



Food and Agriculture Organization  
of the United Nations



## Introduction to African swine fever

Daniel Beltran Alcrudo

*Animal Health Officer  
Regional Office for Europe and Central Asia  
FAO*

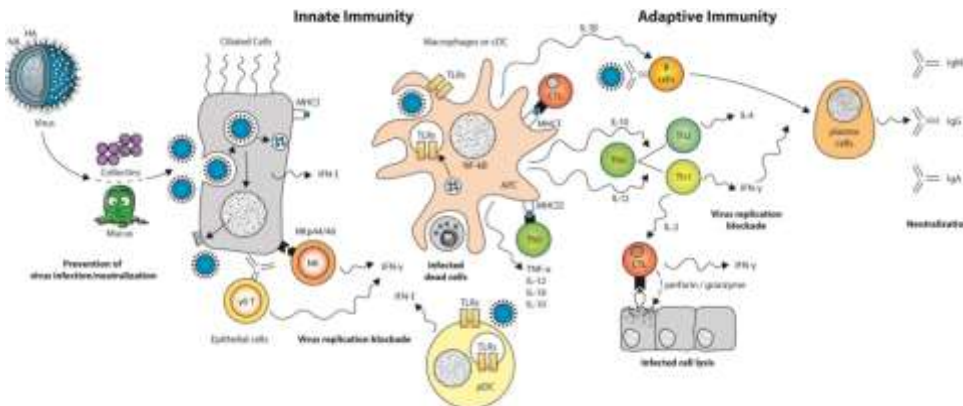


## Key features

- High lethality
- Huge losses (livelihoods, production, trade)
- Very difficult to control once established
- Spreads through infected meat



**There are no vaccine or a treatment against ASF**



## The host

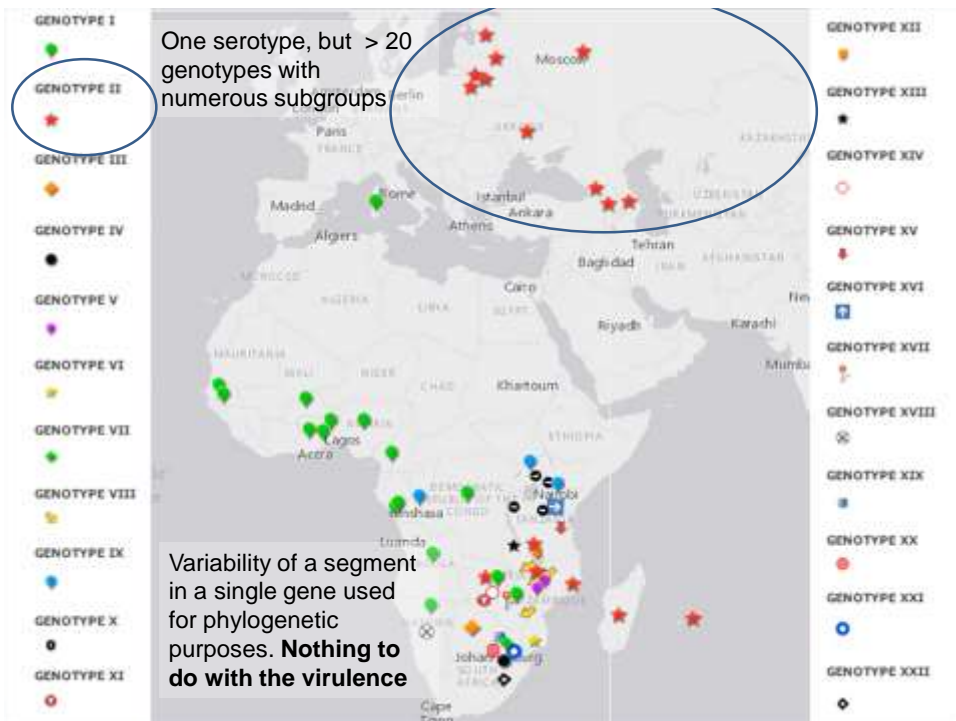
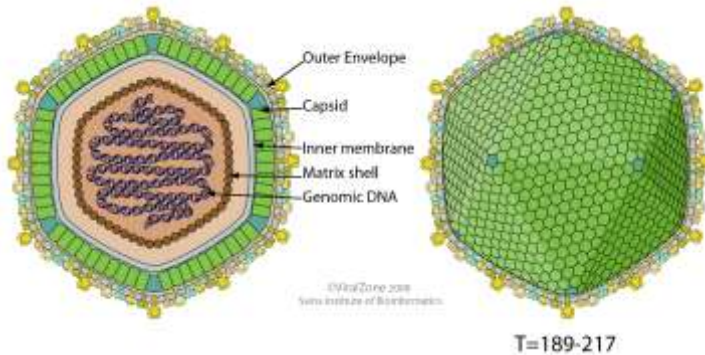
- In Africa, ASF naturally circulates in wild suids that show no clinical signs.
- Domestic pigs of all ages and gender
- Feral pigs and wild boar equally susceptible
- Humans are NOT susceptible
- *Ornithodoros* ticks are the other true reservoir





