

### SWINE UPDATE

### **AFRICAN SWINE FEVER VIRUS** WHAT WE HAVE TO DO TO KEEP IT OUT OF OUR FARMS?

### There are three major considerations required to keep *African Swine Fever Virus* out of a pig farm.

- 1 Permit no access by other pigs Sus scrofa wild and feral pigs.
- 2 Permit no access by any pig product.
- 3 Stopping the movement of infected ticks onto the farm.

### To keep ASF out of your farm the farm must:



Stop all swill feeding.

- Create a secure perimeter fence with a 100m clear zone.
- Stop all contaminated boots, clothing and equipment entering the pig farm.
- Use a suitable disinfectant at the correct concentration and allow sufficient contact time.

With these simple measures the risk of the spread of African Swine Fever onto your pig farm will be significantly minimised.



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There are three major considerations required to keep African Swine Fever (ASF) virus out of Asian pig farms.

- 1. Permit no access by other pigs Sus scrofa wild and feral pigs.
- 2. Permit no access by any pig product.
- 3. Stopping the movement of infected ticks onto the farm.

As there is currently no vaccine for ASF available and the government policy (justifiably) is stamping out, the farm must protect itself.



# NO ACCESS FOR PIGS TO THE FARM – **STOPPING PIGS**

Note all 'pigs' belong to one species – the domestic pig, feral pigs and wild boar pigs are all belong to the species *Sus scrofa* and they can equally share the same pathogens among each other. African Swine Fever is an unusual virus as it also infects other members of the suborder Suina: the family Suidae – including the Wild Boar, Wart hogs, Giant Forest hogs and Bush pigs as well as others and the Tayassuidae family of the Americas.

In the ongoing ASF epidemic in Europe and Russia, wild boar plays an important role in infecting both backyard- and commercial farms. At the moment, there is no evidence that wild boars are involved in the spread of African Swine Fever in Asia. However the region does harbor wild boars, so this might change in the future.

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Stopping pigs	Stopping pig products
Oestrus – females in heat.	Infected pigs – weaners to semen.
Foot – spilt feed to clear up.	Transport – dead and live pigs.
Hide points – remove trees and high crops – corn, sunflower, millet etc.	Pork and food – swill avoidance.
	Hunting – fingernails and equipment.
Perimeter – pigs jump and dig.	Dogs and cats – bringing bones onto farm.
Checking where the wild pigs are; make use of winter snow or fresh rain when looking for tracts.	Rodents and birds.
	Faecal movement – trucking, clothing, shoes, equipment.
	House pig.
	Flies from local dead pigs.
	Fresh grass from outside the perimeter.
	Bedding.

#### Sows in oestrus

Wild boar will want to visit your farm for a number of reasons. Sex is a major biological driver. If gilts and sows are housed outdoors, they are vulnerable to being mated by rogue males from outside the farm. Avoid keeping females in oestrus on the perimeter of the farm.



A sow in a perimeter paddock in heat would be a great attraction to any mature wild boar male.



Spilt feed under feed bins must be removed immediately.



#### Food

The most important biological drive for pigs, after sex is food. A ready supply of pig feed around the farm is obviously an excellent resource that the wild boar is going to want to exploit. All feed spilt, especially around feed bins must be cleared away as soon as possible. Do not allow rodents to split open feed bags resulting in spilt feed. Wasted feed will also attract flies which then multiply on your farm.

#### Perimeter

Many small farms cannot afford any type of perimeter fencing and they will be highly susceptible to incursions by wild and feral pigs. As ASF moves through the district the farms will fall like dominos.

However, the perimeter fence must be more than an illusion. The fence needs to be pig proof – more than 1.5m tall and made so pigs cannot burrow under the fence. The fence needs to be concreted into the ground or put 0.5 meter into the ground. Once built it must be maintained. The bottom of the fence must be clearly visible to security staff at all times and must be walked regularly. Records of the inspection must be kept.

If the farm has a security wall it must not become a garbage area, on either side. Farms are often full of rubbish from soda bottles, food wrappers, cigarettes; all which may be attractive to vermin.

The perimeter also creates a psychological barrier between on-farm and off-farm allowing for on-farm enhanced biosecurity of clothing and boots, essential for ASF control.

