



World's Largest Pork Producer in Crisis: China's African Swine Fever Outbreak

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AFTER SUFFERING a major blow from trade disruptions with China and Mexico, US pork producers are keeping close watch on African Swine Fever (ASF) in China and other countries. The first case of ASF in China was confirmed August 2, 2018 in the northeastern city of Shenyang. According to our information, by the end of October 2018, there were 45 cases of ASF in China with 5,439 pigs infected and 3,841 pigs dead ([download the ASF cases in China as an Excel file](#)).

On the one hand, if ASF spreads to the United States it would devastate US pork exports. On the other hand, ASF may create a pork shortage in China, the largest pork producer and consumer in the world. Even though directly exporting from the United States to China is curtailed by the trade war, China may import pork from other countries and regions such as Canada and the EU, allowing the United States to backfill into these markets.



In this article we introduce the background and current developments of the ASF outbreak in China and discuss the impacts on production, prices, and international trade.

Background

ASF is a highly contagious disease that affects domestic and wild pigs of all ages. Infected animals usually experience high fever, anorexia, lethargy, weakness, and recumbency, and most die within 10 days (Center for Food Security and Public Health 2018). The disease "... is transmitted directly during contact between infected and susceptible pigs, by consumption of the meat from infected pigs, by the bites of infected tsetse flies (*Ornithodoros spp.*), and by contact with material or objects (bedding, feed, equipment, clothes and footwear, vehicles) contaminated by virus-containing matter such as blood, feces, urine or saliva from infected

pigs." (Penrith and Vosloo 2009, pg. 59) So far, there is no vaccine or treatment for ASF.

ASF first occurred in Africa in the early 1900s and spread to Europe in the 1950s. Before the outbreak in China, ASF had been active in East Europe and Russia and caused massive economic harm, accounting for over 800,000 hog deaths from 2007 to 2017 in Russia alone (Kolbasov et al. 2018). The source for the recent ASF outbreak in China is not clear, but it is the same strain prevalent in Russia (Zhou et al. 2018). Beyond China, ASF has recently been discovered in Poland, Latvia, Ukraine, Romania, Moldova, Belgium, Russia, and Bulgaria (The Pig Site 2018).

Current Developments of ASF in China

The first case of ASF in China was discovered in the northeastern province of Liaoning in early August, 2018. From August to late September, there

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were scattered cases throughout northern and central China, and eight concentrated cases in Anhui province in southern China. At the end of September, ASF cases started to reoccur in Liaoning Province, eventually hitting the region with a string of 11 cases. The first ASF cases reached the southwestern province of Yunnan in the second half of October. In terms of inventory, Yunnan was the fifth-largest hog producing province in 2016, while its neighboring province, Sichuan, was the largest (National Bureau of Statistics of China 2018).

As the disease progressed, it started to affect larger producers. All of the producers in cases before October had less than 1,000 pigs in their inventory. However, seven cases in October involved producers with more than 1,000 pigs, and the three largest producers in these cases had 19,938, 7,684, and 6,640 hogs ([download the ASF cases in China as an Excel file](#)). The fact that the disease reoccurred in a province that was already on high alert, and infected large commercial producers that supposedly had better biosecurity measures, is worrying. The total hog inventory involved in ASF cases has reached at least 60,592, with cases in October accounting for 89 percent ([download the ASF cases in China as an Excel file](#)).

Chinese Government's Response

The Chinese government's major responses can be summarized by the following (MOA 2018a; MOA 2018b; Gao 2018):

1. Quarantine areas are set up within approximately three kilometer

radius of the sites for ASF cases (the exact shape and size depend on natural barriers). All pigs within the quarantine area are euthanized, and no hog or hog products are allowed to leave the quarantine area. No hogs are allowed to enter the quarantine areas. The quarantine is lifted if no new cases are discovered within six weeks. Currently, 13 quarantines have been lifted.

2. So far, it is estimated that about 200,000 pigs have been culled (Reuters 2018). Producers were initially compensated at 800 RMB per head. Compensation was raised to 1,200 RMB per head (sohu.com 2018) in mid-September (current sales price is about 1,350 RMB per hog, assuming body weight of 100 kg).