## The virus

- A unique, enveloped, cytoplasmic, double-stranded DNA arbovirus
- Resistant virus to a wide range of T and PH
- Resistant in meat and the environment





ITEM	ASF SURVIVAL
Smoked meat	30 days
Salted meat	182 days
Dried meat	300 days



ITEM	ASF SURVIVAL
Chilled meat	110 days
Skin/Fat (even dried)	300 days
Frozen meat	1,000 days







**However...**

ITEM	ASFV SURVIVAL TIME
Cooked meat (minimum of 30 minutes at 70°C)	0 days
Canned meat	0 days



Obvious implications for the epidemiology and disease control  
**→ Stable in carcasses (dead animals) for 3-5 weeks**





ITEM	ASF SURVIVAL
Blood	>90 days
Feces at room temperature	11 days
Putrified blood	15 weeks
Contaminated pig pens	1 month



## How to destroy ASF virus?

Heat (70°C, 30 min)

Sunlight

Appropriate disinfectants for ASF:

- 2% caustic soda (sodium hydrate)
- Detergents and phenol substitutes
- Sodium or calcium hypochlorite (2-3%)
- Iodine compounds

**Cleaning before disinfection!**





## Clinical presentation



- Clinical signs highly variable
  - Depending on virus virulence, breed, route of exposure, infectious dose
  - Sometimes only fever and death, or unspecific signs
  - Presentation in the field not identical to experimental cases
- Within-herd spread may vary greatly



## How do pigs/wild boar get infected?

- Direct contact with sick animals or infected blood
- Mating







## How do pigs/wild boar get infected?

- Feeding on garbage (scavenging/free-roaming)
- Swill feeding
- Scavenging on carcasses



## How do pigs get infected?

- Soft ticks (*Ornithodoros*)
- Other mechanical vectors?







## How do pigs get infected?

- Contaminated fomites (vehicles, clothes,...). Infected fodder?



## How do pigs get infected?

- Iatrogenic

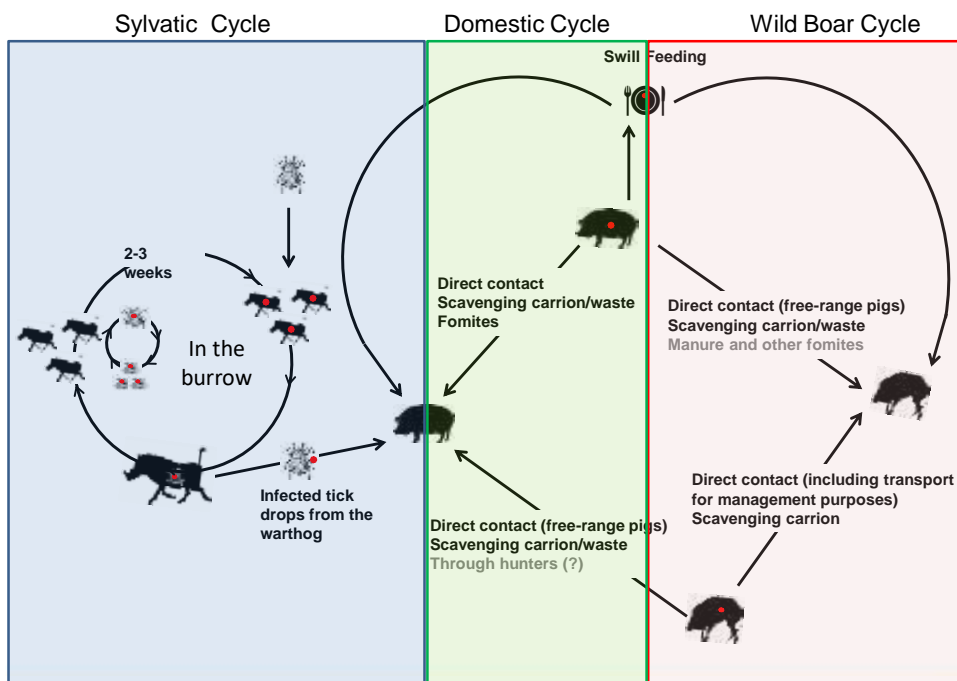




## How do pigs **NOT** get infected?

- Aerosol
- Water, i.e. lakes or rivers
- Mechanical vectors (?)

