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WORKING DOCUMENT

Guidelines on surveillance and control of African swine fever in feral pigs
and preventive measures for pig holdings

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1. Introduction

African swine fever (ASF) is a highly contagious and fatal disease of domestic pigs and feral pigs (including wild boar)¹ transmitted through direct and indirect contacts, ingestion of contaminated feedstuffs and by certain tick vector species. ASF is considered one of the most dangerous diseases of pigs; it affects trade and has a serious socio-economic impact on people's livelihood. No vaccine or drugs are available to prevent ASF infection. Therefore, it is particularly important that ASF free areas are maintained free by preventing the introduction of the disease. All control and eradication measures applicable are based on classical disease control methods, including surveillance, epidemiological investigation, tracing of pigs and stamping out in infected holdings. These measures must be combined with strict quarantine and biosecurity measures in domestic pig holdings and animal movement control.

Wild boar (*Sus scrofa*) and more in general feral pigs are susceptible to ASF and they show similar clinical signs and mortality to domestic pigs. ASF virus (ASFV) infection in wild boar has been reported in the Iberian Peninsula, Sardinia and most recently in the Russian Federation. The information available indicates that the wild boar excrete the virus in the same amount as domestic pigs and the epidemiological dynamics between wild boar and domestic pigs is very similar in terms of direct transmission between infected and susceptible animals. However, wild boars seem to be less efficient in transmitting and maintaining the infection. In fact, in areas where domestic pigs were free from the disease or where the disease was eradicated in pig holdings, very low seroprevalence or absence of seropositive wild boar was reported, suggesting limited persistence of the virus in wild boar population in the absence of contact with infected domestic pigs or infected feral pigs.

Neither in the Iberian Peninsula or even in those areas in Sardinia where the disease was at least temporarily eradicated in domestic pigs, have wild boar played the role of an effective reservoir of the virus, indicating that the disease may fade out spontaneously from the wild boar population. However, at least in certain areas of Sardinia, wild boar are likely to play a more important role in facilitating virus persistence in those areas where wild boar lives in continuous contact with free ranging domestic pigs.

In any case, the role of wild boar in the epidemiology of the disease, especially in certain areas, is not yet completely understood.

¹ EU legislation (Council Directive 2002/60/EC) refers to "feral pigs", i.e. to all pigs that are not kept or bred on a holding, including wild boar, and in this way is different to "pigs", i.e. those pigs that are kept on holdings and are therefore kept under human control. Consequently, this document also refers to feral pigs, except where it was found appropriate to make a clear reference to the wild boar, e.g. due to the scientific literature quoted which refers to a wild boar.

2. Aim of this document

The aim of this working document is to provide guidance to the Member States in controlling ASF when the disease is suspected or confirmed in feral pigs.

When considering this guidance, the activities should be adapted to the feral pig population and the epidemiological situation and include the measures to be taken in the infected area and the provisions to apply in the holdings of that area.

The main objectives of swiftly controlling ASF in feral pigs are to reduce the risk of transmission to domestic pigs and to prevent it becoming endemic in the feral pig population.

Council Directive 2002/60/EC of 27 June 2002 laying down specific provisions for the control of African swine fever and amending Directive 92/119/EEC as regards Teschen disease and African swine fever introduces minimum Union measures for the control of the disease. It provides that when the disease is suspected or confirmed in feral pigs, the concerned Member States has to produce an eradication plan to be submitted to the Commission.

Commission Decision 2003/422/EC of 26 May 2003 approving an African swine fever diagnostic manual sets out serological, monitoring and sampling procedures to be applied in areas where ASF is suspected to occur or has been confirmed in feral pigs.

The guidelines laid down in this document are based on:

- the provisions of Council Directive 2002/60/EC², and in particular of Articles 15 and 16;
- Chapter IV(H) of the Annex to Commission Decision 2003/422/EC³;
- the EFSA Scientific Opinion of the Panel on AHAW on the control and eradication of Classic Swine Fever in wild boar⁴;
- the EFSA Scientific Opinion of the Panel on AHAW on African swine fever⁵.

3. General provisions in cases of ASF suspicion or confirmation in feral pigs

When ASF is suspected or confirmed in feral pigs, Member States should establish an expert group including veterinarians, hunters, wildlife experts and epidemiologists. The expert group shall assist the competent authority in studying the epidemiological situation, defining the infected area and to implement the eradication plan. In fact, Member States shall submit to the Commission within 90 days of the confirmation of the

² Council Directive 2002/60/EC of 27 June 2002 laying down specific provisions for the control of African swine fever and amending Directive 92/119/EEC as regards Teschen disease and African swine fever. OJ L 192, 20.7.2002, p. 27.

