DISCOVERIES

The Pig's Pandemic

In the U.S., many outside the agricultural world have never heard of African Swine Fever. However, this deadly-to-pigs infection offers an example of how devastating—and hard to fight—viral diseases can be.

By Kelli Billstein

ILLUSTRATION CREDIT: LINCOLN AGNEW

Unfortunately, COVID-19 isn't the only pandemic on the planet these days.

In recent years, another viral disease known as African Swine Fever has spread swiftly throughout much of the world, and especially across China, where it has killed 50 percent of the country's pigs. The disease—which only affects pigs—is not dangerous to humans, but it provides an illustration of how difficult treating and mitigating viral pathogens can be.

The ASF virus—which is not related to COVID-19—is, however, also highly contagious. It can wipe out entire herds of hogs in a matter of days with up to a 100 percent mortality rate.

As its name implies, ASF first appeared in Africa in 2007, where it's thought to have originated in wild hogs. From there, ASF spread into parts of Europe, South America, and the Caribbean. Since its appearance, it has been reported in multiple countries across Africa, Asia, and Europe in both domestic and wild pigs. To date, it has not appeared in the U.S., although many fear it may do so one day. If it does, it would be devastating to pork producers across the country, which is why researchers have been studying it intently for years.

In August 2018, one of scientists' worst fears became a reality: ASF developed a strong foothold in China, the world's largest consumer and producer of pork. Despite efforts to contain and control the outbreak by culling entire herds and disposing of affected pigs, ASF still swept across the country. It resulted in the devastating loss of an estimated 50 percent of China's pigs, and consequently 25 percent of the world's supply of pork.

Gordon Spronk (D.V.M. '81), president and CEO of Pipestone, an agribusiness specializing in animal health and operations for farmers, has made more than 300 trips to China to observe ASF firsthand. He doesn't mince words. "ASF is a different virus than any of us—veterinarians or producers—has ever dealt with in North America," Spronk says. "It's the worst virus that pigs can be infected with in the world. If you get the deadliest strain, up to 100 percent of the pigs die. We can't say that with any other virus. This is the worst animal welfare situation you'll probably ever see."

Not only does ASF lead to the worst-case animal welfare scenario, it also has serious implications for the economy. Pork accounts for more than one-third of meat produced worldwide and is an important component of global food security, agricultural economies, and trade. (The recent closure of hog-processing plants in the U.S. because of COVID-19 infections among workers has also demonstrated this fragility within the food chain.)

The struggle that China is going through to fight the spread of ASF is also a reminder of how hard it is to stop a deadly disease from reaching wildfire proportions. And while vaccines are being developed, no definitive one is on the market yet.

John Deen, D.V.M., a Distinguished Global Professor in the Department of Veterinary Population Medicine, specializes in the epidemiology of swine diseases and swine health. He points out that outbreaks grow as a result of human behavior. "When you try to control an outbreak, you have to recognize that you're fighting against nature," Deen says. "We have to ask ourselves how we must change our behavior so that we're not inadvertently supporting the epidemic."

Transportation of pigs across long distances is a prime example of human behavior that spreads ASF. Because this virus transmits through live pigs and pork products (even frozen pork) and can remain infectious over long periods of time, the need to halt transportation to contain an outbreak is paramount. In March, the USDA announced that if any cases of ASF are found in the U.S., all shipment of pigs will be fully stopped for at least three days.

For Deen and other researchers at the College of Veterinary Medicine, biosecurity is a big focus. They're looking closely at how to keep viruses and harmful bacteria out of pig populations and recommend that farmers install air filtration systems in barns. This and careful sanitation and clean equipment are good disease-prevention methods. Deen also researches how viruses like ASF get transmitted from one pig to another and across herds, and he develops models to understand webs of interconnectivity that spread disease across populations. Preparedness in the event of an outbreak still keeps him up at night.

"Pig farmers in North America are reliant on exports to maintain a viable enterprise, and we're selling in excess of 25 percent of pork outside the U.S. If an agent such as ASF is recognized in pigs in the U.S., it would shut down a lot of those markets and collapse the price for pork products," Deen says. "We have to ask ourselves, can it happen? Have we identified all the potential points of entry? Frankly, we haven't, but what can we do?"

Deen still offers reassurance, suggesting that compared to China, the U.S. would be better able to quickly respond should ASF ever be detected here. The U.S. also has a stronger diagnostic capability for the disease, he says, and is already carefully monitoring for its presence. Further, authorities have already put a plan in place to shut down all movement if ASF appears.

"We have to have a vision that we can keep ASF out of the U.S.," Spronk says. "We have to be intentional about how we behave and make decisions. Set it in your mind: We are going to keep ASF out of our national herd."