Better Training for Safer Food

Initiative

Introduction to African swine fever

BTSF

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(prepared in collaboration with M.Masiulis)

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Belgrade, Serbia 6-8 November 2018

Food safety

African Swine Fever Virus

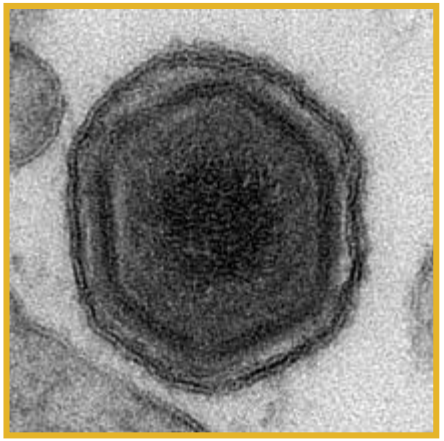
"Highly" contagious viral disease of swine

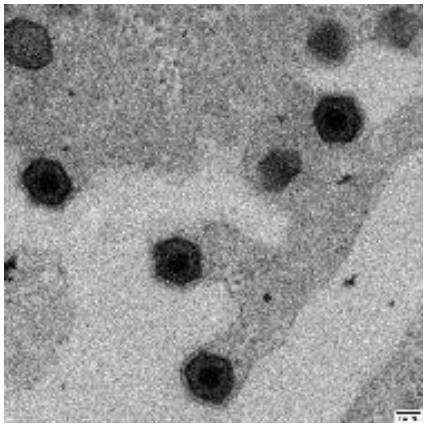
Asfarviridae

- Enveloped DNA virus;
- Transmitted by arthropods;

Isolates vary in virulence:

- High virulence: up to 100% mortality;
- Low virulence: seroconversion.





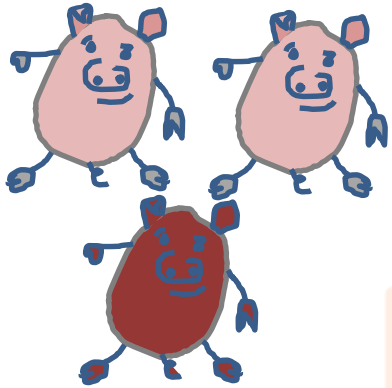
ASF is defined as:

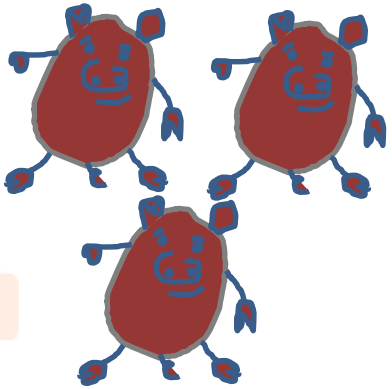
*"a **highly contagious** hemorrhagic disease of suids…"*

Reality:

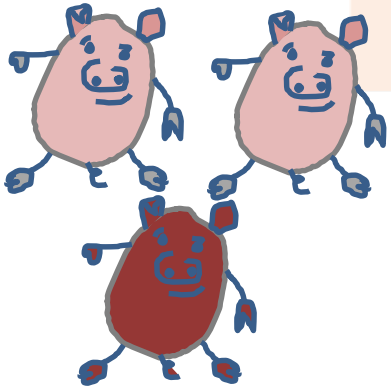
-> ASF is **not** a very highly contagious disease

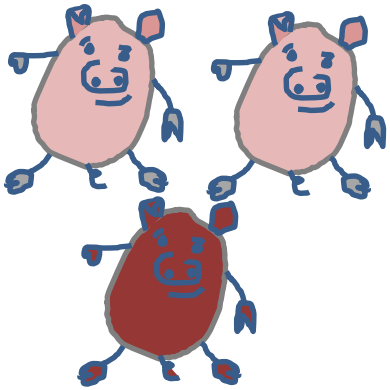
Defining ASF as *"highly contagious"* leads to false expectations and underestimation of the problem…





Expectation





+3d

African Swine Fever Virus

- *Highly resistant;*
- *Killed by high temps and some disinfectants;*
- *Affects domestic and wild pigs.*

European susceptible species:

- Domestic pigs and European wild boar
- All age categories (no age dependency)
- Without gender predilection

(African wild swine – warthog - are unapparent infected and act as reservoir hosts for ASFV in Africa)

It is not a zoonosis!

Environmental Persistence

Stable at pH 4-13…

Survives at least:

- *11 days in feces (room temp)*
- *1 month in soiled pig pens*
- *70 days in blood on wooden boards*
- *15 weeks in putrefied blood*
- *18 months in blood at 4°C*