A perimeter needs to go around the whole farm, it is not just at the entrance. Openings and gates in the perimeter need to be closed and locked with no spaces under the gates where pigs could scoot under to gain access to your feed bins.

A particular area of poor perimeter defence are drainage areas and culverts which need a special grill to prevent access by pigs. **If a farm wants to prevent an ASF incursion, it must have an adequate perimeter fence.** 

Pigs which escape from the security of the farm cannot return – they may need to be eaten.



A pig proof fence must surround the farm. This must be 0.5m in to the ground and 1.5 m high and secure enough to stop a pig. Ensure the bottom of the fence is easily examined at all times.

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An open draining hole easily big enough for pigs to gain access protected by a grill.



A culvert protected by a grill so that pigs cannot gain access to the farm.



Perimeter wall which may look great but be ineffective as perimeter. Note the open gate and the tress by the wall. The overfull trash container is an open invitation to eat for wild pigs. Within 10 m of the wall is a field of high millet, which is also very inviting. Here, feral pigs can hide and sneak up on the farm.

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A small family farm by the road with pigs only protected with a makeshift fence. This is not a proper perimeter barrier.

#### Loading area

An important part of the perimeter is the loading area. Before a truck comes to the farm to pick up pigs for slaughter it should be clean. It is vital that the truck driver and staff who unload and load the pigs do not enter the farm. Design the loading area so all materials flow off farm. After the truck has left the farm the area thoroughly must be disinfected using a suitable disinfectant. Ensure the concentration is correct and allow for adequate contact time. When pigs are delivered to the farm ensure your genetic supplier is reliable.



Clean and efficient loading area.



A problem: the truck driver and farm staff loading the pigs together.

Ceva

#### Surrounding pigs

There should be no pigs housed in the land surrounding the farm, for at least 100 meters. This obviously can be very difficult. Note this also includes any isolation area.

#### Checking

We must have programmes in place to check that the farm is secure.

### Clearway outside the perimeter fence

The farm needs to check the perimeter of the farm. Have the area 100 metres around the farm close-cropped so that it is easy to see any large animal encroaching onto the farm. Pigs live naturally in the forest and so having trees right up to the perimeter is clearly not a good idea.

But you can create an ideal 'forest' of corn, sunflower or millet without thinking. The pigs can now walk up to the front door without being detected. They could even die in the field right next to the farm, their flies visiting your pigs daily.

Do not invite the pigs by having trash in this clearway.



Corn growing right up to the side of the farm provides the wild pigs with lots of hiding places



Provide a clearway of 100m around the farm so any pigs can be seen.

#### Tracking

Learn what pig tracks look like and monitor the mud and wet holes around the farm for their footprints. Learn and look for evidence of pigs living in area surrounding the farm.



Pig tracks in sand – an adult with piglets



Look for evidence that pigs are living in the area



#### Dead wild boar

Sometimes a dead wild boar is found near the farm, especially in the growing corn crop. This is a serious risk. Viable African Swine Fever virus can be found in bones 6 months after death even in decomposing pigs.

Do not let your farm staff handle the body. Most certainly do not allow any meat to be taken from the carcass for their pets or even human use. The carcass must be taken away by others, immediately. All staff who do handle the dead or wild pig must wash their hands and shower thoroughly in soap and water OFF FARM. Their clothing may be washed in a hot wash with soap. Removing all tall plant material within 100 m of the farm helps the farm identify when there is a local dead pig. Flies from a decomposing dead pig can infect your farm.



This dead wild boar was still infective.

#### ACCESS FOR ANY PIG PRODUCT: STOPPING BADDING BADDING STOPPING BADDING STOPPING STOPP

move the virus to other farms, causing a local catastrophe, as we have seen too many times around the world.

If they are moved to the slaughterhouse (often small local, even unlicensed) they will perpetuate the amount of contaminated pork products on the local, national and international market. In smoked and cured pork products, the African Swine Fever virus can remain viable for months: see table 2. ASF virus has been found in illegally imported pork products in several countries in Asia.



#### Gilt and boar sales

It is naturally incumbent on breeders to supply specific pathogen free pigs and obviously no one would want to sell pigs infected with ASFV. But there is a 2-week incubation period when then pigs may appear to be asymptomatic and so it may happen inadvertently.

