologists Work Toward Improved Soybean Disease Resistance

LEXINGTON, KY.

Each year, soybean producers spend countless hours preventing and combating diseases that annually result in a 14 percent yield loss to the crop in the United States. Trying to help farmers in their efforts, plant pathologists in the University of Kentucky College of Agriculture are studying ways to strengthen soybean disease resistance.

By turning a foe into a friend, a UK research group led by plant pathologist Said Ghabrial has developed a bean pod mottle virus vector that identifies potential beneficial proteins in soybeans. They believe it could play a big role in increased disease resistance to important plant pathogens. The researchers continue to explore the vector's possibilities through grants funded by the Kentucky Soybean Board, the United Soybean Board and the North Central Soybean Research Program.

"We are targeting a large number of disease pathogens," Ghabrial said. "With the vector there's no limit to which genes we can test, and we can quickly get results."

While the vector's name may concern some, only a mild strain of the bean pod mottle virus is used in these studies. Therefore, only mild symptoms are produced, and the virus causes little or no apparent damage to the crop.

"At the stage of identifying proteins of interest, there should not be any concern of virus infection among the growers," Ghabrial said.

The vector works by quickly moving through the plant. As it goes through the plant, it produces proteins of interest that may help to enhance the plant's resistance to particular diseases.

Plant virus-based vectors, like the bean pod mottle virus vector, have several benefits. Since they move quickly through the plant and generate high levels of potential beneficial proteins, they can produce results faster than traditional methods. This means less time and money spent by researchers in identifying proteins.

With the vector, UK researchers will conduct studies to determine which candidate proteins are critical to helping the plant stay healthy and fight diseases and which hinder its ability. Once researchers identify the proteins to target, they can look for ways to increase the valuable ones in a cost-effective manner.

In future research, Ghabrial hopes to develop new varieties of soybeans that are resistant to troublesome diseases, such as soybean rust and soybean cyst nematode.

"We hope to use the bean pod mottle virus vector to screen proteins that have antifungal and anti-nematode characteristics," he said. "We may be able to over express those proteins to de- fend against the diseases." Δ