African Swine Fever Fact Sheet

1. Disease overview

African swine fever (ASF) is an **infectious, viral** disease, caused by **African swine fever virus** (ASFV). The disease afffects domestic and wild pigs of the Suid-family (*Sus scrofa* spp) with severe disease including systemic haemorrhagic viral fever. It is spread in four distinct epidemiological cycles: in the first (sylvatic) and second (tick-pig) an arthropod vector (*Ornithodoros* spp ticks) is involved in transmission whereas in the third (domestic pig) and fourth (wildboar-habitat) transmission takes place without the insect vector.

ASF is a **WOAH-notifiable disease**.

ASF is listed in the **European Animal Health Law** under categories **A, D, E**.

2. Agent

ASFV belongs to the Asfarviridae Family; genus Asfivirus. ASFV is the sole member of its family.

ASFV is a complex large, **enveloped** DNA virus with icosahedral morphology. More than 60 structural proteins and more than a hundred infection-associated proteins have been identified. The ASFV **double-stranded linear DNA** genome comprises between 170 and 193 kilobases (kb) and contains between 150 and 167 open reading frames with a conserved central region of about 125 kb and variable ends.

The molecular epidemiology of the disease is investigated by sequencing of the **p72 protein**, which differentiates up to 24 distinct **genotypes**. Different strains of ASFV vary in their ability to cause disease. At present there is only **one recognised serotype** of the virus detectable by antibody tests.

3. Geographical Distribution

With its origin in Africa south of Sahara, ASF now has a global distribution with presence in Africa, Asia, Europe, the Americas and Oceania. It is present in Europe since 2007 and in the EU since 2014.

According to WAHIS data, the agent was reported in the EU in the last 2 years.

4. Animal hosts

4.1. Primary animal species affected

All varieties of *Sus scrofa* (domestic and wild) are susceptible to the pathogenic effects of ASFV. In the ancient sylvatic cycle, the virus circulates between warthogs (*Phacochoerus* spp.) and ticks of the genus *Ornithodoros* spp without causing any pathogenic effects to either the verterbrate or arthropod host. Warthogs are only viremic for a brief time in their life, in the neonatal stage during

which they stay in the warthog burrow. Other African wild suid species such as bush pigs (*Potamochoerus* spp.) and giant forest hogs (*Hylochoerus meinertzhageni*) can be incidentally infected, also without any apparent clinical signs. Ticks of the genus *Ornithodoros* spp. are the only known biological, arthropod hosts of the virus. Other insects (e.g. *Stomoxys* flies) have been shown to be able to act as mechanical hosts.

4.2. Clinical Signs

ASFV produce a range of syndromes varying from **peracute**, **acute** to **chronic** disease and **subclinical** infections. The signs are similar for all susceptible *Suid* species. Both the severity and length of clinical manifestations as well as the incubation time vary depending on viral strain, infection dose, infection route and the immune status of the animal. Infection via the oral route require higher dose to result in an infection compared to infections via injection/tick bite.

The more virulent strains produce peracute or acute haemorrhagic disease characterised by high fever, anorexia, haemorrhages in the skin and internal organs, diarrhoea and vomiting (sometimes bloody), reluctance to move and/or ataxia, respiratory distress and pulmonary oedema and death in 4–10 days from onset of clinical signs. Less virulent strains produce milder clinical signs: slight fever, reduced appetite and depression. Moderately virulent strains induce variable disease forms, ranging from acute to subacute. Abortion in pregnant sows can be a clinical sign for all types of virulence.

4.2.1. Incubation Period

The incubation period of ASF, defined as the interval between infection and the onset of clinical signs, mostly varies from 4 to 19 days after natural infection, in acute form it is on average 3 to 4 days. In experimental infections, the incubation period ranged between 1-30 days (median 4 days) in domestic pigs and 0-8 days (median 3 days) in wild boar.

4.2.2. Morbidity and mortality

Case fatality for highly virulent viruses approach 100% for both domestic pigs and wild boar both in natural and experimental infections. Even highly virulent strains typically express low contagiousness (R_0), meaning that morbidity in a herd or epidemiological will be low initially. Given the high mortality and the fact that pigs in the viremic phase will have high virus loads in e.g. blood, depending on the level of direct and indirect contact between naïve and infected animals, herd morbidity will however increase over time if not brought under control.

For moderately virulent viruses the case fatality rate is lower, with a wide variation (e.g. 30–70%) and a longer duration of the period of illness before death (15–45 days). For low virulent viruses the mortality is low.

4.2.3. Zoonotic Potential

Human infection has not been reported.

5. Transmission

5.1. Vector

The biological arthropod vector for ASF is soft ticks of the genus *Ornithodoros.* In the sylvatic cycle the vector are ticks belonging to the *Ornithodoros Moubata complex*. Ornithodoros *erraticus* were involved in the maintenance of the ASF-epidemic in the Iberian peninsula in the 1960-70's. Other tick of this genus has been reported in Europe.

Kingdom: *Animalia*; Phylum: *Arthropoda*; Class: Arachnida; Order: Ixodida; Family: Argasidae; Genus: *Ornithodoros*; Common name: **soft tick**.

5.2. Transmissibility

Direct transmission: contact between infected and naïve animals.

Indirect transmission: oral or nasal contact with blood and fomites, infected pork or pig products including offal and blood.

Biological vector transmission: soft ticks of the genus *Ornithodoros spp*

Soft tick vector: transstadial, transovarial, and sexual transmission occur.

The **transmissibility** varies with the infection route, with the oral route requiring higher dose (low-medium transmissibility) for infection compared to infections via injection/tick bite (medium-high transmissibility). For oral transmission the transmissibility is dose-dependent and similar for domestic pigs and e.g. wild boar.

6. Diagnostic

WOAH-recommended tests for **agent detection**: Virus isolation, fluorescent antibody test (FAT), ELISA for antigen detection and PCR.

WOAH-recommended tests for the **detection of immune response**: ELISA, indirect immunoperoxidase test (IPT), indirect fluorescent antibody test (IFAT) and immunoblotting test (IBT).

The following table presents data on the sensitivity and specificity of several diagnostic tests from studies deemed eligible according to EFSA's systematic literature review criteria:

Target	Test	Specificity	N studies	Sensitivity	N studies
Antigen	Enzyme linked immunosorbent assay (ELISA)	99.20	7	82.60	9
Nucleic acid	Polymerase chain reaction (PCR)	100.00	5	96.30	7
Nucleic acid	Quantitative polymerase chain reaction (QPCR)	100.00	14	98.30	14
Nucleic acid	Real-time PCR (quantitative or qualitative)	100.00	1	100.00	1
Nucleic acid	Reverse transcriptase PCR (RT-PCR)	100.00	3	98.40	5

Virus	Virus isolation (VI)	100.00	1	95.70	1
Antibody	Blocking ELISA (B-ELISA)	100.00	5	97.90	4
Antibody	Competitive ELISA (C-ELISA)	99.00	1	93.30	1
Antibody	Enzyme linked immunosorbent assay (ELISA)	95.00	9	40.00	13
Antibody	IPT (Immunoperoxidase test)	100.00	1	100.00	2
Antibody	Indirect ELISA (I-ELISA)	99.40	6	95.00	6

7. Prevention and control

7.1. Vaccination

Currently, there are no commercially available vaccines in the EU.

7.2. Treatment

Specific treatments for this disease are not available and not compliant with the AHL. In accordance with the Animal Health Law (AHL) in the EU, susceptible species kept at in the affected holdings shall be culled to prevent further spread of the pathogen.