³ Commission Decision 2003/422/EC of 26 May 2003 approving an African swine fever diagnostic manual. OJ L 143, 11.6.2003, p. 35.

⁴ The EFSA Journal (2009) 932 1-18.

⁵ The EFSA Journal 2010: 8(3): 1556.

primary case a written plan of the measures taken to eradicate the disease in the area defined as infected, which should also include the surveillance and prevention measures to be applied in that area and in the holdings of the same area. Appropriate control and eradication measures have to be implemented in the infected area and these may include suspension of hunting and a ban on feeding wild boar.

The plan should also include the disease monitoring programme to be enforced after a period of at least 12 months has elapsed since the date of the last confirmed case and it shall stay in place for at least 12 additional months. In other words, as for classical swine fever (CSF), the legislation provides that an area where ASF has occurred in feral pigs can regain its free status only after 24 months after the last confirmed case.

A. Demarcation of the infected area

The infected area should be defined taking into account:

- (1) the historical and current geographical distribution of the disease,
- (2) the results of the epidemiological investigations,
- (3) the feral pig population (spatial distribution, continuity of the geographical distribution of the wild boar, meta-populations⁶, home range),
- (4) landscape structure and existence of major natural or artificial obstacles that influence the home range and limit possible contact between feral pigs, such as forested areas, green corridors, motorways, rivers, lakes, etc.

B. Surveillance in the infected area

Due to the characteristics of the disease, obvious clinical signs and high fatality rate, passive surveillance based on investigation of feral pigs found sick or dead plays a pivotal role in the early detection of ASF. In addition, given that a certain proportion of feral pigs may also survive the infection, active surveillance of shot animals may also provide very valuable data on the evolution of the disease and guidance on the assessment of the effectiveness of the disease control measures adopted in the area.

- Surveillance in feral pigs

Specific efforts should be made in determining the extent of the infection in the feral pigs population by investigating the feral pigs found sick or dead and by sampling and testing for both ASF virus and ASF antibodies. Feral pigs found dead represent a main sign of alert, especially when they are found clustered (grouped).

- All feral pigs shot within a hunting season or found sick or dead in the infected area, including the ones killed by car accidents, have to be inspected by a veterinarian and tested for ASF in accordance with the provisions of the

⁶ A meta-population consists of a group of spatially separated populations of the same species which interact at some level.

diagnostic manual. It is worth to remember that ASFV is rather resistant and the autolysed carcasses can be tested as well.

- When ASF is confirmed in feral pigs, surveillance has also to be carried out in the infected area. The size of the target population to be sampled should be previously defined in order to establish the number of samples to be taken. Sample size must be established as a function of the estimated number of living animals and not as a function of the number of animals shot. If data on population distribution, density and size are not available, the geographical area in which the sampling to be carried out must be identified taking into account the continuous presence of feral pigs and the presence of natural or artificial barriers that will efficiently prevent large and continuous movement of the animals. It is recommended to identify sampling geographical units of about 200 km², with a feral pigs population of about 400 to 1000 heads. The minimum number of feral pigs to be sampled within each defined sampling unit must allow for the detection of 5 % prevalence with 95 % confidence. For this purpose at least 56 animals must be sampled in each unit within a hunting season.
- Places at specified high risk for the introduction and spread of ASF, such as those where feral pigs are gathered by the hunters and inspected, should be kept under strict supervision of veterinarians and personnel well-trained in recognising the signs and lesions caused by the disease and on the measures to be adopted to avoid its spread.
- **Surveillance in domestic pigs**

A surveillance programme and preventive measures shall be applied to all the holdings situated in the infected area.

- Pig holdings should be kept under strict health monitoring programme and all sick or dead pigs, for which ASF cannot be excluded on clinical or other grounds, should be inspected by an official veterinarian and examined for ASF in accordance with the provisions in the diagnostic manual. Sudden death could be one of the first clinical signs observed.
- The main clinical and pathological findings to be considered are:
 - a) fever with morbidity and mortality in pigs of all ages.
 - b) fever with haemorrhagic syndrome: petechial and ecchymotic haemorrhages, especially in the lymph nodes, kidneys, spleen (which is enlarged and dark, particularly in the acute forms) and urinary bladder and ulceration on the gall bladder.
- In order to early detect the presence of ASF, pigs slaughtered for own-home consumption should be inspected by an official veterinarian. *Ante* and *post-mortem* examination should be carried out in the infected area and should focus on detecting ASF signs. In case of animals with suspect or doubtful symptoms/lesions, laboratory tests should be carried out in accordance with the diagnostic manual in order to rule out the presence of ASF.

