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Introduction to African swine fever

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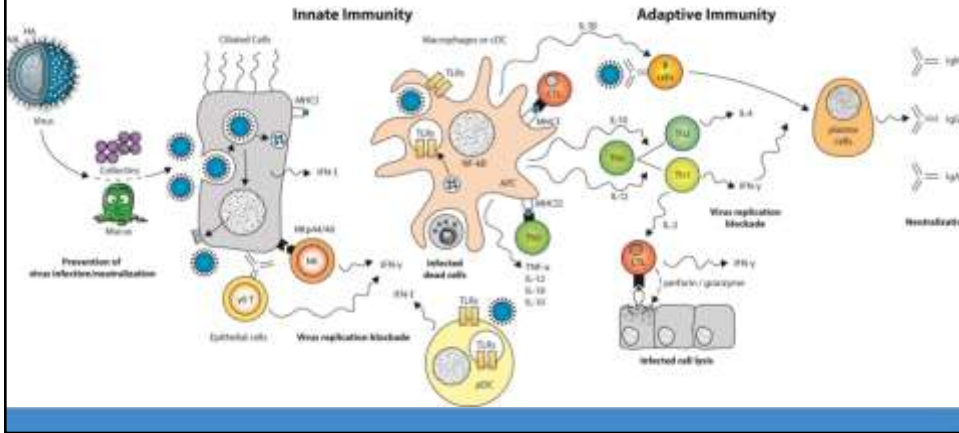


Key features

- 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





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



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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

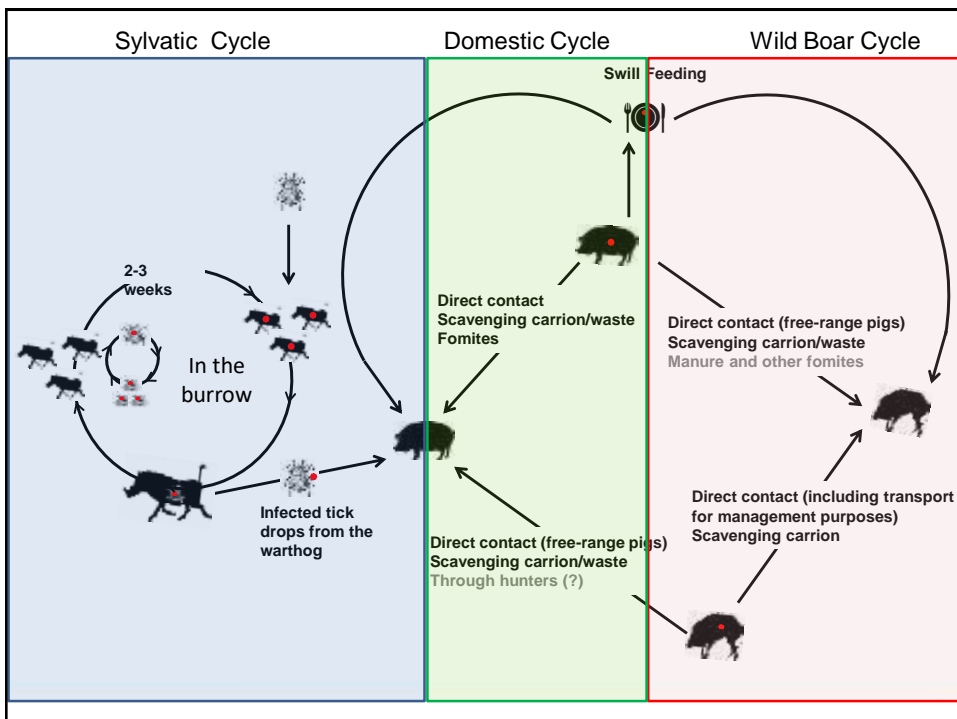




How do pigs **NOT** get infected?

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

IT IS ALL ABOUT HUMAN BEHAVIOUR!