#### Semen

It has to be assumed that the boar stud is maintaining excellent biosecurity. But there is a risk that in the 2-week incubation period the boar stud may be asymptomatic, but the virus could be present in semen and then the spread of ASF is possible.

#### Transport

Trucking is a particular risk in the spread of ASFV. The transport of diseased animals to the farm is very risky. Ensure there is a suitable loading area.

Before a truck comes to the farm to pick up pigs for slaughter it should be clean. When pigs are delivered to the farm ensure your genetic supplier is reliable and the truck was clean on loading. It is vital that the visiting truck driver and related staff, who unload and load the pigs, do not enter the farm.

Cleaning trucks is an extremely difficult and time consuming. The farm team needs to develop functioning standard operation procedures (SOP) and veterinarians must learn to carry out efficient audits. Relying on bacterial counting swabs is a complete waste of time when there is clearly faeces present.

All trucks which carry pigs (semen, live or dead) should be registered and have a GPS tracking device fitted to allow for rapid tracing.



Contaminated farm truck with blood and faecal material easily found in and on the vehicle



A clean truck: note the mud flaps and clean wheels. This is difficult to achieve.



Audit of a 'clean' truck, but faeces found within 2 minutes of examination. This needs to be rewashed.



#### Pork and food

We all love pork. And a lot of our favourite pork products are not cooked, just preserved by salting or smoking. In these products, African Swine Fever will persist for months.

The movement of ASFV by food products is a major source of pathogen transfer onto the farm.

Many of the long-distance movements of the virus has to be attributable to human activity.

**Table 2:** The viability of ASFV in pork products (base: Diseases of Swine 10<sup>th</sup> Edition 2012)

Product	Viable time
Carcass	6 months
Salted meat	6 months
Smoked meat	1 month
Dried meat	1 year
Cooked meat (70°C for 30 min)	0 days – no live virus – no infection
Bone	6 months
Blood products 4°C	1.5 years
Faeces at +20°C	11 days
Faeces at -20°C	Forever

#### Swill feeding

The number one route how ASFV moves between farms is through the oral consumption of food containing contaminated pig products. This is classically through human food 'waste' or swill. The current northern hemisphere epidemic started with ship waste from Africa being improperly managed and subsequently infecting local pigs in Georgia.

Farmers will use swill to reduce the cost of production. Large farms should seriously consider not utilising swill products. If you must use swill products, consider products from vegetarian or Halal restaurants which would not contain pork. But in all circumstance the swill needs to be boiled before being fed.

**Table 3:** The recommendations of processing swill to eliminate the risk of ASF by the OIE

Boiling	Pressure cooking
Cook for 60 minutes at	Cook at 3 bar
90°C with continuous	for at least 10 minutes
stirring	at 121°C

#### Drivers and pork products



Do not throw pork products out of the car window

Pork products thrown out of a truck or left in a road side trash container can then be raided by hungry foraging wild and feral pigs. At truck stops trash containers should be made pig proof. The outbreak in Czech Republic in 2017 and Belgium 2018 may well be through pig products thrown out by drivers. The outbreak in Armenia (2007) clearly followed the main highway.



#### Feed and feed products

Ideally, pig feed should not contain pig products. If it does (e.g. pig plasma), these should be properly treated prior to inclusion. Similarly, there is no reason why minerals or amino acid ingredients should be contaminated with ASFV. But if the staff in the feed mill walk over product or use dirty equipment or shovels then these could contaminate.

Biosecurity at feed mills should be exemplary anyway. We are all in the feed business and similar standards are required from field to fork.



Do not walk or drive on food products



Keep feed mills clean

#### Hunting

Hunting pigs is a popular pastime and has been for thousands of years. These hunters can be a source of ASFV. It is imperative that any person involved in hunting is not permitted access to the farm without taking the appropriate biosecurity precautions. All hunting equipment, in particular knives and arrows must not be allowed onto the farm under any circumstances.

After hunting none of the meat or pig parts – teeth for example, must be allowed to enter the farm.



The fingernails can contain ASFV after butchering a wild boar or domesticated pig

#### Dogs, cats, rodents and birds

Other animals are extremely common on Asian farms. Dogs and cats are invited onto the farm, and rodents (rats and mice) and birds are also present. Facing the threat of ASF it is vital to remove these animals from the farm. While they do not become infected with the ASFV, they can act as mechanical vectors carrying the virus.

