April 2016

Detect and Defeat

Pat Melgares
Kansas State University

Follow this and additional works at: https://newprairiepress.org/seek

Part of the Higher Education Commons

This work is licensed under a Creative Commons Attribution-Noncommercial-No Derivative Works 4.0 License.

Recommended Citation
Melgares, Pat (2016) "Detect and Defeat," Seek: Vol. 6: Iss. 1.

This Article is brought to you for free and open access by New Prairie Press. It has been accepted for inclusion in Seek by an authorized administrator of New Prairie Press. For more information, please contact cads@k-state.edu.
Kansas State University researchers take aim at deadly swine diseases

Late in 2015, scientists at Kansas State University and the University of Missouri delivered news that likely had swine producers worldwide rejoicing: The researchers had developed pigs that are resistant to porcine reproductive and respiratory syndrome, the most devastating disease in the industry.

Known as PRRS, the disease has wreaked havoc on swine operations to the tune of $10 billion over the last 20 years. It is estimated that the disease robs the swine industry of $600 million each year.

So pardon Raymond “Bob” Rowland if the universities’ discovery seemed surreal. The professor of diagnostic medicine and pathobiology at Kansas State University has studied this disease for more than 20 years, nearly his entire professional career.

“I always thought that it would be a generational problem,” Rowland said. “That is, it wouldn’t be solved by me, but probably by the next generation of scientists.”

Resistant pigs are ‘game changer’

It took Randall Prather, a professor of animal science at the University of Missouri, 10 years to genetically engineer pigs so that they would lack a critical protein that seemed to make the pigs susceptible to PRRS.

“Some people think it may take 20 years,” Prather said. “But we were able to do it in 10.”

Staff in Kansas State University’s Large Animal Research Center challenged the pigs in a research setting with the PRRS virus.

“Our first experiment was with the CD 169 protein, but it turned out that was not the molecule,” Rowland said. “We moved on to CD 163 and we found almost immediately that it not only was the right target, it was black and white. When we saw the data, it was very clear that we had the desired result.”

The scientists may be able to apply the same concepts to other diseases, Rowland said. At Kansas State University’s Biosecurity Research Institute and the Department of Homeland Security’s National Bio and Agro-defense facility, which is under construction adjacent to campus, Rowland sees numerous opportunities to continue research that benefits animal well-being, supports industry and helps meet the global demand for animal protein.

“It’s a unique way of tackling viral disease. It is truly a game changer.”

University relentless in solving PRRS

It shouldn’t come as much of a surprise that Kansas State University researchers were part of the breakthrough on PRRS. In terms of a commitment to research of that disease, “we own PRRS,” said Rowland. “There are a lot of groups in the U.S. doing research in this area, but for
An estimated 6 million head and $8 billion in the beef and dairy industries are expected to be impacted by the disease in the coming years.

In Kansas, cattle and calves dominate agricultural production. That was funded for $4.8 million, and set the stage for some of the early research work on PRRS.

In 2008, the U.S. Department of Agriculture selected Rowland as project leader of the multistate PRRS coordinated agricultural project. The project was funded for $4.8 million, and set the stage for some of the early research work on PRRS.

In a state known for beef, pig research thrives

In Kansas, cattle and calves dominate agricultural production. That industry is booming, with an estimated 6 million head and $4 billion in cash receipts each year. But even in that environment, Kansas State University has staked itself as a leader in the U.S. swine industry.

Recently, a university swine nutrition team announced that they are making steady progress in developing improved diets for pigs, a science so exact that even a 1 percent improvement in feed efficiency can translate into $100 million of added profit to the industry.

“A first goal is to save feed and then reduces costs for producers, which ultimately reduces the cost of pork to consumers,” said Mike Tokach, university distinguished professor of animal sciences and industry. “This is extremely important because feed and ingredients are not normally considered a vector in transmitting diseases.”

In early 2016, Hause’s lab also reported the first formal report of porcine parainfluenza virus 1 (PPV-1) from U.S. pigs, which had previously only been detected in the U.S. in 2014.