The importance of pig and pork value chains

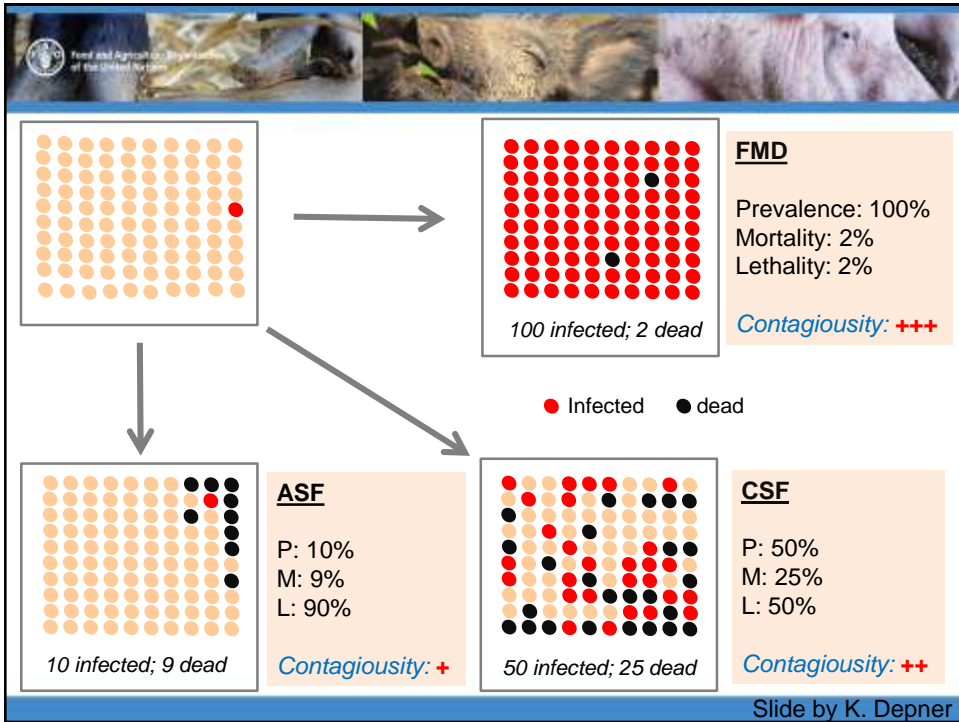
- High within-country variability
- High seasonality
- Highly dynamic in response to the markets, e.g. an ASF epidemic
- Many unknowns