**IT IS ALL ABOUT HUMAN BEHAVIOUR!**





## The importance of pig and pork value chains

- High within-country variability
- High seasonality
- Highly dynamic in response to the markets, e.g. an ASF epidemic
- Many unknowns

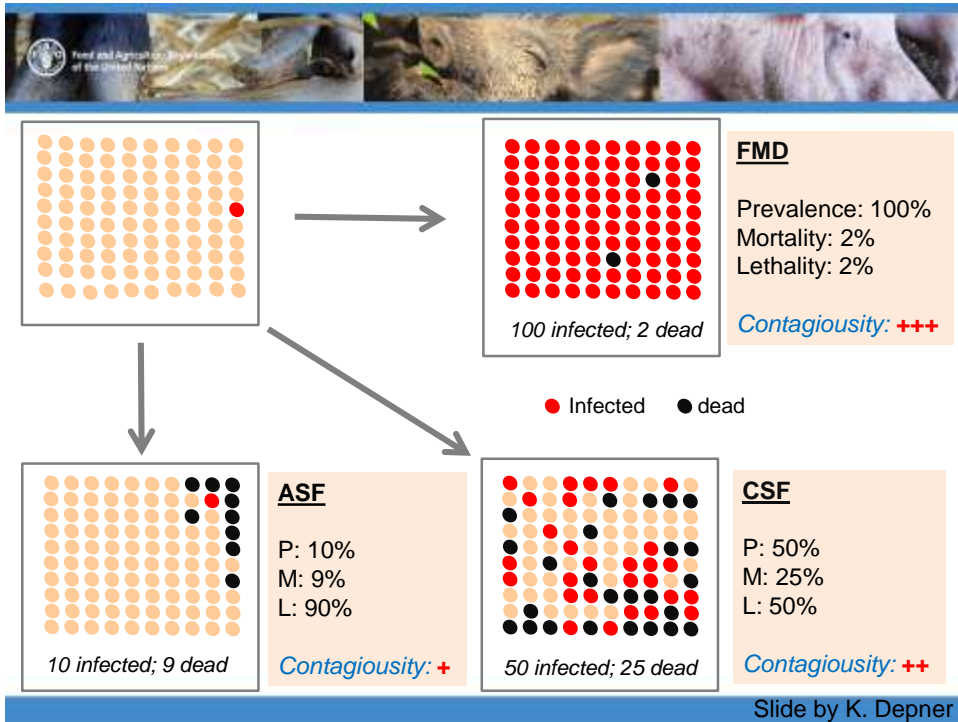
**BUT UNDERSTANDING THEM WELL IS KEY FOR PREVENTION**



## Key epidemiological characteristics

- Despite what textbooks say, ASF is not a highly contagious disease – BUT it is highly lethal



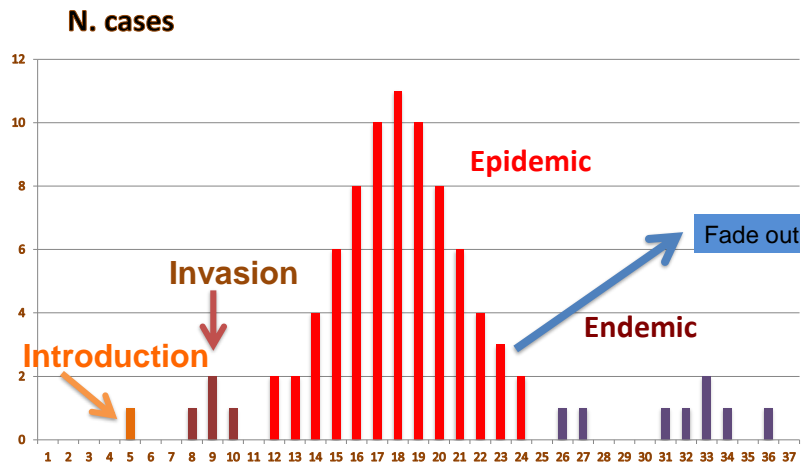


## Key epidemiological characteristics

- Despite what textbooks say, ASF is not a highly contagious disease
- ASF usually presents itself in waves



## The 4 phases of a transmissible disease

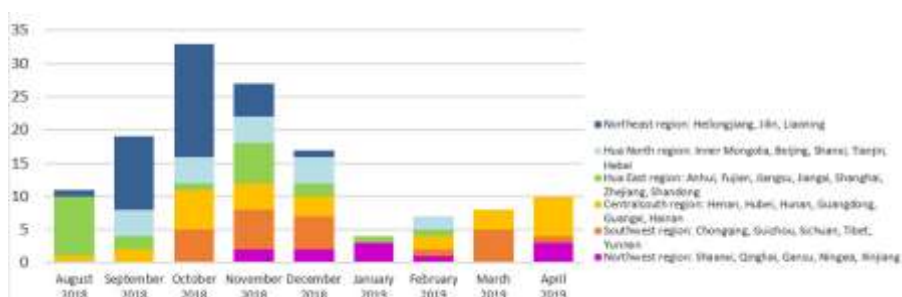


Slide by K. Depner



## Key epidemiological characteristics

- Despite what textbooks say, ASF is not a highly contagious disease
- ASF usually presents itself in waves
- Strong seasonality