3. Restrictions on hog product (pork and pork variety meats) transportation: If two or more prefectures (i.e., cities with surrounding rural areas) in a province have ASF, then hog products cannot be shipped outside of that province. There are also within-province shipping restrictions.¹
4. Restriction on hog transportation: Provinces with ASF cannot ship live hogs outside their borders. Adjacent provinces cannot ship live hogs in or out of the affected provinces' borders. Cross-province hog transportation cannot go through provinces with ASF. There are also within-province shipping restrictions.²
5. Restrictions on slaughtering and live hog markets: Slaughter houses

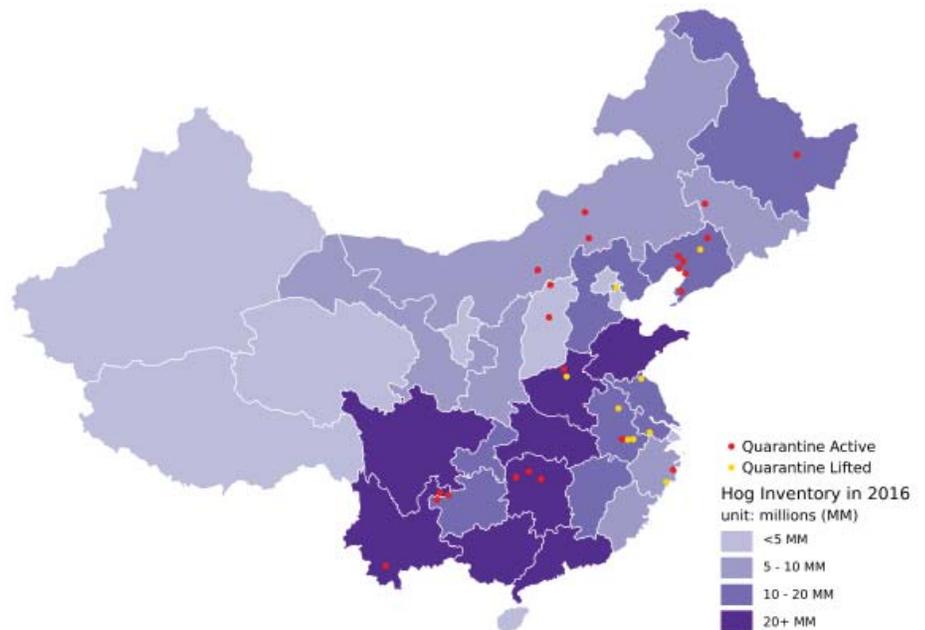


Figure 1. Locations of ASF outbreaks from 08/02/2018 to 10/30/2018.

Source: Data gathered by authors from disclosure announcements by the Chinese government.

¹If a county (prefecture) has one case of ASF, then this county (prefecture) can only ship hog products within the prefecture (province). If a county has two or more cases, transporting hog products from that county are forbidden all together, and other counties in the same prefecture cannot ship outside of the prefecture. For a prefecture, if two or more of its counties have ASF, then shipping outside of that prefecture is forbidden.

²For a given geographical unit (county, prefecture, or province), one ASF will cause a ban on transporting hogs outside of that geographical unit. If two or more of its sub-divisions have ASF (i.e., two counties in a prefecture or two prefectures in a province), shipping across sub-divisions will be banned. Furthermore, all cross-province hog transportation is banned in provinces adjacent to provinces with ASF.

are closed in provinces with ASF. Live hog markets are closed in provinces with ASF and adjacent provinces.

- Feeding hogs with food waste has been banned nationwide.

Despite the government's active response, challenges remain. First, the transmission channel is not entirely clear, making it difficult to form effective policy responses. Second, the prevalence of backyard producers means high monitoring cost. Third, the restrictions on the movement of pork products are more relaxed compared to those on the transportation of live hogs. Since the ASF virus can survive up to 150 days in refrigeration (Center for Food Security and Public Health 2018), the shipment of hog products posts a significant risk.

Current and Potential Economic Impacts

China accounts for about half of the world's pork consumption. Ninety-seven percent of the pork that China consumes is produced domestically (authors' calculation using data from the USDA PS&D database). Therefore, a relatively small shortage in China can cause a large increase in the demand for pork imports. Currently, the leading pork exporters to China include Canada, Germany, Spain, and Denmark. In the case of a large increase in China's import demand, each country's ability to supply pork to China will depend on the development of ASF in that country. Due to the recent tariff increases (Balistreri et al. 2018), pork products from the United States are not competitive in China. However, if ASF

goes out of control in both China and Europe, there is a chance that China may import from the United States despite the high tariff.

So far, direct damage from culling is about 270 million RMB (assuming a live hog price of 13.5 RMB/kg, average hog weight of 100 kg, and a total of 200,000 hogs culled), or \$37.8 million dollars. Furthermore, the restrictions on cross-province hog transportation have caused regional hog prices to diverge. The restrictions on cross-province hog transportation were first placed on provinces with ASF on August 31 (MOA 2018a), then expanded to adjacent provinces on September 11 (MOA 2018b). So far, cross-province hog transport has essentially ground to a halt. In northeastern China, a pork surplus region where ASF was first discovered, live hog prices dropped 11 percent from August 1 to October 19. In eastern China, which is a major pork consumption region, hog prices increased 16 percent during the same period (Figure 2). The divergence of regional pork prices is even more dramatic between certain regions. For instance, from August 1 to October 19, the price of pork decreased by six percent in northeastern China, increased by 19 percent in eastern China, and increased by 27 percent in western China (Figure 3). Despite the relatively relaxed transportation restrictions on pork compared to those on hogs, it seems that substantial regional pork shortages are starting to develop.

