



Food and Agriculture Organization
of the United Nations

Preventing transmission of ASF between domestic pigs and wild boar

Regional African Swine Fever (ASF) Wild Boar Management Workshop

(GCP/RER/060/CHC)

Belgrade, Serbia

21-23 May 2019

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Chenais et al. 2018

- 1) Sylvatic cycle: common warthogs; bushpigs and soft ticks.
- 2) Tick-pig cycle: soft ticks; domestic pigs.
- 3) Domestic cycle: domestic pigs and pig products.
- 4) Wild boar-habitat cycle: wild boar; pig- and wild boar products and carcasses; the habitat.

Domestic cycle

Pig <-> pig/contaminated products



Oral infection
less efficient
virus transmission



Contagious form: Direct (oral) transmission between domestic pigs in the absence of ticks

Chenais et al., 2018

Wild boar-habitat cycle

WB <-> WB/contaminated habitat



Oral infection
less efficient
virus transmission



Contagious form: Direct (oral) transmission between wild boar in the absence of ticks

Chenais et al., 2018

ASFV transmission to domestic pigs

- Direct contact between infected wild boar and domestic pigs
- Susceptible pigs housed in direct contact with infected wild boar became infected after 6-12 days (Gabriel et al., 2011; Pietschmann et al., 2015)

Table 1: Main sources and routes of transmission established during the outbreaks of ASF in domestic pigs in years 2008-2012

Source and transmission of virus	Number	%
Selling infected pigs	1	0,3
Neighbourhood (infected pigs in backyards)	5	1,7
Direct contact with humans (having a meal right at the farm)	1	0,3
Contact during transportation, shipping, movement	108	38
ASFV infected wild boar	4	1,4
Swill feeding	100	35
Not established	65	23
Total:	284	100

Source: Belyanin, 2013

ASFV transmission to domestic pigs

- Indirect contact to infected wild boar
 - ...by feeding infected wild boar products/uncooked swill
 - ...by contaminated fomites: surfaces of vehicles, equipment or clothing
 - ...by wild boar environment
 - contaminated bedding material, fresh grass, seeds
 - ...by blood sucking arthropods?



Tenacity

Material	Duration	Method	Reference
Feces (4°-6C)	160 days	Bioassay (i.m.)	Kovalenko 1972
Feces (4°C-RT)	3 months	Virus isolation (low titres)	Blome and Dietze, 2011 (FAO report)
Feces (4°C)	8 days	Virus isolation	Davies et al., 2015
Feces (37°C)	3-4 days	Virus isolation	Davies et al., 2015
Urine (4°C)	15 days	Virus isolation (low titres)	Davies et al., 2015
Urine (21 °C)	5 days	Virus isolation (low titres)	Davies et al., 2015
Urine (37°C)	2-3 days	Virus isolation (low titres)	Davies et al., 2015
Urine (4°-6C)	60 days	Bioassay (i.m.)	Kovalenko 1972

Tenacity

Material	Duration	Method	Reference
Blood	140 days in the dark	Bioassay	Montgomery et al., 1921
Blood	> 6 years at 4-6°C	Bioassay (i.m.)	Kovalenko et al., 1972
Blood	> 90 days	Virus isolation (high titres)	Blome and Dietze, 2011
Spleen	240 days (6-8°C)	Bioassay (i.m.)	Kovalenko et al., 1972
Spleen	>90 days	Virus isolation (high titres)	Blome and Dietze, 2011
Muscle	155 days (6-8°C)	Bioassay (i.m.)	Kovalenko et al., 1972
Muscle	183 days		McKercher, 1987
Muscle	90 days	Virus isolation (low titre)	Blome and Dietze, 2011
Fat	123 days	Virus isolation	McKercher, 1987

NOTE: the intramuscular route is more effective to infect pigs than the oral route!

Tenacity

Material	duration	method	Reference
Blood on wooden plank under soil	81 days	Bioassay (i.m.)	Kovalenko 1972
ASF-Blood on wooden plank on soil	192 days	Bioassay (i.m.)	
ASF-Blood on clay brick under soil	112 days	Bioassay (i.m.)	
ASF-Blood contaminated sand	81 days	Bioassay (i.m.)	
ASF-Blood contaminated soil	112 days	Bioassay (i.m.)	
ASF-Blood contaminated water 1:100	176 days	Bioassay (i.m.)	
ASF-Blood contaminated water 1:1000	<17 days	Bioassay (i.m.)	

