

African swine fever

How it occurs and how to control?

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African swine fever is a highly contagious haemorrhagic viral disease of domestic and wild pigs, which is responsible for serious economic and production losses. This disease can affect pigs of any age showing high mortality rates. The key clinical signs include blue purplish cyanotic snout, ears, tail and lower legs, high fever and heavy discharge from eyes and nose. As no vaccines are developed till now, strict hygienic and control measure should be taken to control the disease and in case of outbreak, veterinarians should be consulted immediately.

Keywords: African swine fever, Contagious, Haemorrhagic, Pig, Vaccine, Viral disease

What is African swine fever?

African swine fever (ASF) is a viral disease of pig and wild boar that is usually deadly that can spread very rapidly in pig herd. There are neither vaccines nor cures. For this reason, it has serious socio-economic impacts in affected countries. Humans are not susceptible to the disease. African swine fever virus (ASFV) is a large, double-stranded DNA virus in the *Asfarviridae* family. It is the causative agent of African swine fever (ASF). The virus causes a *hemorrhagic fever* with high mortality rates in domestic pig; some isolates can cause death of animals as quickly as a week after infection. It persistently infects its natural hosts, warthogs, bushpigs and soft ticks of the genus *Ornithodoros*, which likely act as a *vector*, with no disease signs. ASFV replicates in the *cytoplasm* of infected cells. It is the only virus with a double-stranded DNA genome known to be transmitted by *arthropods*.

The disease occurs in many African countries, outbreaks have also occurred in other parts of the world, including Central and Eastern Europe, Eurasia (Russia and the

Caucasus region), and China. Cases have occurred in the Western Hemisphere (South America, the Caribbean) but are now eradicated. ASF has never occurred in the U.S. In 28 April 2020, India reported the first ASF disease outbreak in Assam and Arunachal Pradesh. It has been said that the disease is being spread transboundarily from China. According to the data available with the veterinary department, over 2,500 pigs have been recorded dead from the 6 affected districts so far

in Assam. ASF has serious animal health and economic consequences, including export bans on pig and pork product. Movement restriction, herd depopulation, and other strict control measures are necessary to eliminate the disease in affected areas.

Species prone to African swine fever

Members of the *suidae* family, including domesticated swine, wild boars, feral swine, warthogs, bush pigs, and giant forest hogs are susceptible for ASF (Fig. 1).



Fig. 1. Large White Yorkshire Pigs

Geographical distribution

ASF is present in wild and domestic pigs in regions of Asia, Europe and Africa.

ASF different from swine flu

Swine influenza or swine flu is a respiratory disease of pig, which is caused by type A influenza virus that regularly causes outbreaks of influenza in pig population. According to the US Centers for Disease Control and Prevention (CDC) the swine flu causing virus leads to a high number of infections in pig herd, but is not as fatal as ASF. Specific swine influenza vaccine is available for pig while there is no vaccine for ASF till date. The swine flu virus is spread among pigs through close contact and through contaminated objects moving between infected and uninfected pig.

Impact ASF on pig farmers

Pig farmers face a difficult situation as pig start to die in a large number in the farm as well as impacting sales negatively creating havoc among the pig rearers. The outbreak also ruins the prospect of export of pork products causing a huge loss.

Mode of infection

The African swine fever virus is often introduced into a herd after the feeding of uncooked or undercooked contaminated pork products which are ingested by a pig. The virus is then easily spread between pigs by direct contact with an infected animal or by its body fluids (nasal, oral, feces, blood) or tissues (meat) and indirectly from contact with contaminated objects (fomites) such as vehicles, equipment, footwear or clothing (Fig. 2). Some species of ticks (vector) can transmit the virus. Blood sucking flies or insects may possibly spread the virus between pigs. Aerosol transmission is limited.