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



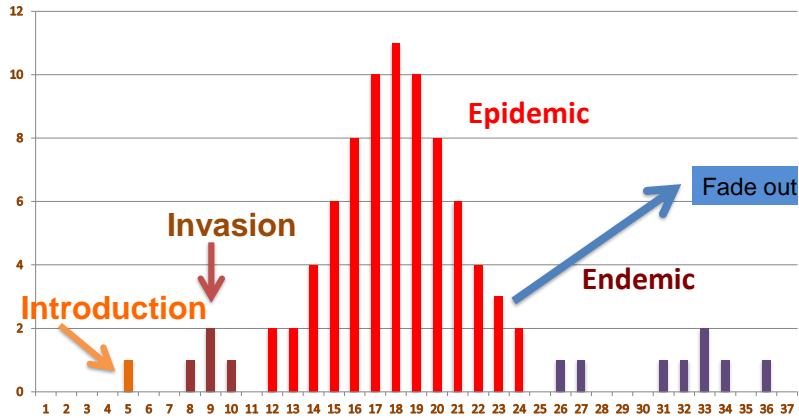
Key epidemiological characteristics

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



The 4 phases of a transmissible disease

N. cases

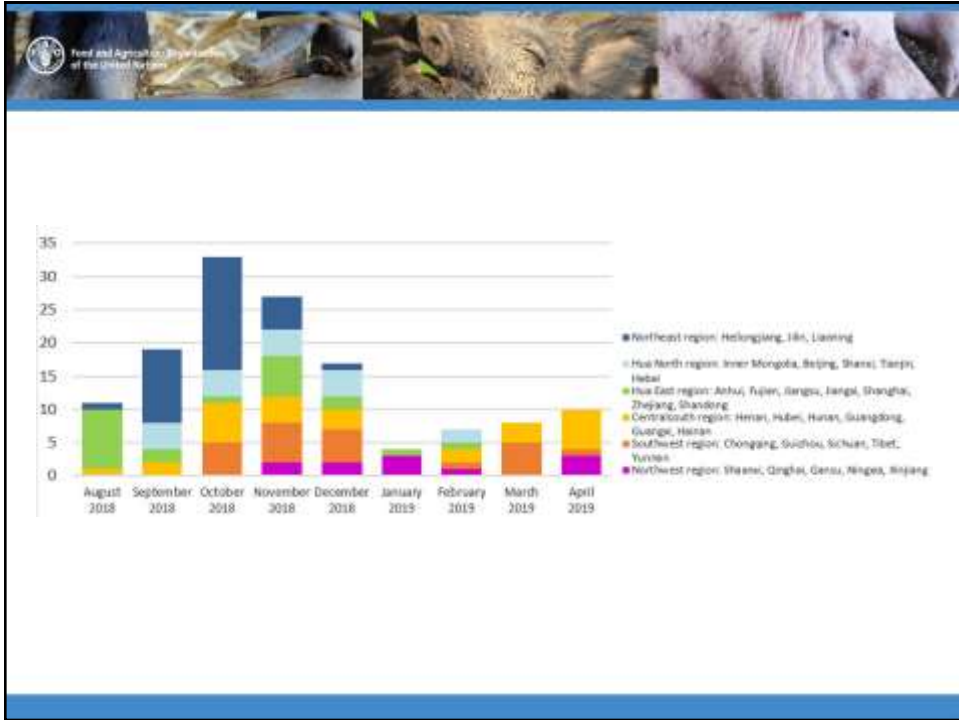


Slide by K. Depner



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

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



Clinical presentation

	Peracute	Acute	Subacute	Chronic	Asymptomatic
Mortality:	90-100%	~60%		2-10%	
Virulence:	HIGH	MODERATE		LOW	
	Peracute ASF	Acute ASF	Subacute ASF	Chronic ASF	
Fever	High	High	Moderate	Irregular or absent	
Thrombocytopenia	Absent	Absent or slight (late)	Transient	Absent	
Skin	Erythema	Erythema	Erythema	Necrotic areas	
Lymph nodes	-	Gastrohepatic and renal with marbled aspect	the majority of lymph nodes resemble a blood clot	Swollen	
Spleen	-	Hypersplenomegaly	Partial hyperaemic splenomegaly or focal infarction	Enlarged with normal colour	
Kidney	-	Petechial haemorrhages mainly in cortex	Petechial haemorrhages in cortex, medulla and pelvis; peri-renal oedema	-	
Lung	-	Severe alveolar oedema	-	Pleuritis and pneumonia	
Gall bladder	-	Petechial haemorrhages	Wall oedema	-	
Heart	-	Haemorrhages in epicardium and endocardium	Haemorrhages in epicardium and endocardium; hydropericardium	Fibrinous pericarditis	
Tonsils	-	-	-	Necrotic foci	
Reproductive alteration	-	-	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





Bloody froth from the nose and mouth





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.