Dogs and cats are a particular concern because if they find a pig carcass they may scavenge and then bring a bone home. African Swine Fever Virus can survive for more than 6 months in bone making this route a particular concern.

Dead pigs must be disposed of appropriately. Do not leave dead pigs exposed so that dogs and cats can scavenge.

WHAT WE HAVE TO DO TO KEEP IT OUT OF OUR FARMS?





Dog sniffing around sealed dead boxes



Farm dog scavenging on a dead sows



Dead pig pit where not all carcasses are covered promptly.



Dog print found near the dead pig pit on the left, indicating an insecure perimeter.



#### Dead pigs

Properly managed composting can reach over 50°C for considerable time and this should be sufficient to render the ASFV inactive. Farms should be encouraged to build formal composting or incineration plants so that trucks are not required to move dead stock from the farm.

#### Pig faeces

It is remarkably easy for inadvertent movement of pig faeces onto a pig farm from a third source.

The primary concern is the movement of pig faeces by humans.

This can be broadly considered into four categories

- 1. Shoes
- 2. Clothing
- 3. Equipment
- 4. Transport this has been covered previously.

#### Shoes

If shoes have faecal material adherent it is vital that this material does not find its way onto Pigs have a simple instinctive the farm. behaviour when a stranger enters their pen they surround the visitor and lick the shoes and clothing of any interesting smelling items faeces is of particular interest to pigs. A major purpose of the perimeter fence is to create a clean and clear definition of on-farm and off-farm. All off-farm shoes must remain off-farm. To prevent contamination of on-farm shoes a simple step over is advised. This also reduces the risk that any material which falls of the shoes such as drying mud or snow does contaminate foot wear which is worn in the locality of the pigs.

It should be noted that footbaths and foot mats provide little protection against African

Swine Fever as the contact time even with clean shoes is just not sufficient.



Shoes must be removed prior to entry to the farm and step over must be used to clearly differentiate between off-farm footwear and on-farm footwear.



Different colours can be extremely helpful in making the biosecurity differentiation.



Foot baths and foot mats are not sufficient in protecting the farm against ASFV, especially when they are dry!

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#### Clothing

Like shoes, clothing can carry small but deadly pieces of faeces. To eliminate this risk, farms should provide on-farm clothing, especially outer clothing, to all visitors and staff. The purpose of having a shower prior to entering into the farm is not only to wash the visitor but also to remove the visitor's clothing which can then be replaced with on-farm clothing.



Farms should supply external on-farm clothing for all visitors



Showers can be very useful to have visitors remove their off-farm clothing and put on on-farm clothing.

#### Equipment

Equipment which is contaminated with pig faeces can also act as a mechanical vector. All equipment coming onto the pig farm, needs to be assured that they are clean. Passing cleaned small items through a UV light box producing ozone can help. Bigger items can be sterilised using ozone. A particular case where equipment has been demonstrated to be the source of ASF infection, has been associated with repair and building personal.

Rectal thermometers must not be moved between farms, all farms should have their own.



#### Repair staff

When you invite builders to carry out repairs on your farm they will often bring in their own equipment, for example power tools. These can be extremely difficult to disinfect or sterilise. The most critical component is the power cable which is trailing on the floor in the pig's faeces, as the builder moves around the farm. This power cable is then coiled up and used on the next farm - often unwashed, even when the farm has excellent showering/cleaning facilities. Many repair people just do not understand the seriousness of hygiene. Note they have never been trained in biosecurity protocols. Repair staff must be interrogated about their ownership and contact with pigs at home and previous pig contact within the last 48 hours. Get them to sign documentation to this effect. Ideally provide your own equipment where possible but at least wipe all the faeces off the equipment.



When farms are being repaired the invited staff must be treated with great caution.



*Electrical cables are a particular concern when inviting repair staff to the unit.* 

#### Veterinarians

The veterinarian deals with healthy and sick animals. They are diligent, but mistakes happen. Do not allow post-mortem equipment, needles, syringes and rectal thermometers to go between farms. Ensure that the clients provide the necessary investigative equipment. In particular all farms should provide outer clothing and boots for the veterinarian. Veterinarians should clean and disinfect vital equipment thoroughly.