Clinical signs

Clinical signs and mortality rates can vary according to the virulence of the virus and the type species of pig:

Acute forms of ASF are characterised by high fever, depression, anorexia and loss of

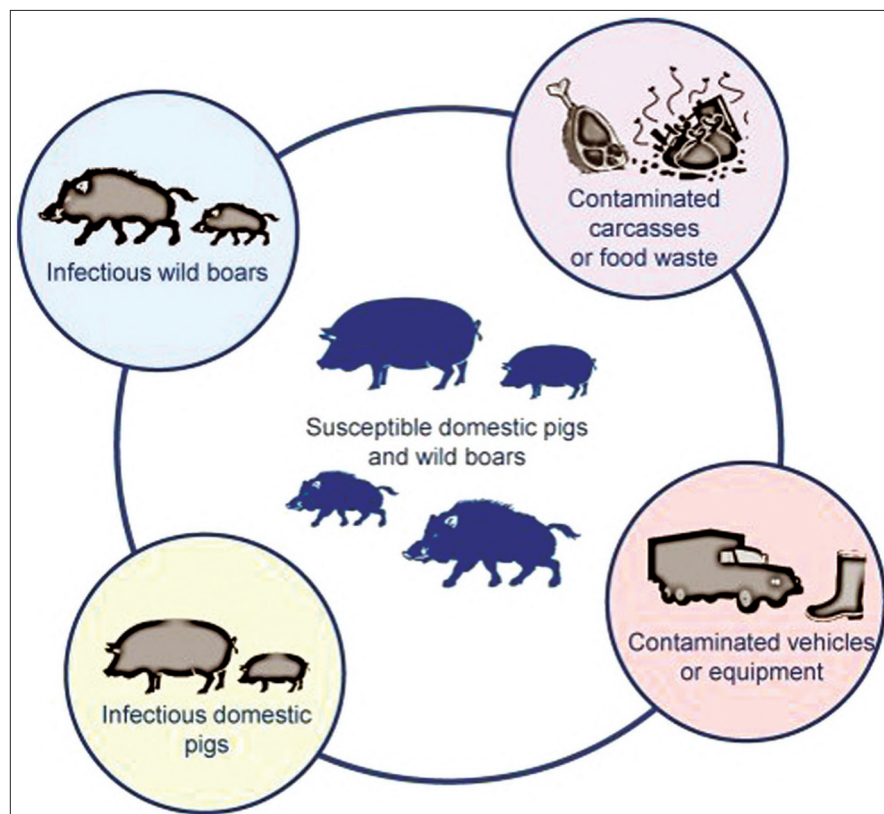


Fig. 2. How ASF spreads. Source: Sanchez-Cordon *et al.* 2018

appetite, haemorrhages in the skin (redness of skin on ears, abdomen and legs), abortion in pregnant sows, cyanosis, vomiting, diarrhoea and death within 6-13 days (or up to 20 days). Mortality rate may be as high as 100%. In white-skinned pig, the extremities turn bluish purple and hemorrhages become apparent on the ears and abdomen. Groups of infected pigs lie huddled together shivering, breathing abnormally, and sometimes coughing. In pregnant sows, spontaneous abortions occur.

Sub acute and chronic forms are caused by moderately or low virulent viruses, which produce less intense clinical signs that can be expressed for much longer periods. Mortality rate is lower, but can still range from 30-70%. Chronic disease symptoms include loss of weight, intermittent fever, respiratory sign, chronic skin ulcer and arthritis.

Different type of pig may have varying susceptibility to ASF virus infection. African wild pig may be infected without showing clinical signs allowing them to act as reservoirs. Animals that recover from the illness can be carriers of the virus for several months.

Diagnosis

The clinical symptoms of ASFV infection are very similar to classical swine fever, and the two diseases normally have to be distinguished by laboratory diagnosis. This diagnosis is usually performed by an ELISA or isolation of the virus from the blood, lymph nodes, spleen, or serum of an infected pig.

Vaccine research

As of 2020, no vaccine is commercially available. Immunity appears to be largely strain specific. An experimental vaccine is in development against the 2007 Georgia isolate which is currently circulating, which is attenuated by deletion of the viral I177L gene.

Risk to human

Human is not susceptible to the African swine fever virus.