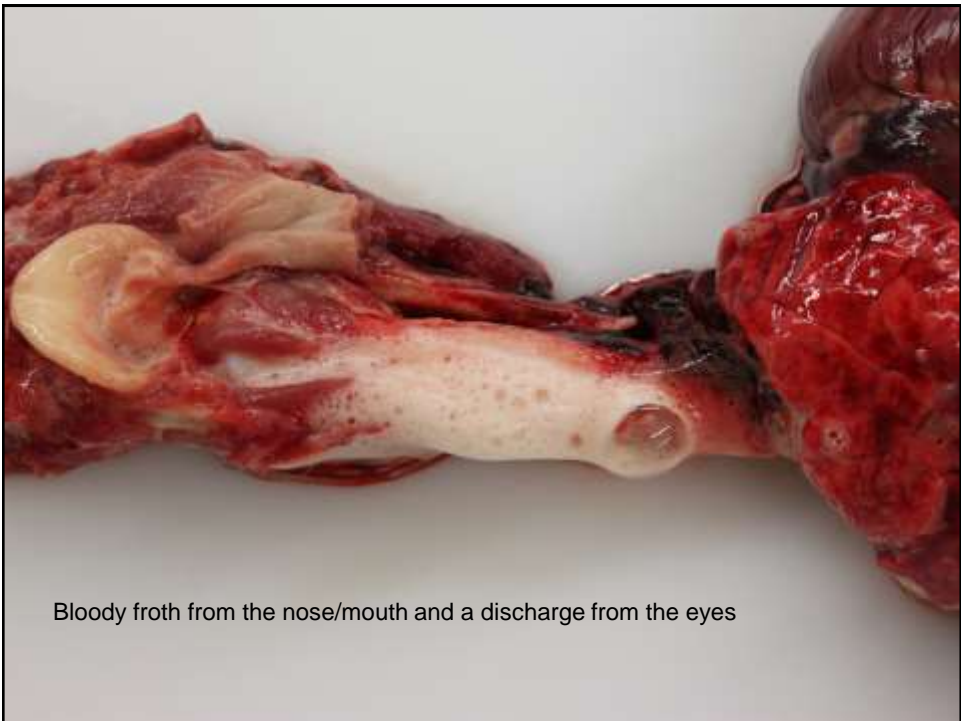






Acute form – Not typical post-mortem findings

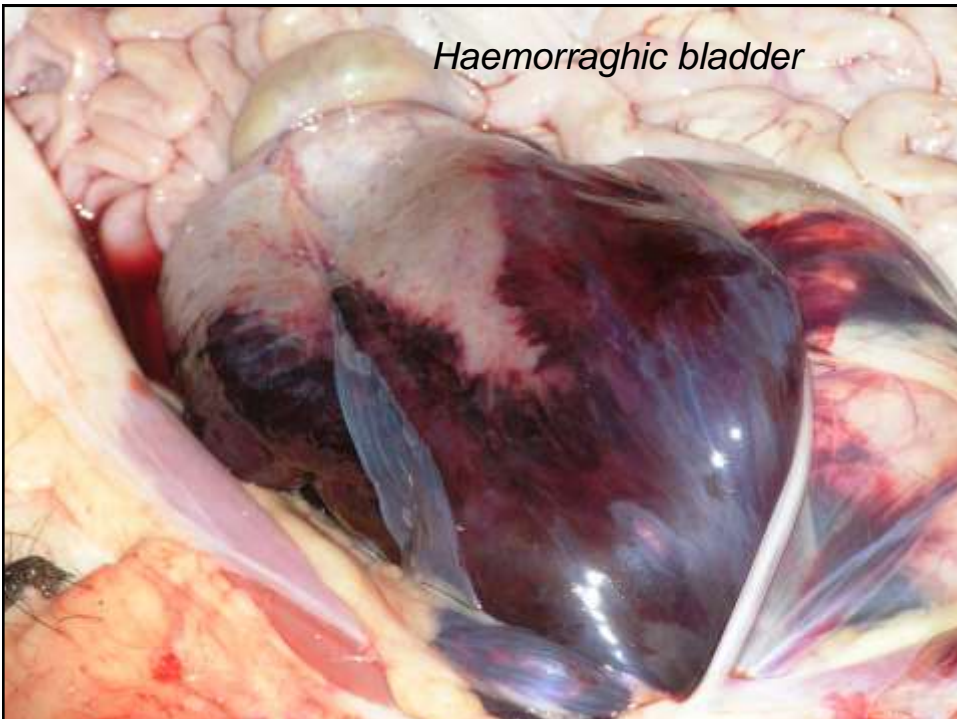


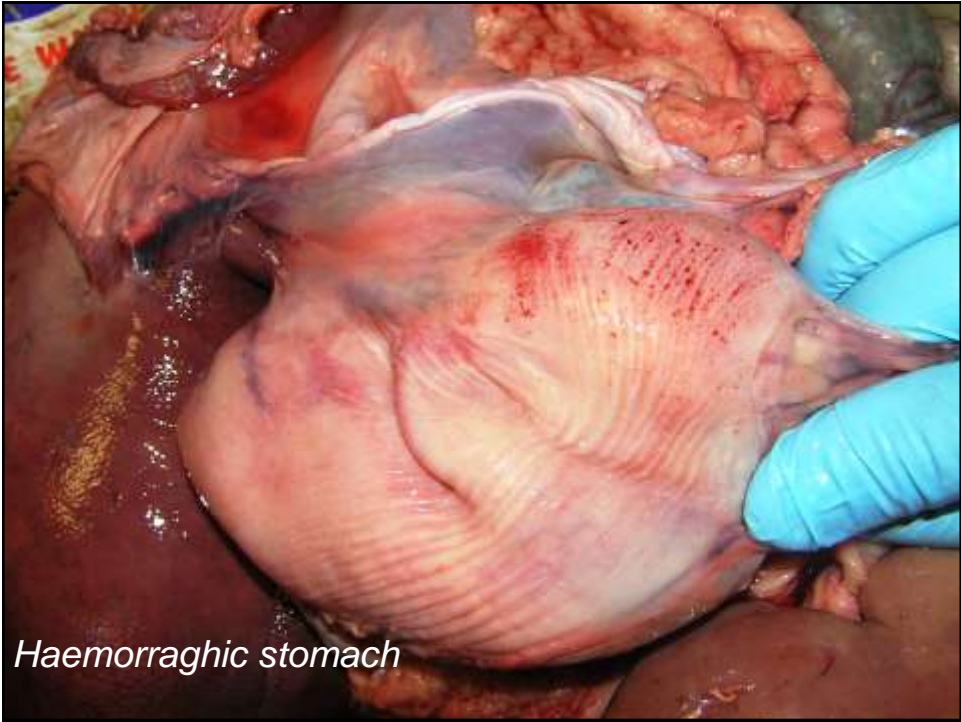


