A Constant Battle: Protecting Kansas Crops from Disease

Researching how to stop wheat blast from spreading to North America and identifying a gene that gives wheat plants resistance to a stem rust pathogen known as Ug99 have put K-State plant pathologists in the news recently.

As Doug Jardine, professor and extension state leader, researched the department's history for the university's 150th birthday celebration, he found examples of how K-State plant pathology research has benefited Kansas and beyond for more than a century.

W.A. Kellerman was the first plant pathologist at Kansas State Agriculture College in 1888, the year after the Kansas Agricultural Experiment Station (KAES) was established. He and W.T. Swingle studied cereal rusts and smuts and concluded that the most reliable method of rust control would be through breeding for resistance. Following this, J.F. Roberts entered into wheat breeding, and the variety Kanred was distributed by KAES in 1917.

The Department of Botany and Plant Pathology was formed in 1919. Because of a severe cereal rust problem, the U.S. Department of Agriculture centered its national wheat leaf rust project in the department in 1932.

K.A. Stokdyk, the first full-time plant pathology extension specialist, aggressively developed crop shows and disease crop tours, as well as campaigns for promotion of chemical control of potato diseases and wheat bunt.

One of the department's early disease control successes involved using a combination of seed treatment, resistance, and effective extension programs to eliminate bunt, a significant disease of Kansas wheat.

Another early achievement was the complete elimination of milo disease, once a scourge of sorghum in the southwestern plains.

The Plant Disease Diagnostic Lab will celebrate its 50th anniversary in 2014. It was established in 1964 to serve the county extension agents and other Kansas citizens with needs for plant disease identification.

Plant pathology became a stand-alone department in 1967. It was originally housed in Dickens Hall, and then moved to Throckmorton Hall when it was built in 1981.

Professor Erick De Wolf, lower right, participates in a Fusarium Laboratory Workshop session in a Throckmorton Plant Sciences Center classroom.

In the early 1980s, department head Jim Shephard began actively recruiting scientists with expertise in genetics and the molecular basis of plant pathogen interactions, providing basic scientific expertise to reinforce the existing expertise in applied science. Continuing this approach enables integrated research within the department to address diseases at both fundamental and applied levels, with the goal of obtaining more effective control.

The Kansas Board of Regents formally designated the Wheat Genetics Resources Center as a Center of Excellence in 1984. Currently, it has about 11,500 breeding lines of wheat and its wild relatives that are available to researchers around the world.

The department serves as the regional hub of the nine-state Great Plains Diagnostic Network, which is part of the National Plant Diagnostic Network. The networks were established after the September 2001 terrorist attacks to enhance agricultural security.

The Fusarium Laboratory Workshop teaches identification techniques for one of the most important groups of plant and human pathogens. The workshop has been at K-State every other year since 2000, with alternate years outside the United States.

"All but two current faculty were recruited to K-State at the beginning of their careers as assistant professors. They have grown and matured in Kansas, with Kansas crops and the needs of the state directing the research questions they ask and answer," said John Leslie, department head.

"With the department's recent No. 1 national ranking, it is clearly possible to recruit the best young scientists to K-State and to retain them through competitive salaries and working conditions.

"The major challenge in the coming years is to retain the department's top national billing and to strengthen its reputation for excellence in graduate education, research, and extension. Our goal is to draw the best students and scientists in the world to Manhattan to study and learn from some of the best scientists in the world. Together they will help make Kansas agriculture even more productive and further reduce vulnerabilities to the entire gamut of plant diseases."

For more information see *www.plantpath.ksu.edu.*