





## Summary: Preliminary analysis of whether mosquitoes can carry and transmit African swine fever Weiyun Qin<sup>1</sup>, Zhongcheng Gao<sup>1</sup>, Shenglong Wu<sup>1,2</sup>, and Wenbin Bao<sup>1,2</sup>\*

Summarized by the MSHMP team

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## **Key Points:**

- African swine fever (ASF) continues to pose a large risk in the absence of safe and effective ASF vaccines
- There is evidence indicating that mosquitos may be a possible ASF vector
- Mosquitos captured at ASF positive farms had DNA extracted and tested for ASF with no positive results

African swine fever (ASF) is known to cause large economic losses to swine producers due to the disease's high infectiousness, swift spread, and high mortality rate. Currently there are no safe and reliable vaccines available for use in swine production facilities. The virus's ability to remain infectious for extended periods of time in the environment, in pork products, and a range of external conditions makes the understanding ASF vectors and transmission routes critical to preventing infection in swine herds. Soft ticks are the main vectors and reservoir hosts for ASF. They facilitate viral replication and can infect pigs over a year after becoming infected. However, there is no current evidence of a direct relationship between soft ticks' occurrence and ASFv spread within Europe and they are environmentally limited within China. The seasonal trend of ASF in Europe, the extended habitats of mosquitoes, and the known ability of mosquitoes to carry a variety of diseases, make it important to better understand if mosquitoes can be ASF vectors. This study investigated the possibility of mosquitoes carrying ASFv in swine farms within China.

## Methods

A total of 463 mosquitoes were collected from five large-scale farms with ASF infections. At each farm 50 to 100 mosquitoes were collected. All insects were identified using stereo microscope and all were cleaned with a 75% ethanol solution, doubly rinsed with phosphate-buffered saline, and stored in liquid nitrogen. DNA was extracted from half of the mosquitoes, checked for concentration and purity, and a probe-based qPCR was used to identify individual mosquito DNA. Next, remaining mosquitoes from the same farm were combined and DNA extracted. Samples were categorized based upon CT value, with  $\leq$  35 being positive, 35-40 as potentially positive, and samples lacking a CT value as negative. Potentially positive samples were retested. The positive control was a standard ASFv strain and negative control was distilled water without DNA.

## **Results and Discussion**

All of the DNA from the mosquitoes collected at the five farms had a CT value of 0, with no ASF DNA detected in any of the samples including the pooled samples for each farm.

To be considered a vector usually requires that the viral DNA can be isolated from the mosquitoes, which was not possible here as the mosquitoes yielded negative ASF results. Whether or not mosquitoes have transmission capacities requires further study. The generally inconclusive literature and reports along with the lack of viral evidence in this study suggest that mosquitoes are not disease vectors for ASF. Furthermore, out of the 155 ASF outbreaks where the epidemic source was identified, 100 (64.5%) of the outbreak were caused by transport of swine or swine products, or by related personnel and vehicles. Since the virus is able to survive for extended periods in external environments, and then be transferred between swine sites via vehicles, people, tools, and swill.

The results found in this study suggest it is unlikely mosquitoes are heavily involved in the transmission of ASF. Still, swine sites should continue to follow and plan mosquito control procedures since mechanical transmission cannot be conclusively ruled out. ASF prevention measures should continue to focus on people, vehicles, and supply at the farm, since these avenues of entry are much more common means for ASF to enter a site.

Find the paper at: https://doi.org/10.1186/s12917-021-02865-2