Haemorrhagic heart



Haemorrhagic bladder

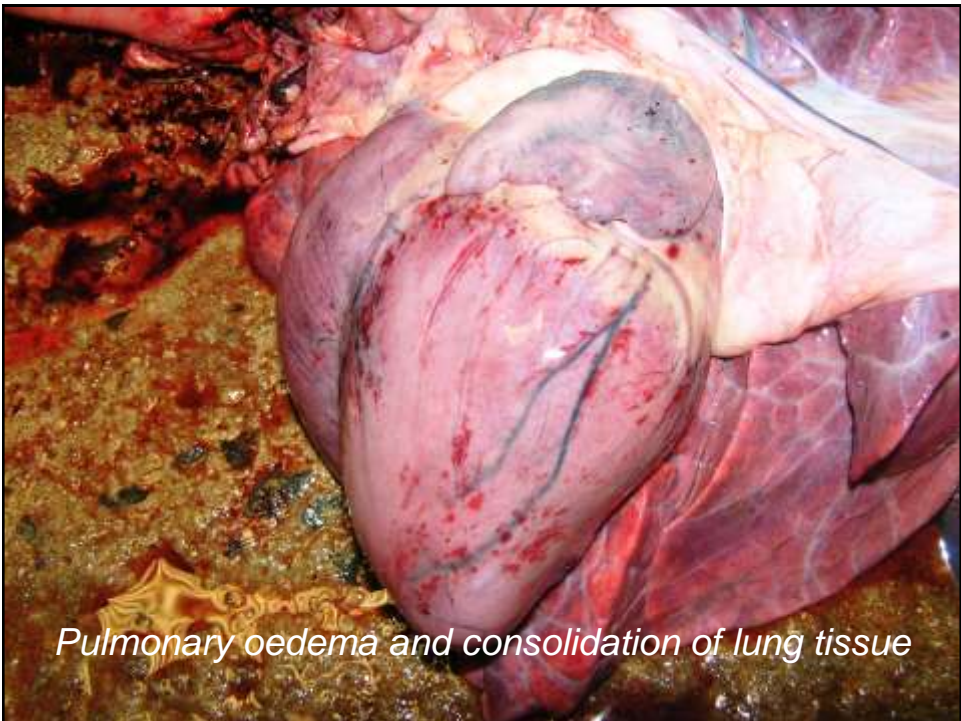


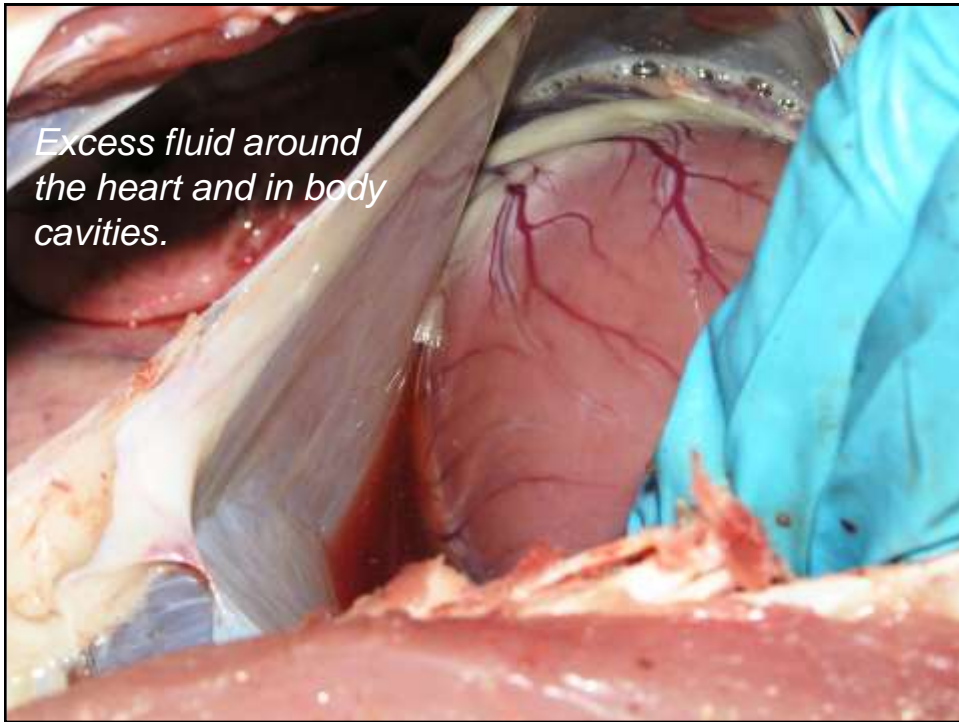


Haemorrhagic stomach