## Unpredictable behavior as ASF spreads

<b>ASF Africa</b> <ul style="list-style-type: none"> <li>• 1910s-Today</li> <li>• Multiple genotypes</li> <li>• Sylvatic cycle</li> <li>• Tick-Pig cycle</li> <li>• Mostly domestic cycle (as waves)</li> </ul>	<b>ASF in Iberian Peninsula</b> <ul style="list-style-type: none"> <li>• 1960s-90s</li> <li>• Genotype I</li> <li>• Pig cycle</li> <li>• Tick-Free range pigs challenging</li> <li>• Finally controlled</li> </ul>	<b>ASF jumps (Europe &amp; Caribbean)</b> <ul style="list-style-type: none"> <li>• 1960s-1980s</li> <li>• Genotype I</li> <li>• Domestic cycle</li> <li>• Fast control (sometimes extreme measures)</li> </ul>	<b>ASF in Sardinia</b> <ul style="list-style-type: none"> <li>• 1970s-Today</li> <li>• Genotype I</li> <li>• Domestic cycle, (illegal free-range)</li> <li>• Spill-over in wild boar</li> </ul>
<b>ASF in ex-USSR</b> <ul style="list-style-type: none"> <li>- 2007-Today</li> <li>- Genotype II</li> <li>- Pig cycle</li> <li>- Spill over in wild boar, sometimes for long periods</li> </ul>	<b>ASF in Baltics &amp; Central Europe</b> <ul style="list-style-type: none"> <li>- 2012-Today</li> <li>- Endemic in wild boar</li> <li>- Slow spread</li> <li>- Sporadic outbreaks in pigs</li> </ul>	<b>ASF in Romania</b> <ul style="list-style-type: none"> <li>- 2018</li> <li>- Genotype II</li> <li>- Bushfire-like spread in pigs</li> <li>- Few wild boar affected</li> </ul>	<b>China</b> <ul style="list-style-type: none"> <li>- 2018</li> <li>- Genotype II</li> <li>- Only domestic pigs??</li> </ul>





## Clinical presentation

Mortality: 90-100% HIGH      ~60% MODERATE      2-10% LOW

Virulence: HIGH      MODERATE      LOW

Peracute      Acute      Subacute      Chronic      Asymptomatic

	Peracute ASF	Acute ASF	Subacute ASF	Chronic ASF
<b>Fever</b>	High	High	Moderate	Irregular or absent
<b>Thrombocytopenia</b>	Absent	Absent or slight (late)	Transient	Absent
<b>Skin</b>	Erythema	Erythema	Erythema	Necrotic areas
<b>Lymph nodes</b>	-	Gastrohepatic and renal with marbled aspect	the majority of lymph nodes resemble a blood clot	Swollen
<b>Spleen</b>	-	Hypersplenism	Partial hyperaemic splenomegaly or focal infarction	Enlarged with normal colour
<b>Kidney</b>	-	Petechial haemorrhages, mainly in cortex	Petechial haemorrhages in cortex, medulla and pelvis; peri-renal oedema	-
<b>Lung</b>	-	Severe alveolar oedema	-	Pleuritis and pneumonia
<b>Gall bladder</b>	-	Petechial haemorrhages	Wall oedema	-
<b>Heart</b>	-	Haemorrhages in epicardium and endocardium	Haemorrhages in epicardium and endocardium; hydropericardium	Fibrinous pericarditis
<b>Tonsils</b>	-	-	-	Necrotic foci
<b>Reproductive alteration</b>	-	-	Abortion	Abortion

**Current Genotype II in Eurasia**



## Clinical signs

- Generally characterized by the sudden death of pigs
- All ages and both genders may be affected
- Wild boar shows the same clinical signs



## Peracute

- high fever (41-42 °C)
- loss of appetite and inactivity
- Sudden death within 1-3 days before any clinical sign.
- Often, no apparent clinical signs nor lesions in organs





## Acute (1)

- After 4-7 days incubation period (seldom, up to 14 days)
- Fever of 40-42 °C
- Lack of appetite
- Increased respiratory rate.
- Death within 6-9 days for highly virulent strains, or 11-15 days for moderately virulent isolates.
- Lethality up to 90-100 %
- Ocular and nasal discharge;
- Sleepy and weak, lie down and huddle
- Carcasses in good body condition







## Acute (2)

- Infected pigs may show one or several of the following signs:
  - constipation or diarrhoea, which may progress to bloody
  - vomiting
  - abortion at all stages of pregnancy;
  - haemorrhagic lesions, reddening, cyanosis...









*Cyanosis (bluing) at the tips of ears*



*Necrotic lesions on skin of the abdomen, neck and ears*







## Acute form in wild boar – Clinical signs

- Same signs in wild boar and feral pigs.
- Colour changes and haemorrhages in the skin easily missed in due to darker skin and thick hair.
- The same applies to dark-skinned pig breeds.