It remains uncertain whether the ASF situation will cause China to import more pork. This will happen if the heavily populated coastal provinces experience increases in pork prices due to restrictions on the movement of pork and hogs. The relative increases in pork prices in the south suggest that this may be imminent. Sources of uncertainties include, but are not limited to, the

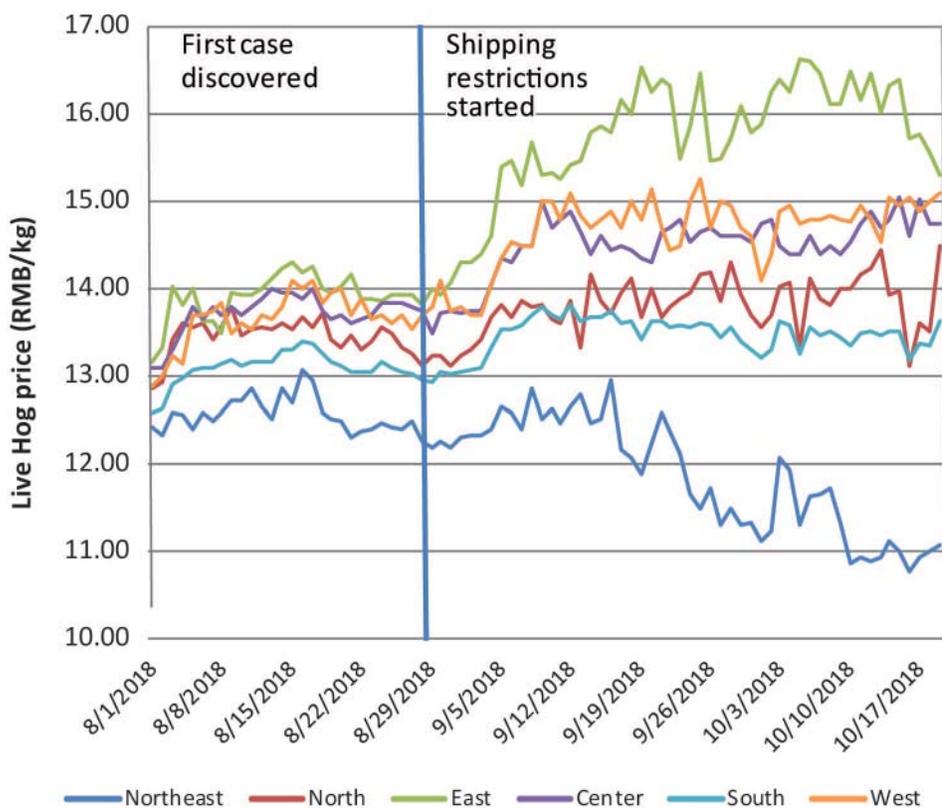


Figure 2. Regional hog price divergence.

Note: Price data are collected from www.zhujiage.com.cn. Regional prices are simple averages of prices in member provinces. Due to data availability, Northeast includes Heilongjiang, Jilin, and Liaoning; North includes Tianjin, Beijing, and Hebei; East includes Jiangsu, Zhejiang, and Shanghai; South includes Guangdong and Guangxi; and, West includes Sichuan and Shanxi.

