

Maddie Fugate
Mahomet-Seymour High School
Mahomet, Illinois
Poland, Factor 4: Animal Health

Poland: Present and Future Methods of Eradicating African Swine Fever

When many Americans think of Poland, they think of a history of strife and unspeakable atrocities committed there during past wars. However, few know that Poland is the tenth largest pork producing country in the world with a dynamic agriculture industry that is critical to feeding not only the Polish population but also surrounding Eastern European countries that desperately need the pork (Top 10 Pork Producing Countries). The average Pole consumes 39.5 kilograms of pork a year or around 87 pounds, but this number could soon change due to a deadly disease (Global Meat Production). African Swine Fever (ASF) first reared its ugly head in the region when it broke in Belarus but in February of 2014, Poland had their first signs of the deadly disease. The first signs of this disease started in wild boars in a region near the border Belarus and spread quickly to domestic swine. There is grave concern that this disease could reach epidemic proportions and might decimate the agricultural infrastructure in Eastern Europe (African Swine Fever Virus Detected in Poland).

It is most concerning that many Polish farmers rely on raising pigs as a chief source of income and pork is a staple of many Polish dishes. Meat is a very important part of the Polish diet and the most widely consumed meat in Poland and for that matter around the world is pork (Food in Every Country). In Poland, pork is normal served as cutlets that are sometimes breaded. However, sausage and bacon are found in a majority of traditional Polish dishes. This is evidenced in many places around the world that boast that they serve authentic Polish sausage (Food in Every Country). Sadly, the Poles diet may be under drastic change due to African Swine Fever. In June of 2016 alone there were over 261 pigs killed due to this devastating disease. The average hog produces 371 servings of pork meaning that in the month of June over 96,831 servings of pork were lost just due African Swine Fever. This doesn't sound like a big deal until you realize that most of the Polish pork farms are very small and family owned and 261 pigs would be the sum total annual production as many as 10 producers (Poland reports New ASF Outbreaks).

This disease can have a huge impact on the Polish supply of food and the native farmer's ability to earn a living since in Poland 60.57 percent of the population lives in urban areas. Compare that to Americas 80.7 percent or even Ukraine at 72 percent urban residency (Urban Population). The real difference between Poland and other similar countries is that 16 percent of the 38.5 million residents are involved in the agricultural industry and rely on production of food as the primary source of their income. That is quadruple the rest of European Union that averages around 3 to 4 percent agricultural employment. The importance of the swine industry to Poland's economy is even more critical when you consider that Poland exports over \$883 million in pork products a year and only 12 percent of that pork is raised by farms with over 1,000 sows (Poland-Agriculture). In Poland, the average number of pigs per farm is 29, which is considerably different when compared to Denmark at 1,165 pigs per site or the Netherlands at 1,014 pigs on-site (Pig Farming in Poland Today). As you can see, the majority of Poland's pork production comes from small family owned farms or backyard operations used to provide food for local families. The average Polish swine farm accounts for 75 to 90 percent of the farms income so euthanizing a farm infected with African Swine Fever will damage a Polish family farmer's ability to make a living. Diseases like African Swine Fever will likely destroy much of the Polish

swine industries infrastructure if allowed to become an epidemic and remedies aren't found to slow down the infection rate (African Swine Fever).

The nature of the size and scope of the farms and the reliance on local food supplies is where the problems begin. African Swine Fever has a nearly 100 percent mortality rate. The disease not only affects the live animal but also the carcasses, which leaves crippling effects for small farm and restricts the ability of the infected country to export the "tainted" carcass to other countries (African Swine Fever). As of now, Polish farmers use biosecurity techniques and whole herd eradication as means to solve this disease since there is no vaccine or treatment currently available for the disease.

African Swine Fever is a highly contagious viral disease of pigs. The virus originated in Africa, but outbreaks have occurred in Europe, South America, Asia, and the Caribbean. African Swine Fever has been eradicated from the Western Hemisphere and has never occurred in the U.S. The disease has severe animal health and economic consequences, including export ban, movement restrictions, depopulation, and strict control measure will be necessary to eradicate the disease (Unexpected Epidemiology).