**Acute form – Not typical post-mortem findings**

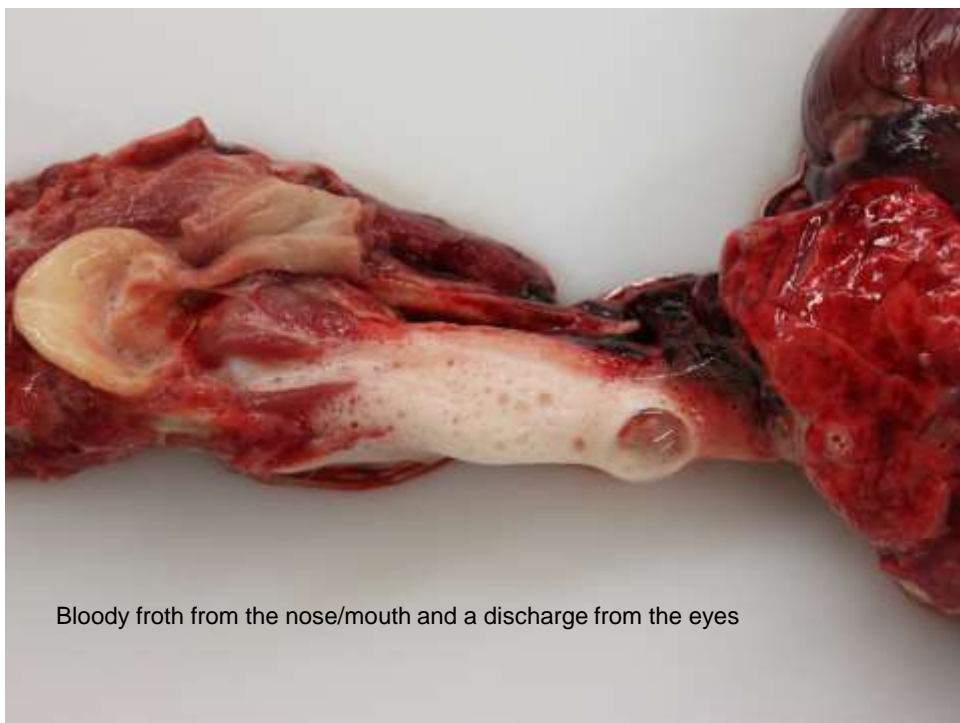
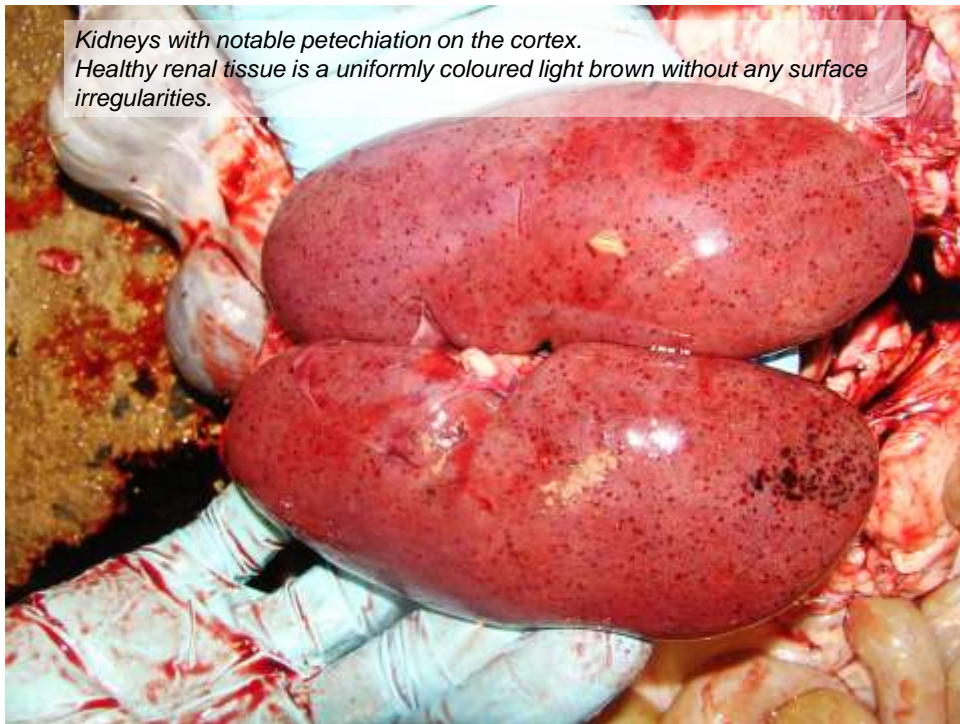


*Haemorrhagic and enlarged gastrohepatic and renal lymph nodes. Non-diseased tissue is a healthy white/pink colour without inflammation.*



*Spleen often enlarged, friable (fragile) and shows signs of infarction (dark area). Healthy spleens are uniformly coloured (red-brown) and textured.*