But: No virus isolation possible from soil beneath positive carcasses and viral genome load very low (PCR) (Nurmoja and Zani et al., 2018)

Tenacity of meat products

Material	Duration	Method	Reference
Pork products*	16 days (22-27°C)	Virus isolation (low titre)	Kolbasov et al., 2011
	84 days 4-6°C)	Virus isolation (low titre)	Kolbasov et al., 2011
	118 days (-18 to -20°C)	Virus isolation (low titre)	Kolbasov et al., 2011
Heated ham	<5 days	Virus isolation negative (5 d)	Mc Kercher 1978
Salami/peperoni sausage	<30 days	Virus isolation negative (30 d)	Mc Kercher 1978
Iberian Ham	112	Virus isolation	Mebus et al. 1993
Serrano ham	140	Virus isolation	Mebus et al. 1997
Salami	18 days	Bio assay (oral)	Petrini et al. 2019
Pork belly	60 days	Bio assay (oral)	Petrini et al. 2019
Loin	83 days	Bioassay (oral)	Petrini et al. 2019

*corned pork, pork fat, cured pork fat, smoked pork fat

ASFV transmission to domestic pigs

- Social attitudes and economic considerations (Vergne et al., 2016)
 - lacking disease awareness in hunters and/or farmers
 - reputation



Some countries started building fences...

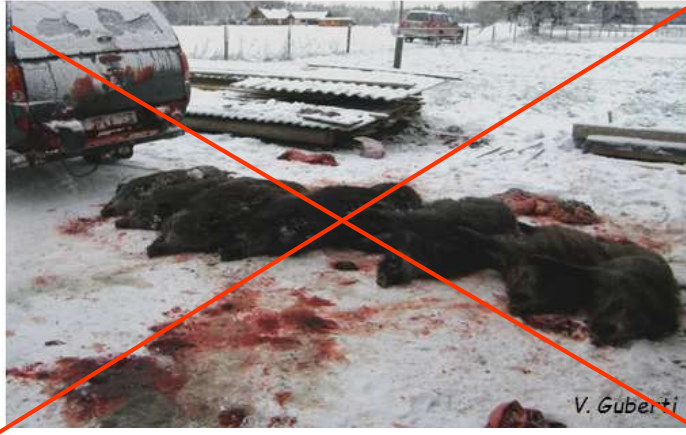


Source: <https://www.ndr.de/nachrichten/schleswig-holstein/Baubeginn-fuer-daenischen-Wildschweinzun,wildschweinzun110.html>

... to stop migrating wild boar

What can we do to prevent ASF spread from wild boar to domestic pigs?

Biosecurity during hunting!



... blood is very efficient to transmit ASF

Biosecurity during hunting...