African Swine Fever has spread across much of Eastern Europe in recent years. It has been present in Russia since 2007, affecting wild boars and domestic pigs, and has spread in large parts of the country. Russia reported around 400 outbreaks due to ASF with approximately 12,500 cases in domestic pigs (out of 500,000 susceptible pigs) and 600 cases in wild boars since 2007. The Ukraine reported African Swine Fever in 2012 and in 2014. In 2013, Belarus identified two outbreaks of African Swine Fever, one of them very close to the border with Lithuania and Poland and reported 27 cases in wild boars. Poland reported the first case of ASF in wild boars in February of 2014 but soon spread to domestic herds. The protocol in Poland is to euthanize all of the pigs on an infected farm and this began with the termination of all animals in an infected farm in 2014 as well as testing of all swine within a 20-mile radius of the infected herd. In addition, to date 21 wild boar populations as well as four domestic pork production sites have tested positive for ASF (BMC Veterinary Research). The concern is that infection with ASF seriously hinders Poland's ability to export pigs and pork which are a vital part of the agricultural economy. Poland was banned from exporting swine to neighboring countries and the United States after the first domestic case, which significantly hindered producer's ability to profitably raise swine in their country. In 2014 China banned the import of Polish pork after the first two wild boar cases were confirmed since half of the globe's pork resides in China and their government feared "vast losses" if ASF were to take hold in the country. This could result in an annual loss of \$92 million dollars in import of Polish pork from the Chinese ban. In addition, Russia followed suit and also banned Polish exports and this became equally concerning since Russia consumes over one fourth of all the pork exported from the EU. The Polish economy is dependent on pork exports since it returns \$1.2 billion in annual exports and bans like China and Russia could devastate the Polish pork industry. It is imperative to find solutions to prevent the spread of this disease to find ways to restore pig health in European farms to increase the production of the much-needed protein and return global confidence in the safety and healthiness of the Polish pork supply (Mikesell).

To date there has not been an effective vaccine developed to prevent the infection of African Swine Fever so most of the protocols to stop the spread of the disease were to encourage producers to improve biosecurity and minimize the potential contact between feral pigs and their domestic counterparts. However, there has been breakthrough research reported in the UK that involves utilizing innovative gene editing technology to insert the DNA from a wart hog into common farm stock and makes domestic hogs immune to African Swine Fever (BMC Veterinary

Research). Even with biosecurity and up and coming technology Poland has requested more European Union involvement in controlling this deadly disease. Poland is also calling for financial aid for those countries trying to eradicate African Swine Fever (Linden).

African Swine Fever is spread through multiple vectors such as: ticks, bodily fluids and excretions, uncooked pork, as well as fomites. Due to the number of vectors for this disease increased biosecurity education and implantation is needed (African Swine Fever). In Poland, some common measures taken as of now are segregation, cleaning, and disinfecting. Unfortunately, due to the genetic makeup of African swine fever few disinfectants can render the disease inactive. By informing Polish producers on disinfectants tested to kill the virus proper disinfecting may take place. Known disinfectants that are effective in inactivating the disease include Sodium Hypochlorite, Citric Acid (1%), and some Iodine compounds. Another easy biosecurity measure to be taken is proper carcass disposal and outlawing the use of feeding pork-derived byproducts in pork production. This will be a key component in stopping the spread of this disease because many outbreaks happen due to condemned carcasses. Also limiting vectors like fomites transported to the farm on vehicles can greatly reduce the spread of African Swine Fever. Restricting vehicle entry has played a great role in the United States in stop the spread of Porcine Epidemic Diarrhea, another viral epidemic, and educating Polish producers on the lessons learned in the United States can only improve the national pig herd health. Producers must understand that biosecurity at times like these must be a priority to reduce the impact of this deadly disease on swine infrastructure in Poland (Poland Making Progress on ASF Control). The government must step in and educate producers on establishing clean and dirty sides of their farms and help them understand that it important to assess factors that increase the spread of diseases on their farms and help them find ways to minimize transmission. This will involve removing the presence of wild animals, pests and rodents from their operations and encouraging producers to change clothing and footwear before entering the production facilities.

Biosecurity improvements is the short term solution to slow do the spread of diseases in the Polish Agricultural Sector but there is developing technology that will be available in the near future that can make African Swine Fever extinct. British scientist determined that African wart hogs were essentially immune to African Swine Fever. The virus still infected them but did not express any symptoms or harm from the disease. Essentially, Wart Hogs have an immune system that recognizes the infection in ASF but doesn't mount the massive immune response that is seen in domestic hogs. So the wart hogs essentially don't respond to the infection in a way that causes overstimulation like common farm swine. The scientists were able to extract the DNA from the wart hog that made it resistant to ASF and insert that into the DNA of commercial swine breeding stock. This technology is known as gene editing and it is hoped that it will be the future of eliminating many diseases in livestock, which impedes global farmer's abilities to maximize meat production (Devlin). Gene editing technology essentially mimics the process of natural selection and natural genetic mutation (Sachs). This will allow little public concern over the negative images we have historically seen from GMO's debates. This differs from other gene modification since the new techniques overcomes three major objections to Genetic Modifications in the past: the use of viruses to "carry" genetic changes into the pigs' cells, the need to use antibiotic resistance genes in the modification process, and the need for cloning. The expected timeline for availability of the resistant pigs in commercial production is five to ten years and these pigs have the potential of revolutionizing the global swine industry and ultimately making farmers capable of producing more pork to feed the growing world (BMC Research Notes). In addition to African Swine Fever researchers have made great strides in developing pigs that are resistant to other diseases like Porcine Reproductive and Respiratory Syndrome (PRRS) and Psuedorabies. It is critical that we continue to make strides in disease resistance technology since producers are being asked to reduce the use of antibiotics in their systems making it imperative to develop ways

to prevent diseases from infecting the pigs or creating genetics that are incapable in being infected. It is also critical to make this resistance technology cost effective so that producers of all sizes in all countries can take utilize it (Sachs).