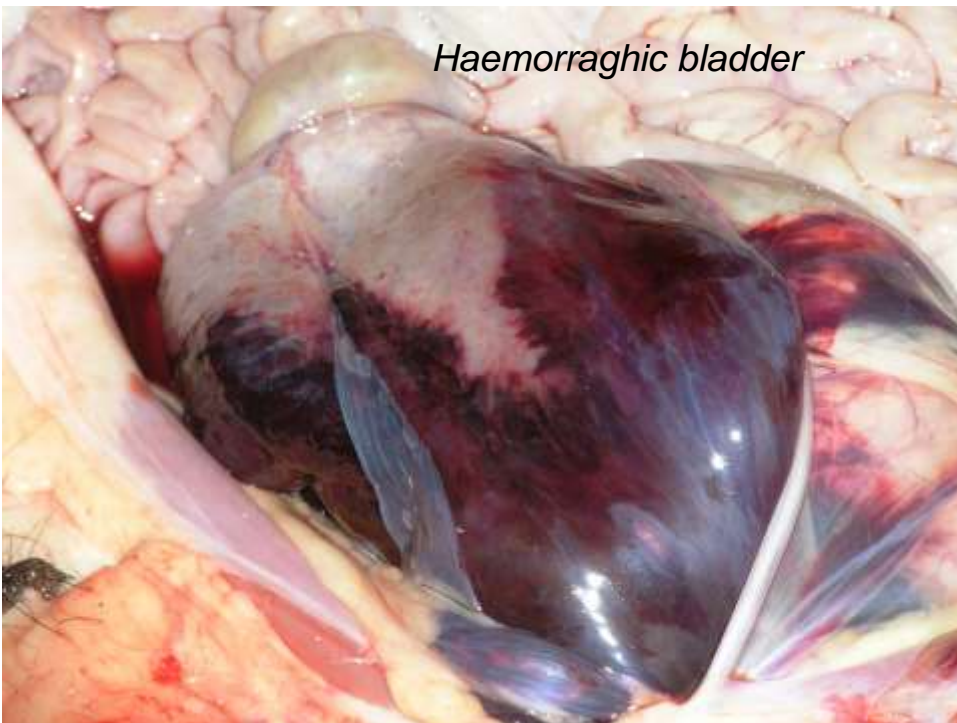


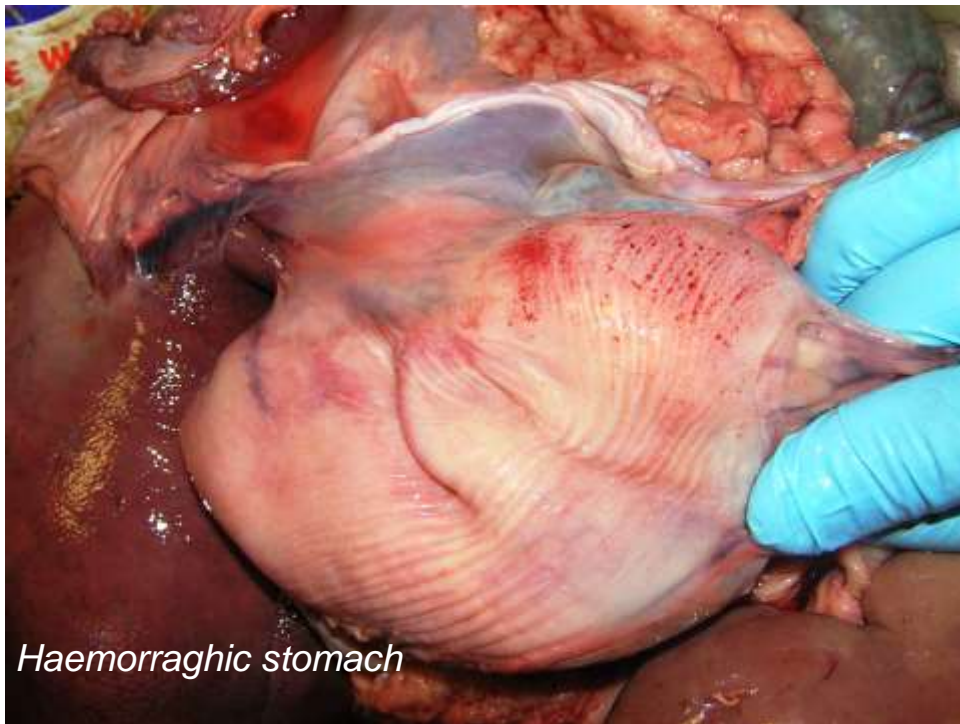


*Haemorrhagic heart*