Haemorrhagic intestines



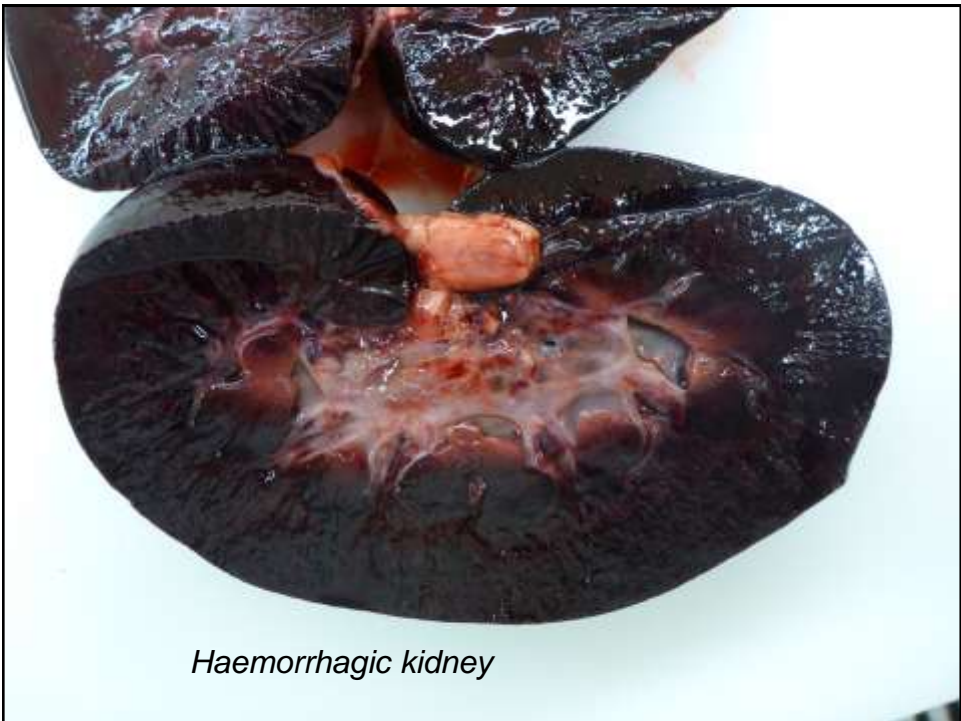


How about post-mortem findings in wild boar?

Exactly the same!



Haemorrhagic gastrohepatic lymph nodes