#### Wash hands on entry

Ensure all visitors including staff wash their hands on entry to the farm. This is to include a nail brush, soap and water – not just alcohol. *African Swine Fever virus* has an envelope and soap will start to deactivate the virus – if present on the hands.

This is particularly important for visitors who have been handling uncooked pork – including hunters or veterinarians and anyone who had bacon for breakfast!



Hand washing facilities on entry to the farm. This must include a nail brush, soap and water.

WHAT WE HAVE TO DO TO KEEP IT OUT OF OUR FARMS?



#### Downtime

People do not get infected with ASFV. African Swine Fever Virus causes absolutely no issue in man, dogs, cats, rat, mouse or other mammal besides pigs. But they can all act as a vehicle to transfer the virus by their hands, clothing, boots or equipment. Being away for 10 days and then eating a ham sandwich on the way to the farm – it is ham sandwich not the downtime that matters. What was the point of the 10 days?



House pig

ago, many pigs live in very close proximity to

people including even in the house. These pigs

are both at risk to succumbing to African Swine

Fever and via their owners becoming a risk of

infecting other pigs, some who live on large

In Asia, as was common in Europe 50 years

Bedding must come from known sources.

#### Owner

It is a sad truth that around the world the owner of the pig is often the one who most consistently break biosecurity rules. It is imperative that the boss shows clear and determined application of the farm's biosecurity protocols.





Fresh grass feed and bedding

If fresh grass or bedding is contaminated with saliva, faeces, urine, blood or body parts of infected pigs and these items are brought onto the farm, the pigs can become infected with AFSV.



*Providing bedding and grasses to pigs can significantly improve their welfare - but they must come from within the farm perimeter or from a secure site.* 

Pigs as pets



Pigs living with a family in Asia

WHAT WE HAVE TO DO TO KEEP IT OUT OF OUR FARMS?



#### Flies

Is it suspected that flies can move from the dead pig onto the farm and thus act as a mechanical vehicle for the transmission of ASFV.



Fly maggots on a decaying pig

### STOPPING MOVEMENT OF TICKS ONTO THE FARM

In Africa the tick Carios (*Ornithodorus*) spp, is an important vector as well as an important reservoir for ASF. Once infected, they may carry the virus for years. In the colder parts of the northern hemisphere the resident ticks are not considered a risk. But as the pathogen moves south into the tropical South-East Asia, other relatives of Carios may prove to be a vector and this needs to be anticipated ahead of time.

Ticks spend the majority of their life on vegetation, and only occasionally feed on vertebrates including pigs. Once infected, tick populations can harbor the African Swine fever for a long time, even in absence of pigs.

Many of the biosecurity measures listed above will also reduce the likelihood of ticks getting into contact with on-farm pigs. Additionally, removal of vegetation and trash on-farm and immediately around the farm perimeter might further reduce the risk.

Ticks are a particular concern when repopulating a previously infected farm, especially when the buildings contains wood, and/or the pigs are housed in open pens close to vegetation.



Carios tick



### OTHER **CONCERNS**

#### Rare breeds of pigs

Most pig loving countries have their own rare breeds of pig. China is unique in the pig world having a vast and vital range of pig breeds adapted for different climates and production systems. The latest revolution in Europe and now the global pig production to have over 30 psy started with the Meishan pig. It is essential that these pig breeds are preserved. African Swine Fever is a major threat to this valuable resource to the pig for tomorrow and generations to come.



Preservation of Asia's rare breeds of pigs is essential for the future of the global pig industry.

#### Other species of Suidae

*Sus scrofa* extends from Gibraltar to Singapore and is widespread in all of Eurasia. However, *Sus scrofa* is just one of many pig species which inhabit South East Asia.

The three main branches of these pigs can be illustrated by the Babyrusa, the various

Bearded pigs, the Warty pigs and the endangered Pigmy Pig. Given the range of African Swine Fever's ability of infect the Suidae family it is highly likely all these different species will be susceptible and ASF has the capacity to cause the extinction of these vital members of the pig family. It is incumbent on the farming and veterinary associations to provide sanctuary and protection for these animals.



Babyrusa



Bearded pig from Malaysia



Warty pig from the Philippines

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