The use of gene editing in Poland will allow farmers to source boars and gilts that will be resistant to ASF and will give farmers peace of mind that they will be able to continue to produce healthy and profitable pork. The Polish agricultural community will undoubtedly have to create a cooperative mentality to allow for producers to source these genetics since they will probably cost a premium over other less high tech genetic options (Devlin). The size and scope of the average Polish swine farm will necessitate that groups are formed that purchase ASF resistant boars and place them in a community stud that allows access for many small producers that are geographically close. Establishing a population of commercial swine that is resistant to ASF will open up export opportunities and insure that honest to goodness Polish sausages can be purchased by hungry consumers all over Europe. These resistant hogs will allow consumers to have peace of mind that the pork they consume is the healthiest of any protein source and should assist in reducing costs in pork production that have historically risen while attempting to prevent and treat diseases (Devlin). This reduction in cost will allow for pork to remain as an inexpensive protein source and will keep consumer demand at a high level. The adoption of high tech pork will improve the quality of life for the Polish swine producers and will also give consumers a tasty and nutritious food source.

Works Cited

- Adamowski, Jaroslaw. "Poland's Pork Exports on the Rise." *The Pig Site*. N.p., 12 July 2016. Web. 22 July 2016.
- "African Swine Fever." - *European Commission*. N.p., 14 July 2016. Web. 22 July 2016.
- "African Swine Fever Virus Detected in Poland." *The Pig Site*. N.p., 19 Feb. 2014. Web. 24 July 2016.
- "African Swine Fever: Unexpected Epidemiology Fuels Spread into the European Union." *Animals People Pathogens*. N.p., 18 July 2016. Web. 22 July 2016.
- "BMC Research Notes." *A Study of Alternative Splicing in the Pig*. N.p., 15 Mar. 2010. Web. 22 July 2016.
- "BMC Veterinary Research." *African Swine Fever Virus Transmission Cycles in Central Europe: Evaluation of Wild Boar-soft Tick Contacts through Detection of Antibodies against Ornithodoros Erraticus Saliva Antigen*. N.p., 4 Jan. 2016. Web. 22 July 2016.
- Devlin, Hannah. "Could These Piglets Become Britain's First Commercially Viable GM Animals?" *The Guardian*. Guardian News and Media, 23 June 2015. Web. 22 July 2016.
- "Global Meat Production and Consumption Continue to Rise." *Worldwatch Institute*. N.p., 24 July 2016. Web. 25 July 2016.
- Linden, Jackie. "Poland Calls for More EU Action on African Swine Fever." *WATTAgNet RSS*. N.p., 16 Feb. 2016. Web. 22 July 2016.
- Mikesell, Sarah. "Poland's Agriculture Industry - Pig Production Down, Dairy Booming." *The Pig Site*. N.p., 24 June 2015. Web. 22 July 2016.
- "Pig Farming in Poland Today." - *Pig Farming Facts*. N.p., n.d. Web. 22 July 2016.
- "Poland." *Poland*. N.p., n.d. Web. 22 July 2016.
- "Poland." *Food in Every Country*. N.p., n.d. Web. 22 July 2016.
- "Poland - Agriculture." *Poland Agriculture, Information about Agriculture in Poland*. N.p., n.d. Web. 22 July 2016.
- "Poland Making Progress on ASF Control." *The Pig Site*. N.p., 28 July 2015. Web. 22 July 2016.
- "Poland Reports New ASF Outbreak in Pigs." *The Pig Site*. N.p., 28 June 2016. Web. 24 July 2016.
- Sachs, David H., and Cesare Galli. "Genetic Manipulation in Pigs." *Current Opinion in Organ Transplantation*. U.S. National Library of Medicine, 14 Apr. 2009. Web. 22 July 2016.
- "Top 10 Pork Producing Countries." *Top 10 Pork Producing Countries*. N.p., 9 Feb. 2016. Web. 22 July 2016.

"URBAN POPULATION (% OF TOTAL) IN POLAND." *URBAN POPULATION (% OF TOTAL) IN POLAND*. N.p., n.d. Web. 22 July 2016.