*Haemorrhagic bladder*



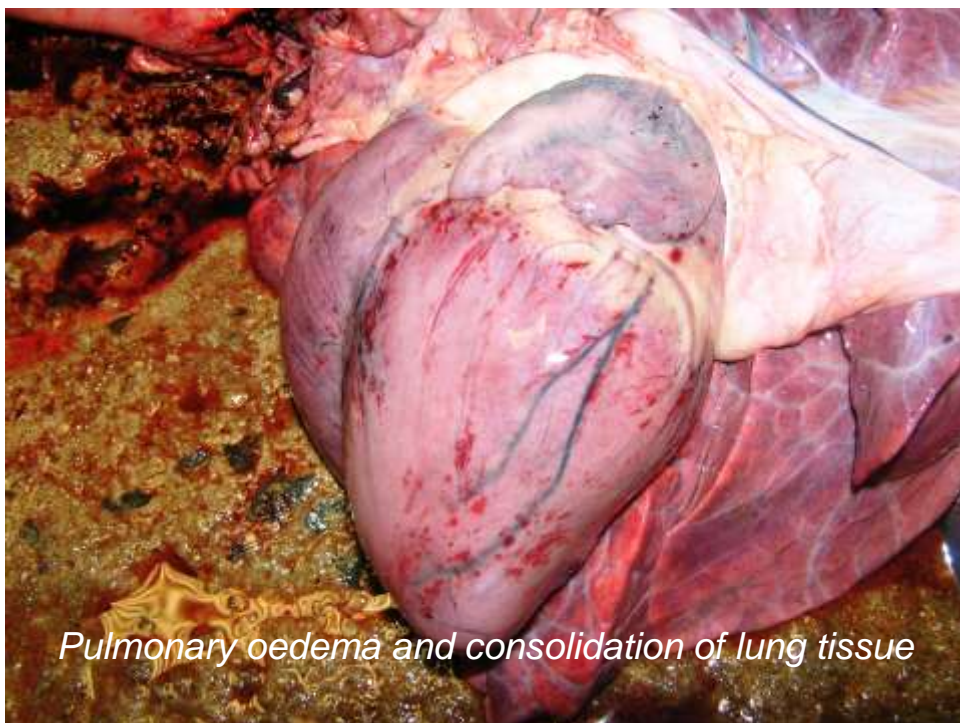
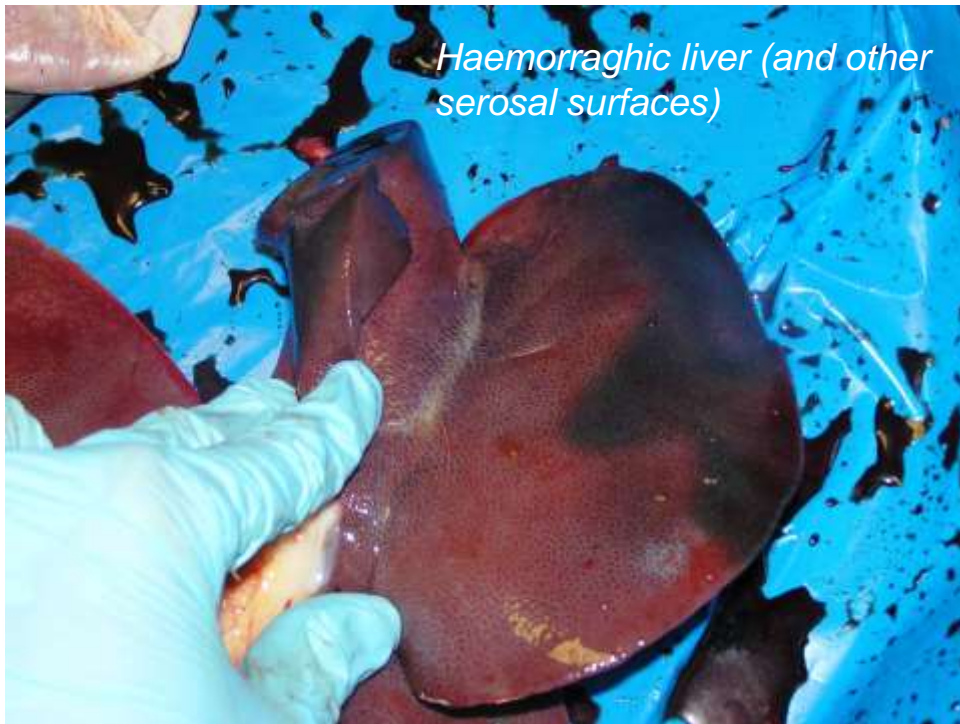


