FRIEDRICH-LOEFFLER-INSTITUT
FLI
Bundesforschungsinstitut für Tiergesundheit
Federal Research Institute for Animal Health

African Swine Fever (ASF)

Information of the FLI | Last updated 02|18|2014

African Swine Fever (ASF)

Causative agent

The causative agent of African Swine Fever (ASF) is a large, complex DNA virus. It is the only representant of the genus *Asfivirus* within the virus family of *Asfarviridae* (the acronym „Asfar“ stands for *African swine fever and related viruses*). The double-stranded, non-segmented genome codes for at least 54 structural and numerous non-structural proteins. The virus possesses various characteristics which enable it to escape the host immune response and modulate it. ASF virus (ASFV) can be transmitted by vectors (soft ticks of the genus *Ornithodoros*) and must therefore be classified as Arbovirus *(arthropod-borne virus)*.

Distribution

ASF occurs endemically in many African countries south of the Sahara. Differentiation must be made between a sylvatic cycle between soft ticks and warthogs and outbreaks within the domestic pig population.

Outside of Africa, the virus was present on the Iberian Peninsula from the 1960s to the late 1990s. Short episodes were also observed in Europe in the Netherlands, France, Malta and Belgium as well as on the American continent in Brazil, Haiti, the Dominican Republic and Cuba. Introduction of the virus to Sardinia in 1978 caused a still ongoing endemic which has been associated with multiple outbreaks in domestic pigs and wild boar over the past few months.

