Network for wildlife health surveillance in Europe

*Diagnosis Card*

# African Swine Fever

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**Etiology**

African swine fever virus (ASFV), only member of the genus *Asfivirus* in the family *Asfarviridae*.

**Affected species** (wildlife, domestic animals, humans)

ASFV infects mainly suids: the Warthog (*Phacochoerus africanus*), the Bushpig (*Potamochoerus larvatus*), the Red River Hog (*Potamochoerus porcus*), the Giant Forest Hog (*Hylochoerus meinertzhangeni*) and the Eurasian wild boar and feral/domestic pig (*Sus scrofa*).

**Epidemiological characteristics and disease course**

ASFV often is transmitted by direct contact between animals, but indirect contact through cannibalism, infected fomites, food or water, and arthropod vectors also occurs. ASFV is maintained in a wild cycle in Africa where the Warthog and the soft tick *Ornithodoros moubata/porcinus* are involved. Other African suids may occasionally be involved in the epidemiology of ASFV. In Europe, an additional sylvatic cycle involving wild boar and their habitat has been identified. The persistence of the virus in carcasses and the environment helps maintain infection in the wild boar population. The soft tick *O. erraticus* also may act as a reservoir of ASFV. Clinical signs following infection by ASFV are only observed in domestic and wild Sus scrofa. Peracute, acute, chronic, and subclinical manifestations of ASFV infection may happen in wild boar, although only peracute, acute, and subclinical forms have been reported

**Clinical signs**

Animals often are found dead. Fever is the most consistent clinical sign in sick animals. Other clinical signs may include inappetence, depression, increased respiratory rate, abortion, diarrhea, and epistaxis. Reddening of skin seen in domestic pigs is not readily visible in wild boar. In chronic infections, swollen joints from arthritis and skin ulcers may be seen.

**Gross lesions**

Gross lesions observed in wild boar consist of haemorrhages in different organs, including the kidneys and lungs. Still, they are most commonly found in lymph nodes (particularly mesenteric, gastro-hepatic and renal lymph nodes) and the spleen. The spleen often is enlarged, and yellow or bloody fluid may be seen in body cavities and the pericardium.

**Histological lesions**

The most significant lesions are seen in the lymphoid system. Microscopic findings consist of severe necrosis and depletion of lymphocytes in lymphoid follicles and paracortical areas of the lymph nodes and spleen. Haemorrhages and sometimes vasculitis and thrombosis can be seen in different tissues. Macrophages and monocytes display a cytopathic effect.

**Differential diagnosis**

ASF resembles other diseases like classical swine fever, salmonellosis, erysipelas or other septicemias.

**Criteria for diagnosis**

ASF diagnosis should include parallel detection of virus and antibodies for obtaining a full picture of the epidemiological situation in the area. The final diagnosis should be based on the interpretation of the results derived from using a number of validated tests in the appropriate samples, combined with information coming from disease epidemiology, scenario, and clinical signs.

**Recommended diagnostic method(s) and preferred samples** (incl. recommended amount and appropriate storage)

Laboratory diagnostic tests employed to test domestic swine are also recommended to test wild suids.

Samples collected from hunted animals should include anti-coagulated whole blood for the detection of virus or viral nucleic acid and serum or plasma for the detection of antibodies. Samples collected from dead wild boar should comprise tissues for both virus and antibody detection. Alternative samples may be better suited, especially for wild boar carcasses, such as dry blood and tissue swabs and dried filter papers. The table below summarizes the techniques, target samples and their recommended use.

| DETECTION | TECHNIQUE | RECOMMENDED USE | TARGET SAMPLES | RECOMMENDED AMOUNT/ STORAGE |
|---|---|---|---|---|
| Nucleic acid detection | PCR tests (i.h. conventional and real time PCR tests and commercial tests) | Early detection: suspicion, outbreak investigation, surveillance. Individual and herd testing. Movements from restricted zones | **Organs:** bone marrow, spleen, lymph nodes, liver, tonsil, heart, lung, kidney. | 5 gr/<-70ºC |
| | | | **Blood with EDTA.** | 1ml/<-70ºC |
| Virus detection | Virus isolation and identification by haemadsorption (HAD) test (i.h) | Confirmation of primary outbreak/ case in free countries. | **Organs:** bone marrow, spleen, lymph nodes, liver, tonsil, heart, lung, kidney. | 5 gr/<-70ºC |
| | | | **Blood with EDTA.** | 1ml/<-70ºC |
| Antigen detection* | Direct Immunofluorescence (DIF) (i.h) | Individual and herd testing (in case of clinical signs), early detection. | **Organs:** spleen, lymph nodes and tonsil. | 5 gr/<-70ºC |
| | Antigen ELISA commercial kit | Surveillance. Herd testing (in case of clinical signs). | **Organs:** spleen and lymph nodes. | 5 gr/<-70ºC |
| | | | **Plasma** from anticoagulated blood | 0.5ml/<-70ºC |
| Antibody detection | ELISA (i.h ELISA tests and commercial tests) | Individual and herd testing when deemed appropriate. Surveillance | **Sera or plasma** | 0.5ml/≤-10ºC |
| | Immunoblot (IB) (i.h) | Confirmatory test Individual and herd testing when deemed appropriate. | **Sera or plasma** | 0.5ml/≤-10ºC |
| | Indirect Immunoperoxidase test (IPT) (i.h) or Immunofluorescence Antibody (IFAT) test (i.h) | Confirmatory test Individual and herd testing when deemed appropriate. Surveillance; epidemiological studies (time of the infection) | **Sera - Plasma** from anticoagulated blood **Exudates from tissues** **Corporal fluids** (pericardial, thoracic, etc) | 0.2ml/≤-10ºC |

** It is recommended its use in parallel with antibody detection tests. i.h. = in house test*

## EWDA proposed protocol (for harmonization at large scale)

The ELISA test is recommended for non-haemolysed sera but the IPT in parallel with real-time PCR testing of blood, tissue samples and exudates is recommended to have a complete picture of the epidemiology of the disease in affected areas.

## Laboratories that can be contacted for diagnostic support

Dr. Carmina Gallardo. CISA-INIA/CSIC (EU Reference Laboratory for ASF and FAO reference Centre for ASF), Spain (http://www.asfreferencelab/) (eurl.asf@inia.csic.es)

Dr, Sandra Blome, Institute of Diagnostic Virology, Friedrich-Loeffler-Institut, Suedufer 10, 17493 Greifswald-Insel Riems, Germany (sandra.blome@fli.bund.de)

Dr. J.M. Sánchez-Vizcaíno, Universidad Complutense de Madrid, Spain (jmvizcaíno@vet.ucm.es)

Dr. Livio Heath, ARC-OVI, Transboundary Animal Diseases Programm, Onderstepoort, South Africa (HeathL@arc.agric.za)

## Recommended literature


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