

Interview with Bret Cooper, Ph.D.,

Plant Physiologist, USDA ARS, Beltsville, MD

I'm studying soybean rust, and soybean rust is a fungus that infects soybeans and it entered the United States in 2004, came up from South America, maybe Brazil, and it rode in on a hurricane and landed in the southern part of Louisiana. It has since spread around out of the southern part of the United States, at Georgia, at Florida. American soybean farmers are worried about this disease because they have discovered that their crops, their soybeans crops, are absolutely susceptible to soybean rust fungus. If it spreads around, especially into the major soybean growing areas, or the northern part of the United States, we could have up to 50% crop loss in some areas and it could result in \$2 billion a year worth of damage. And that's quite a lot of damage to only a \$12 billion industry.

We use mass spectrometry to identify the proteins of the fungus, and we hope that by identifying the proteins of the fungus, we can develop new chemicals, new fungicides that we can target toward these proteins and, perhaps, inhibit the growth of the fungus and keep it from spreading throughout the United States and infecting more plants.

We're not the only ones that use mass spectrometry to identify proteins. The pharma industry is using mass spectrometry to identify proteins in malaria. There is no cure for malaria and the pharma companies are hoping to identify proteins from the malaria parasite and develop vaccines that target these proteins directly and hope to discover a cure soon.

We hope to use the same technology to devise some type of vaccine or therapeutic type of chemical to inhibit the growth of soybean rust, in this case. USDA ARS at Beltsville has a containment greenhouse in which we grow plants infected with soybean rust. We have to use this facility to contain the pathogen, even though soybean rust is spread throughout the southern part of the United States, it's not in Maryland and it's not in the northern part of the United States in some of the main soybean growing states such as Iowa or Illinois. We want to prevent that disease from spreading up north, yet we need to work on it at the same time, so we work on it in a containment facility in these areas to prevent its spread. This facility is very important. USDA has spent a lot of money building it and we intend to use it, provide samples and materials and distribute those to other scientists throughout the country who don't have such a facility and aren't able to do research on this pathogen in their state.