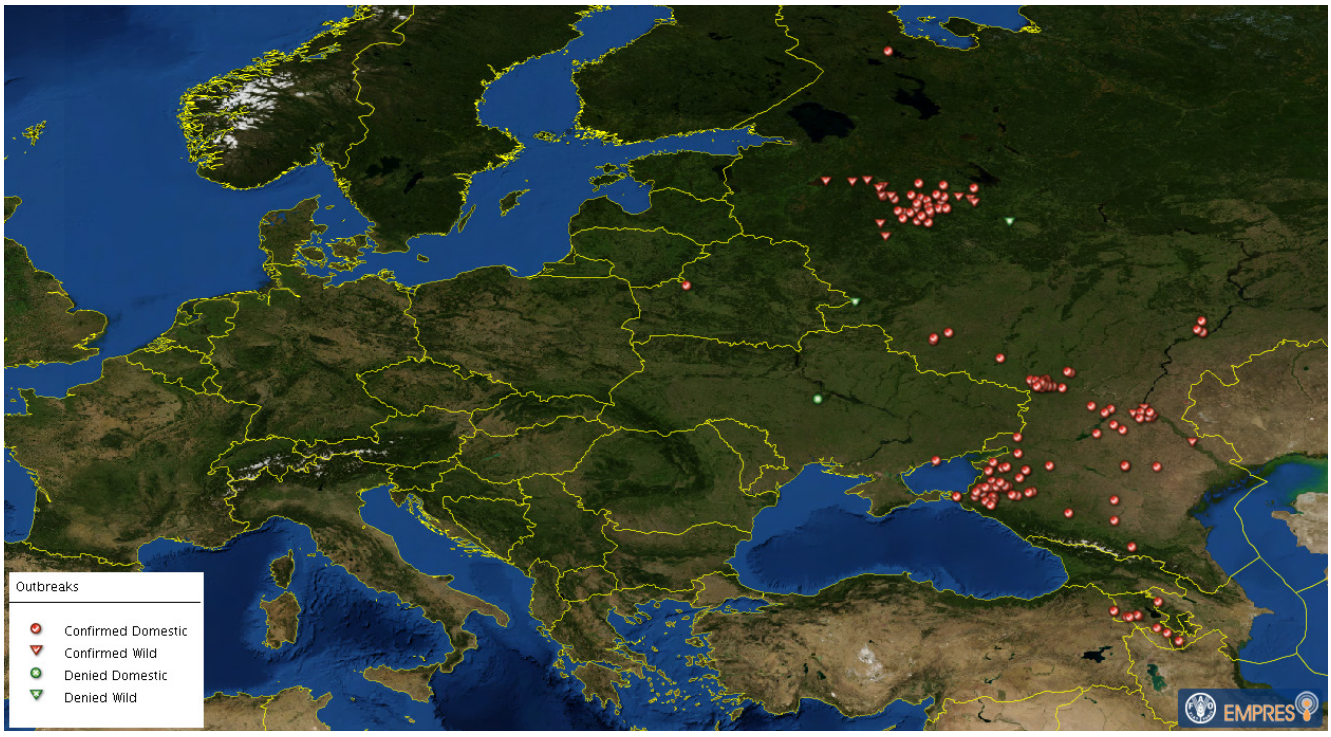

Fig. 1: Outbreaks of ASF in the Russian Federation and several transcaucasian countries mid-2011 to mid-2013. Source: FAO EMPRES, 06|28|2013

Presumably in 2007, ASFV was introduced from Africa into the Georgian Republic and has since spread to Russia via several Transcaucasian countries. Since then, continuing outbreaks with a clear tendency to spread have occurred in Russia. Ukraine has also reported cases in domestic pigs and wild boar. Belarus, Lithuania and Poland have detected ASF in wild boar.

In Germany, ASF has not occurred so far.

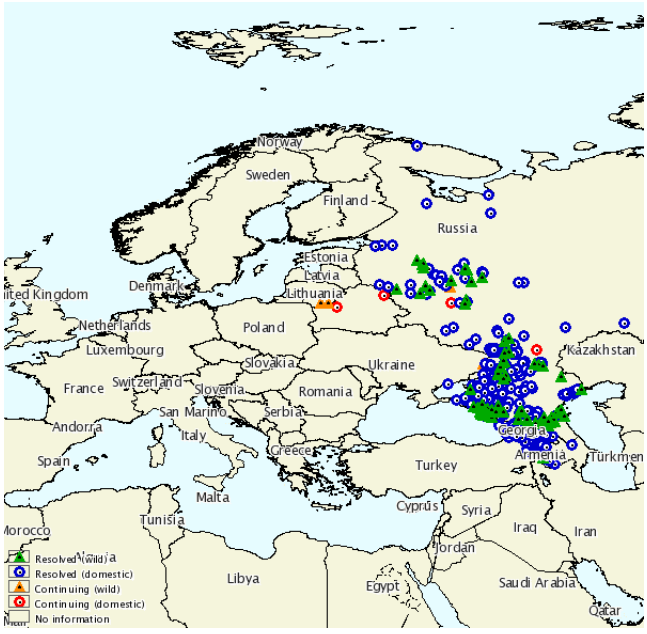

Fig. 2: Outbreaks of ASF from 2007 to the end of January 2014. Source: OIE WAHID, 01|28|2014

Affected Animals

Only domestic pigs and wild boar are affected by ASF. Competent vectors are soft ticks of the genus *Ornithodoros*.

Transmission

The virus can be transmitted either directly, e.g. by contact between animals, or indirectly.

Soft ticks can play a role as vectors. Based on the current knowledge this transmission route however seems to be negligible in Germany. (Illegal) feeding of food waste in contrast is of high importance.

Human health risk

ASFV is no zoonotic pathogen.

Clinical picture

The clinical symptoms of ASF can vary considerably and depend on the virulence of the ASFV strain and on the animal's immune status. In addition to acute cases of disease which are similar to hemorrhagic fever, chronic and subclinical courses occur.

Highly virulent ASFV strains cause acute disease with mortality rates of up to 100 percent within 5 to 10 days. The virus which at present causes continuing outbreaks in the Russian Federation belongs to this highly virulent group of strains. This virus strain is equally harmful in all age groups of pigs and wild boar and leads to death of the affected animals within 7 to 10 days.