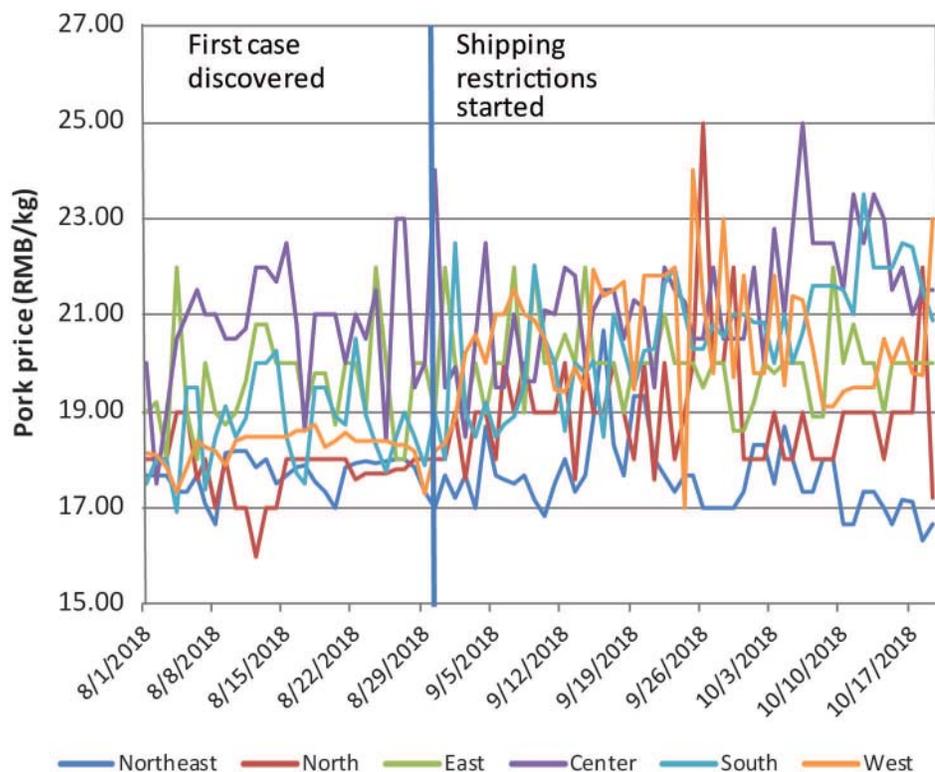


Figure 3. Regional pork price divergence.

Note: Price data are collected from www.zhujijage.com.cn. Regional prices are simple averages of prices in member provinces. Due to data availability, Northeast includes Heilongjiang, Jilin, and Liaoning; North includes Heibei; East includes Jiangsu; South includes Guangdong and Guangxi; and West includes Sichuan and Shan'xi.

further development of ASF in China, producers' responses to low prices in some regions, consumers' food safety concerns and reactions, whether the government will place more or less restrictions on pork transportation, and the development of ASF in Europe, which will affect import availability and price.

References

Balistreri, E. J., C. Hart, D. Hayes, M. Li, L. Schulz, D.A. Swenson, W. Zhang, and J. Crespi. 2018. "The Impact of the 2018 Trade Disruptions on the Iowa Economy." Policy Brief 18-PB 25, Center for Agricultural and Rural Development. Available at: <http://www.card.iastate.edu/products/policy-briefs/display/?n=1281>.

Center for Food Security and Public Health. 2011. "African Swine Fever Fact Sheet." Iowa State University. Available at: http://www.cfsph.iastate.edu/Factsheets/pdfs/african_swine_fever.pdf.

Gao, Y.C. 2018. "The Notification to Further Strengthen the Prevention and Control of African Swine Fever." (In

Chinese). Available at: <http://politics.people.com.cn/n1/2018/1025/c1001-30361142.html>.

Kolbasov, D., I. Titov, S. Tsybanov, A. Gogin, and A. Malogolovkin. 2018. "African Swine Fever Virus, Siberia, Russia, 2017." *Emerging Infectious Diseases* 24(4): 796–798.

Ministry of Agriculture (MOA). 2018a. "The Notification to Reinforce the Supervision of the Transportation of Hogs and Hog Products." (In Chinese). Available at: http://www.moa.gov.cn/ztl/fzwwfk/zcfg/201809/t20180925_6158459.htm.

Ministry of Agriculture (MOA). 2018b. "The Notification to Further Reinforce the Supervision of the Cross-province Transportation of Hogs and Hog Products." (In Chinese). Available at: http://www.moa.gov.cn/govpublic/SYJ/201809/t20180925_6158480.htm.

National Bureau of Statistics of China. 2018. <http://data.stats.gov.cn/>. Accessed in 2018.

Penrith, M. L., and W. Vosloo. 2009. "Review of African Swine Fever: Transmission, Spread and Control." *Journal of the South African Veterinary Association* 80(2): 58–62.

The Pig Site. 2018. "Where is African Swine Fever Now?" Available at:

<http://www.thepigsite.com/swinenews/45429/where-is-african-swine-fever-now/>.

Reuters. 2018. "China has Culled 200,000 Pigs Due to African Swine Fever Outbreaks -Animal Health Official." Available at: <https://www.reuters.com/article/china-swinefever-culling/china-has-culled-200000-pigs-due-to-african-swine-fever-outbreaks-animal-health-official-idUSB9N1WQ01P>.

Sohu.com. 2018. "Ministry of Finance and Ministry of Agriculture: Compensation for Hog Culling for ASF Increased to 1200 RMB/head." (In Chinese, accessed in 2018). Available at: http://www.sohu.com/a/254120311_166411.

US Department of Agriculture Foreign Agriculture Service Production, Supply and Distribution Database (USDA PS&D Database). 2018. Available at: <https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery>.

Zhou, X., N. Li, Y. Luo, Y. Liu, F. Miao, T. Chen, S. Zhang, P. Cao, X. Li, K. Tian, H.J. Qiu, and R. Hu. 2018. "Emergence of African Swine Fever in China, 2018." *Transboundary and Emerging Diseases*. <http://doi.org/10.1111/tbed.12989>. ■