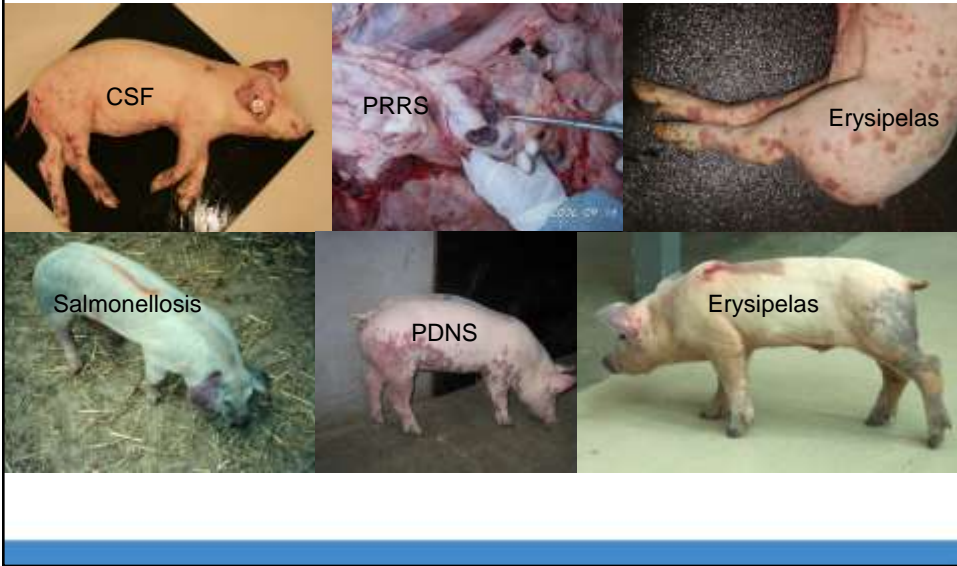
Haemorrhagic kidney

Petechiation on the kidney's cortex



Spleen enlarged





Thanks for your attention