*Haemorrhagic stomach*

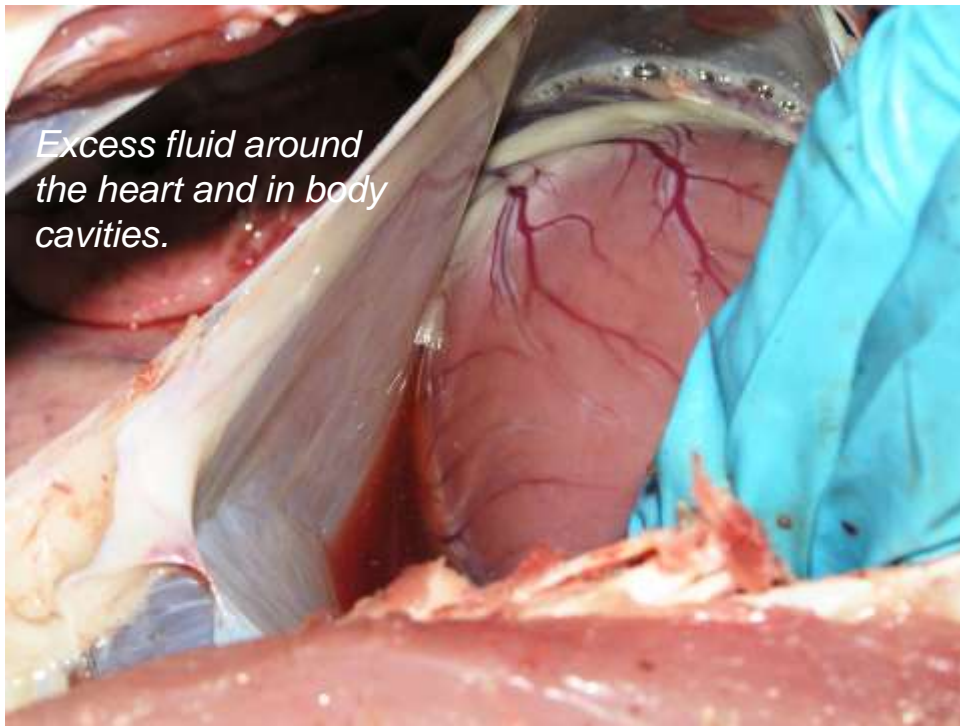


*Haemorrhagic  
intestines*









**How about post-mortem findings in wild boar?**

Exactly the same!

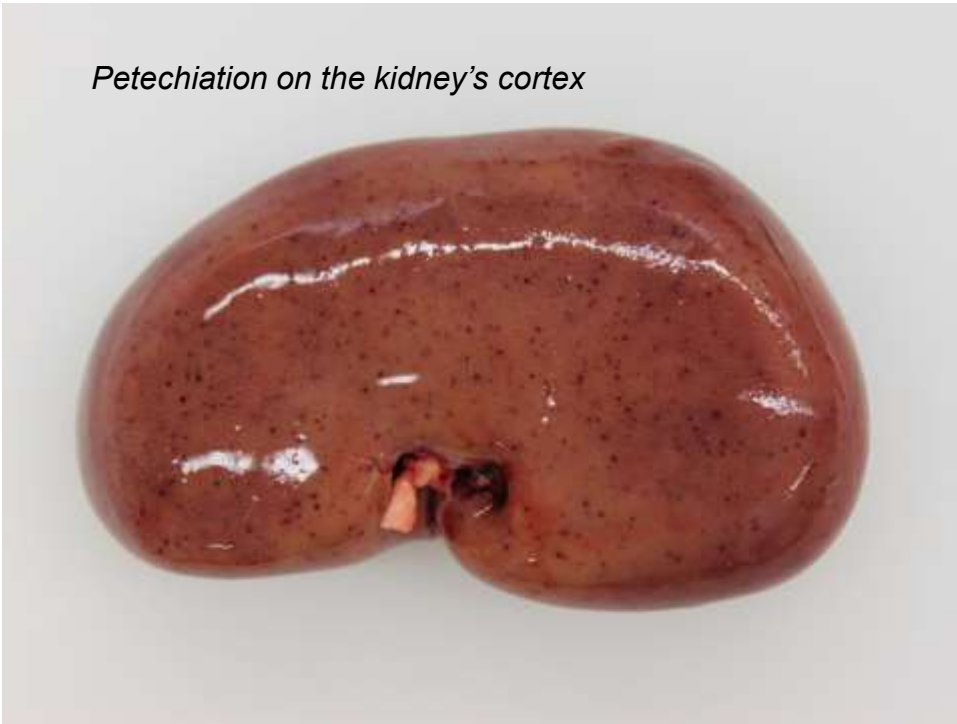


*Haemorrhagic gastrohepatic lymph node*



*Haemorrhagic kidney*

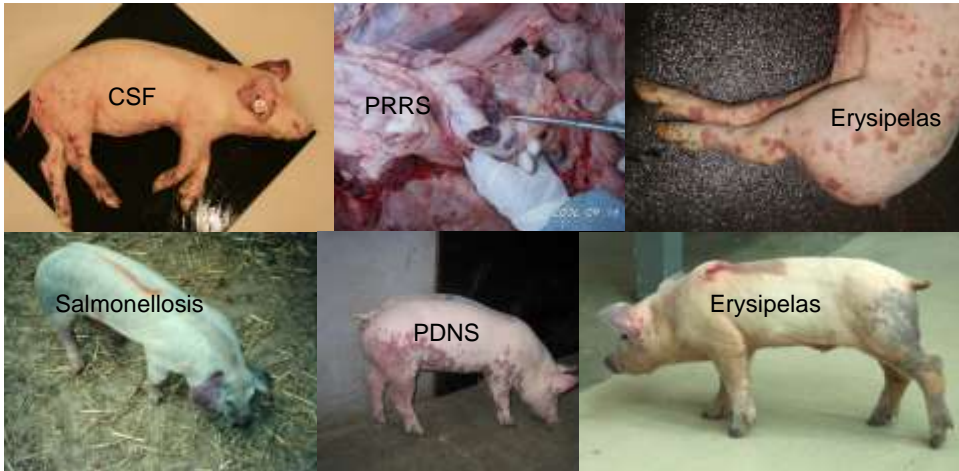
*Petechiation on the kidney's cortex*



*Spleen enlarged*







**Thanks for your attention**