C. Preventive measures in the infected area

- Standstill and movement control

Standstill is to be immediately imposed on all suspected or infected holdings in the infected area. All the pig holdings, including all backyard holdings in the infected area, should be placed under official surveillance. A census has to be carried out and kept updated. Pigs should be kept in their living quarters or any other suitable place where they can be isolated from contact with feral pigs. No pigs should be allowed to enter or leave the holdings, except where authorized by the competent authority. Free-range keeping of pigs should be forbidden. The transport the movements of pigs, and the dispatch of their semen, ova and embryos from the infected area for intra-Union trade shall be banned.

- Live pigs markets

When the presence of ASF is suspected in the feral pig population, animal markets should be kept under strict supervision of veterinarians and personnel well-trained in recognising the signs of the disease and on the measures to be adopted to avoid its spread. When the disease is confirmed live pigs markets should be closed.

- Disposal of carcasses

Carcasses of all domestic and feral pigs found dead in the infected areas shall be processed under official supervision and tested.

In accordance with Article 8(a)(v) of Regulation (EC) No 1069/2009 of the European Parliament and of the Council of 21 October 2009 laying down health rules as regards animal by-products and derived products not intended for human consumption and repealing Regulation (EC) No 1774/2002 (Animal by-products Regulation)⁷, all body parts, including hides and skins, of wild animals, when suspected of being infected with diseases communicable to humans or animals, are classified as Category 1 material. Such material is to be disposed of or processed in accordance with Article 12 of that Regulation. Accordingly, viscera and other parts of feral pigs shot or found dead in the affected area, are to be disposed or processed in accordance with Article 12 of Regulation (EC) No 1069/2009.

⁷ OJ, L 300, 14.11.2009, p.1.

- **Swill feeding**

Feeding of catering waste is a **high risk practice** as several diseases, including ASF, can be introduced in a healthy population through this practice. **Therefore, a proper implementation of the existing rules prohibiting swill feeding to pigs should be ensured.** A communication campaign should be addressed to pig owners to make them understand the danger of that practice. If necessary, the existing system for collection of catering waste food from households, restaurants, etc., should be reviewed in order to prevent possible gaps and shortcomings in the collection and safe disposal of waste.

- **Biosecurity**

Farmers of the infected area should be encouraged to enhance biosecurity practices in their holdings in order to prevent the introduction of ASF. In domestic pigs and wild boar the most effective routes of infection are through direct contact and ingestion of infected material.

In order to minimize the risk of ASF introduction into a pig holding:

- (a) pigs should be introduced from trusted and certified sources,
- (b) visitors should be discouraged to enter the pig holdings, especially the commercial ones,
- (c) personnel should be well trained/informed and contacts with other pigs forbidden,
- (d) perimeter fencing preventing contact with feral pigs (double fences preferable) should be install on a pig holding,
- (e) carcasses, discarded parts from slaughtered pigs and food waste should be disposed of in an appropriate manner,
- (f) no part of any feral pig, whether shot or found dead should be brought into a pig holding,
- (g) sharing of equipment between the holdings should be discouraged,
- (h) appropriate means for cleaning and disinfection have to be placed at the entrance of the holdings. Vehicles and equipment should be properly cleaned and disinfected before entering into contact with pigs; however they should not enter the holding,
- (i) appropriate hygiene measures have to be applied by all persons entering into contact with pigs (domestic and/or feral).

- **Tick control**

Infected *Ornithodoros* ticks are able to retain the ASFV for a long time (this has been shown to occur for at least 5 years) and to transmit it to susceptible species. In addition, these soft ticks can transmit the virus from tick to tick through transstadial, sexual and transovarian transmission. They are therefore able to act as virus reservoir. These ticks are common in pig pens in many areas of Africa and in certain parts of the Iberian Peninsula, while the information available suggests that they are

absent from Sardinia. Knowledge about the occurrence of these ticks in other areas of Europe is rather incomplete. They are harboured inside pig sties in old buildings, where they hide in cracks and surfaces that provide sufficient humidity. Due to the ticks long life and ability to survive for a long time without feeding, eradication of ticks from the old pig sties is invariably unsuccessful. Therefore, in order to avoid contacts, pigs should not be housed in infested premises. The premises should be isolated with fences to prevent the access of pigs or destroyed and then new premises rebuilt in another location.