“While we established that feed and food ingredients may act as a vector to transfer the virus,” said Kansas State University’s Jason Woodworth, assistant professor, “nothing we do to improve feed efficiency reduces the amount of feed that producers use to feed their pigs.”

“As researchers, we are free to pursue the problems that we want to pursue, the problems that will do the most good,” he said. “It’s not just studying a virus, it’s a multidisciplinary approach. It’s not just studying the biology of the virus.”

In 2014, Benjamin Hause, an assistant professor, led a research team that identified a new porcine epidemic diarrhea virus (PEDv) in North Carolina. In pigs, the virus is similar to Parkinson’s disease in humans.

“Europeans have been dealing with the porcine epidemic diarrhea virus, or PEDs, since the 1970s, but it wasn’t until 2014 that the costly disease was discovered in a U.S. herd. Some estimates indicate that 8 million pigs died due to the virus in 2014.

“We have established that feed and food ingredients may act as a vector to transfer the virus,” said Kansas State University’s Jason Woodworth, assistant professor of animal sciences and industry. “This is extremely important because feed and ingredients are not normally considered a vector in transmitting diseases.”

In the university’s Veterinary Diagnostics Laboratory, Benjamin Hause, an assistant professor, led a research team that identified a new porcine epidemic diarrhea virus (PEDv) in North Carolina. In pigs, the virus is similar to Parkinson’s disease in humans.

“Europeans have been dealing with the porcine epidemic diarrhea virus, or PEDs, since the 1970s, but it wasn’t until 2014 that the costly disease was discovered in a U.S. herd. Some estimates indicate that 8 million pigs died due to the virus in 2014.

“We have established that feed and food ingredients may act as a vector to transfer the virus,” said Kansas State University’s Jason Woodworth, assistant professor of animal sciences and industry. “This is extremely important because feed and ingredients are not normally considered a vector in transmitting diseases.”

In the university’s Veterinary Diagnostics Laboratory, Benjamin Hause, an assistant professor, led a research team that identified a new porcine epidemic diarrhea virus (PEDv) in North Carolina. In pigs, the virus is similar to Parkinson’s disease in humans.

“Europeans have been dealing with the porcine epidemic diarrhea virus, or PEDs, since the 1970s, but it wasn’t until 2014 that the costly disease was discovered in a U.S. herd. Some estimates indicate that 8 million pigs died due to the virus in 2014.

“We have established that feed and food ingredients may act as a vector to transfer the virus,” said Kansas State University’s Jason Woodworth, assistant professor of animal sciences and industry. “This is extremely important because feed and ingredients are not normally considered a vector in transmitting diseases.”

In the university’s Veterinary Diagnostics Laboratory, Benjamin Hause, an assistant professor, led a research team that identified a new porcine epidemic diarrhea virus (PEDv) in North Carolina. In pigs, the virus is similar to Parkinson’s disease in humans.

“Europeans have been dealing with the porcine epidemic diarrhea virus, or PEDs, since the 1970s, but it wasn’t until 2014 that the costly disease was discovered in a U.S. herd. Some estimates indicate that 8 million pigs died due to the virus in 2014.

“We have established that feed and food ingredients may act as a vector to transfer the virus,” said Kansas State University’s Jason Woodworth, assistant professor of animal sciences and industry. “This is extremely important because feed and ingredients are not normally considered a vector in transmitting diseases.”

The $5 million project is funded through 2017 by the National Institute of Food and Agriculture. In another project, Kansas State University researchers are hoping to take down a deadly virus that is said to have a 100 percent mortality rate in piglets under 7 days old.

PRRS, sometimes called bluestem pig disease, is a virus that causes reproductive failure in breeding stock and respiratory tract disease in young pigs.

In 2008, the U.S. Department of Agriculture selected Rowland as project leader of the multistate PRRS coordinated agricultural project. The project was funded for $4.8 million, and set the stage for some of the early research work on PRRS.

In 2008, the U.S. Department of Agriculture selected Rowland as project leader of the multistate PRRS coordinated agricultural project. The project was funded for $4.8 million, and set the stage for some of the early research work on PRRS.