Prevention and control

Prevention in Country free of the disease depends on implementation of appropriate import policies and biosecurity measures, ensuring that neither infected live pig nor pork products are introduced into areas free

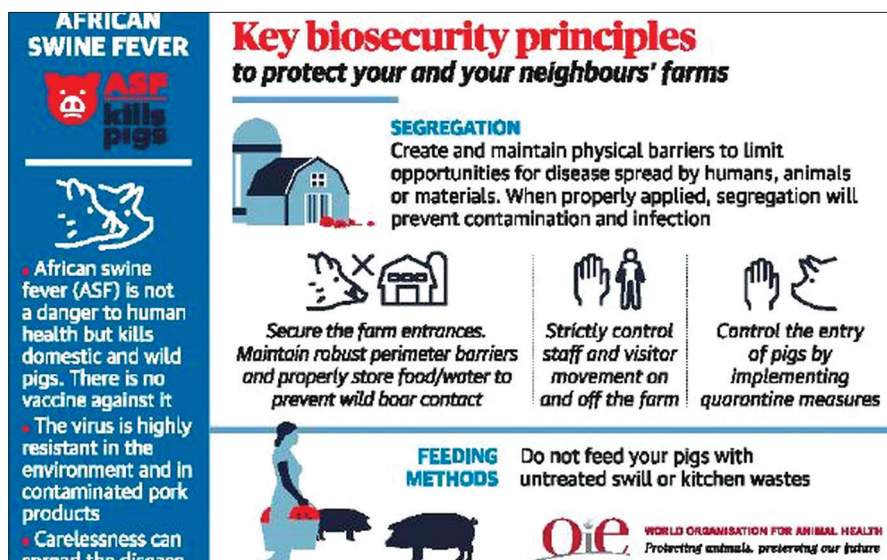


Fig. 3. Biosecurity measures

of ASF (Fig. 3). This includes ensuring proper disposal of waste food from aircraft, ship or vehicle coming from affected Country and policing illegal imports of live pigs and pork products from affected Country. During outbreaks and in affected Country, control of ASF can be difficult and must be adapted to the specific epidemiological situation. Classic sanitary measures may be employed including early detection and humane killing of animals (with proper disposal of carcasses and waste), thorough cleansing and disinfection, compartmentalisation and movement controls, surveillance and detailed epidemiological investigation, strict biosecurity measures on farms.

As observed in Europe and in some regions of Asia, the transmission of ASF seems to depend largely on the wild boar population density and their interaction with

low-biosecurity pig production systems. The good knowledge and management of the wild boar population and a good coordination among the Veterinary Services, wildlife and forestry authorities are required to successfully prevent and control ASF. Depending on the epidemiological situation, the involvement of the soft tick vector should also be considered in the control programme.

How can farmer protect his pigs?

ASF can spread easily. The virus is highly resistant in the environment, especially at low temperatures. It is also highly resistant to many disinfectants. Do not feed raw or undercooked pork products (swill, garbage or waste) to pigs. Prevent contact with feral or wild hogs. Whenever possible, house pigs indoors. Monitor the animals daily

for any signs of illness. Isolate any pigs that are ill and contact veterinarian to determine the cause. Isolate any pigs entering the farm for several weeks before placing them with the herd. Control tick and other insect vectors (e.g., flies). Control measures for ASF will require quarantine and depopulation of affected animals. There is no vaccine or treatment for ASF.

CONCLUSION

The continued spread of ASFV in many Countries demonstrates a potential for further spread in other regions of the World. There are still many gaps in our knowledge of the biology of ASFV, its interaction with hosts, immune responses correlating with protection and how these can be activated. Vaccine development against ASF has been hampered by large gaps in knowledge concerning ASFV infection and immunity. Current studies indicate that ASFV isolates circulating in Eastern Europe and the Russian Federation are highly virulent and kill most of the infected domestic pigs and wild boars. There is a need for continued monitoring in the field, along with experimental infections, to identify ASFV isolates of altered virulence.

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