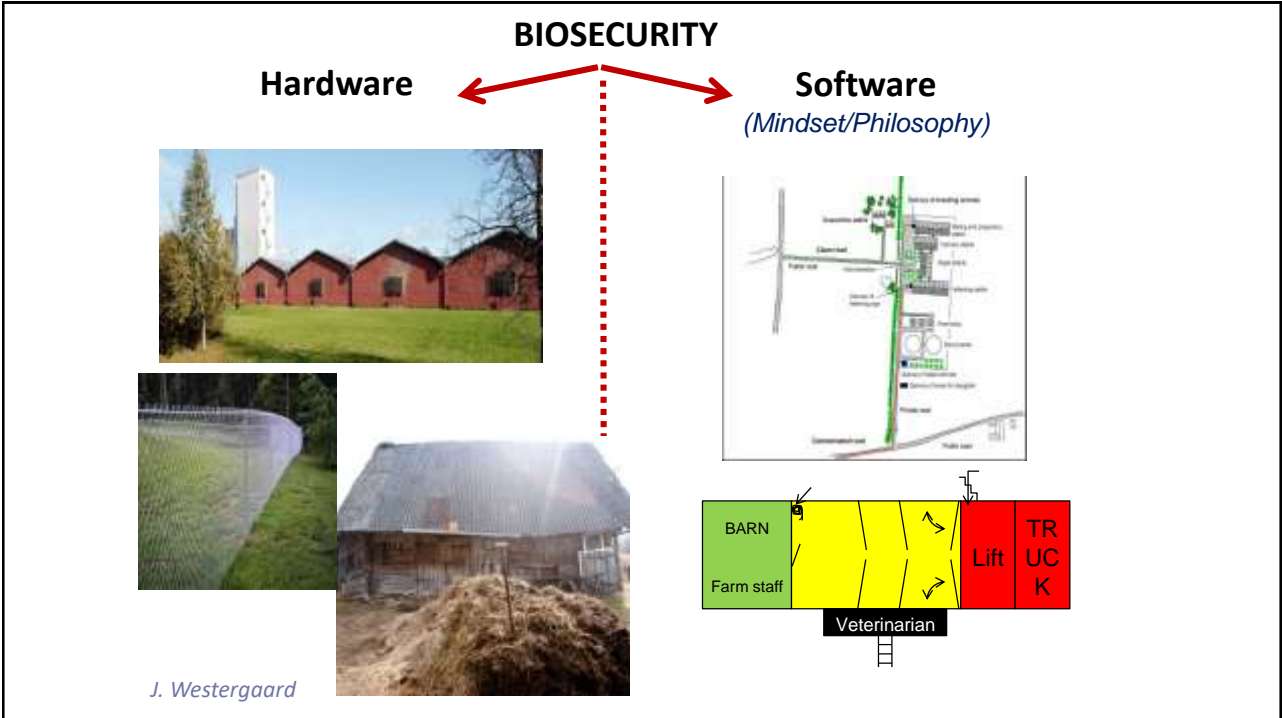
- no dressing on the spot
- transport in plastic tubs to avoid the loss of body liquids
- use designated dressing facilities
- proper disposal of dressing residues
- avoid transport of carcasses by private cars



Picture: GF-TADS handbook ASF in wild boar



Picture: Thomas Patzelt



What can we do to prevent ASF spread from wild boar to domestic pigs?

Biosecurity on farms



... looks very secure

Pictures: Klaas Dietze

Biosecurity on farms

Can be safe as well...



Pictures: Klaas Dietze

What can we do to prevent ASF spread from wild boar to domestic pigs?

NO DIRECT CONTACT BETWEEN DOMESTIC PIGS AND WILD BOAR



- stable fences/walls around farm buildings
- double fencing around areas with free ranging pigs

What can we do to prevent ASF spread from wild boar to domestic pigs?

NO CONTACT BETWEEN DOMESTIC PIGS AND WILD BOAR



- challenging in organic pig farming / free-ranging pig herds



→ distance of at least 2 meters between two fences

What can we do to prevent ASF spread from wild boar to domestic pigs?

NO DIRECT CONTACT BETWEEN DOMESTIC PIGS AND WILD BOAR



- safely closed and fenced carcass container
- if other adequate carcass disposal is impossible, cadavers must be buried safely

Anything we can quickly dig out by shovel a wild boar can access easily!

What can we do to prevent ASF spread from wild boar to domestic pigs?

NO SWILL FEEDING



- any uncooked pork product from infected pigs can transmit the disease
- high tenacity of the virus especially in meat/blood

What can we do to prevent ASF spread from wild boar to domestic pigs?

NO UNPROCESSED FEED OR BEDDING MATERIAL HARVESTED IN AREAS WITH INFECTED WILD BOAR



- ASF is safely inactivated by heat:
 - 56°C for 70 minutes
 - 60°C for 20 minutes
- avoid material from ASF affected areas

What can we do to prevent ASF spread from wild boar to domestic pigs?

NO ACCESS OF VISITORS/HUNTERS TO THE FARM



- quarantine of 48 h before entering the pig stable after hunting
- access to pig facilities only to staff (no visitors)
- changing clothing/shower before and after entering the stable



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Thank you for your attention!

Source: Kaden et al., Forschungsreport 2007