The clinical symptoms are unspecific and include high fever, anorexia, respiratory and gastrointestinal symptoms, cyanoses (particularly upon agitation), inability to rise and peracute cases of death. In some cases hemorrhagic symptoms were observed.

African Swine Fever (ASF)

Based on the clinical symptoms, the disease cannot be differentiated from Classical Swine Fever (CSF) and other severe courses of disease!

Fig. 3: Domestic pigs with high fever

Fig. 4: Tusker with unspecific symptoms

Fig. 5: Piglet, peracute death

Laboratory diagnostic detection

Pathogen detection:
Pathogen detection is done by real-time PCR or virus cultivation on macrophage cultures. The majority of ASFV strains cause hemadsorption, which can be used for diagnostic purposes.

Both, serum and EDTA blood samples are suitable for pathogen detection during acute infection. Suitable organ samples are in particular tonsils, lymph nodes or spleen.

Indirect detection:
For antibody detection in serum and plasma, several ELISA kits, which however have no marketing authorization in Germany yet, are available. Furthermore, antibodies can be detected by indirect immunofluorescence or immunoperoxidase tests. Immunoblots are also used. Serum is the sample material of choice.

Epidemiology

The disease was first described officially in 1921, when an outbreak associated with a high mortality rate occurred in imported domestic pigs in Kenya.

In Africa, a closed sylvatic cycle exists between warthogs and soft ticks *(O. moubata)*. Although as a rule warthogs do not develop clinical disease, they can transmit the virus to the ticks, which become infected via the blood meal. Infected ticks transmit the virus transstadially and transovarially. By contact with infected ticks the virus can be introduced into the domestic pig population, where it no longer depends on vectors to spread. Particularly direct contact with infected pigs and pig products must be considered as the main transmission route. (Illegal) feeding of food

waste is of high importance. Contact with blood is the most efficient transmission route. If no blood is involved, contagiosity of the virus can be moderate.

In Europe, the role of soft ticks in the transmission of ASF differs between regions. While in Spain and Portugal, ticks of the Ornithodorus erraticus complex hampered disease control considerably, ticks played no role at all in central European countries. Soft ticks do not seem to play a role in the out-breaks in the Transcaucasian countries and in the Russian Federation.

It must be considered that European wild boars are as susceptible to infection as our domestic pigs. So far, infected wild boar populations rather were victims of infections originating from the domestic pig population. This situation might however change with the appropriate wild boar density and favorable climatic conditions

Control

African Swine Fever is a notifiable disease in Germany and control is based on the Regulation on the Protection against Swine Fever and African Swine Fever (Swine Fever Regulation). Early disease detection and rapid laboratory diagnosis are an integral part of the control measures. The possible involvement of ticks leads to shorter time limits and increased restrictions (search for the vector, possibly longer restocking bans).

There is no vaccine against African Swine Fever!

Recommendations for livestock owners, hunters and veterinarians

If acute symptoms occur which cannot clearly be associated with another disease and, in particular, do not respond to antibiotics, suitable samples should be sent to the responsible veterinary diagnostic agencies of the federal states for investigation of a possible swine fever infection.

In view of the current ASF situation at the borders of the EU particularly hunters are requested to report an increased occurrence of dead wildlife (wild boar) to the competent authorities and to send in samples (particularly sweat, lymph nodes, spleen, lung) for investigation.

Farm veterinarians, but also farmers themselves are strongly requested to send in more samples (particularly blood samples, but also other materials) for diagnostic investigation of febrile generalized infections, abortions or increased rates of dead livestock in pig holdings.

Your cooperation is crucial for a functioning early warning system!

More information on the internet

- Information of the Food and Agriculture Organization of the United Nations (FAO):
  - Report on the sitution in Russia: http://www.fao.org/docrep/018/aq240e/aq240e.pdf
  - General information on ASF: http://www.fao.org/docrep/004/x8060e/x8060e00.htm
- Information of the EU reference laboratory on ASF:
  - http://asf-referencelab.info/asf/en/

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