- **Awareness campaign**

Pig farmers and the operators of the pig sector should be made aware of ASF, be able to recognize the first symptoms, how to report it and how to avoid the spread of the diseases, including the risk of introducing pig products into the holding or introducing meat products from abroad. Commercial and non-commercial holdings should also be encouraged to enhance their biosecurity level. Information campaigns should also be enforced in order to increase hunter's awareness of the measures to be adopted in the framework of the eradication plan and the requirements to be complied with in order to avoid any spread of the disease. The method of inspection and safe removal of feral pigs found dead or shot in that area should be included as well. Hunters and gamekeepers should be instructed to report the finding of each dead feral pig to the competent authority.

- **Hunting**

Any new infection introduced in a new environment can spread if sufficient hosts of the susceptible species are locally available. Hunting feral pigs could appear a simple and direct way to manage the number of susceptible animals in order to facilitate the control and the eradication of ASF. However, hunting pressure may be counter-productive, since it may increase the size of the home-range of wild boar meta-populations, facilitating contacts between meta-populations, and promoting long distance movements of individual animals. In addition, hunting may pose some additional risks, namely those related to the handling of infected carcasses and possible dispersal of virus in the environment by hunters. However, hunting may be necessary for sampling purposes.

Hunting feral pigs has been used for the control of CSF. However, there is little evidence that hunting is an efficient disease management tool in controlling that disease. This may be due to the fact that hunting has a complex effect on population dynamics, depending on the age and sex of the animals targeted. The theoretical effects of two possible targeted hunting scenarios that have been used for the control of CSF are described below:

- Targeting hunting (mainly young wild boar under one year of age) is assumed to temporarily decrease the number of susceptible animals and thus it should facilitate the fading out of the CSF infection. However, harvesting juveniles may leave enough breeding females to maintain a high birth rate, yielding susceptible animals that enable the disease to persist.

- Alternatively, hunting targeting breeding females would decrease the population long-term. However, it might temporarily increase the turnover of the population, providing ideal conditions for CSF to spread further by eliminating those animals that may have already developed immunity against CSF. This may be particularly critical in dense populations that ‘react’ by flexibly increasing their breeding capacity (density-dependence).

Therefore, the use of targeted hunting has not been considered a simple issue for the control of CSF, and it might even prove counter-productive.

Given the epidemiological characteristics of African and classical swine fever, as regards susceptible species and their ecological behaviours, the same weakness identified in the use of hunting as a control tool for CSF may also be extended to the control of ASF. Additionally, it is worth considering that in the case of CSF, hunting could be used in combination with wild boar vaccination, in order to reduce the size of the susceptible population. The latter is not applicable to ASF due to the fact that a vaccine is not available for this disease.

Taking all the above into account, it is not possible to conclude that rapidly reducing the density of a feral pig population by hunting is an effective measure to facilitate the eradication of ASF from feral pigs. Additionally, it is worth to remember that due to the characteristics of ASF, the lethality induced by the disease is normally higher than the one achievable by hunting.

In cases where the disease is detected in a small size population of feral pigs (few hundred individuals in areas with limited density of feral pigs), it would appear more prudent to monitor the evolution of the disease without increasing hunting pressure or even stopping hunting as it is likely that the disease would fade out spontaneously after some months. However, a system should be in place to safely remove carcasses of feral pigs found dead as they can be a very important source of infection.

In those areas with high density of feral pigs, reducing their density through intensified hunting might facilitate the fading out of the disease. However, this should be done only after a proper study of the population dynamic in question, and taking all precautions to prevent contacts between meta-populations of feral pigs and long distance movements of individual animals as much as possible.

In all cases, it is of paramount importance:

- to test for ASF virus and antibodies in all feral pigs found dead or shot in the infected area and in its surroundings, so that the measures adopted can be adjusted on the bases of the results achieved; and
- to prevent the contact between feral pigs and domestic pigs, by ensuring the application of all the proper biosecurity measures in order to prevent the transmission of diseases amongst the two populations.