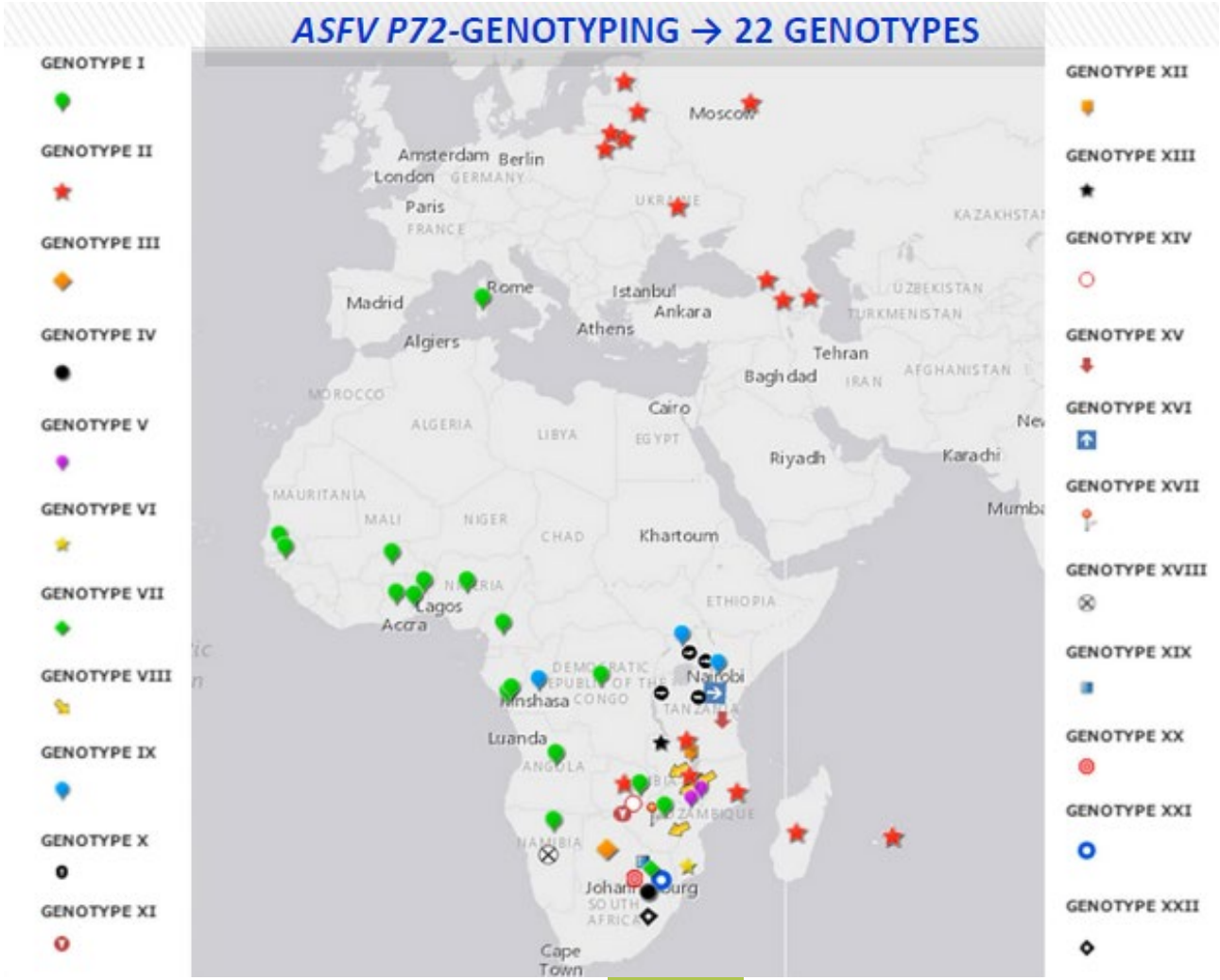
ASF VIRUS IS VERY STABLE

Carcasses: 3 – 5 weeks infectious

- 140 days in Iberian and Serrano hams
- 399 days in Parma ham
- 112 days in Iberian pork loins.
- 18 months in pig blood at 4°C
- 11 days in faeces at 20°C
- **Stable in carcases (dead animals) which decompose**

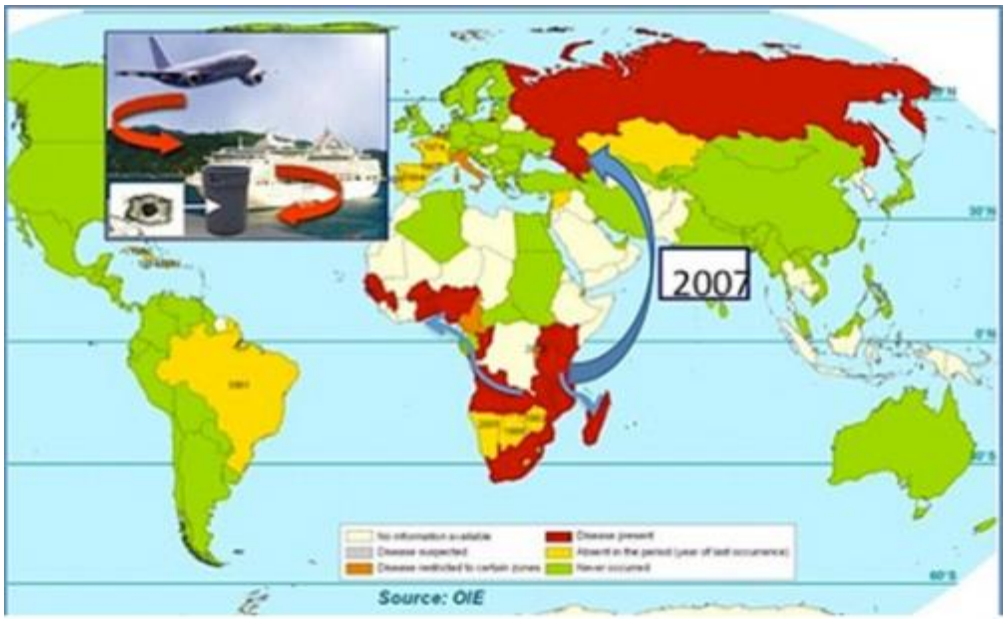
However, no infectious ASFV has been found in cooked or canned hams when processed at 70°C.

ASF genotype circulation



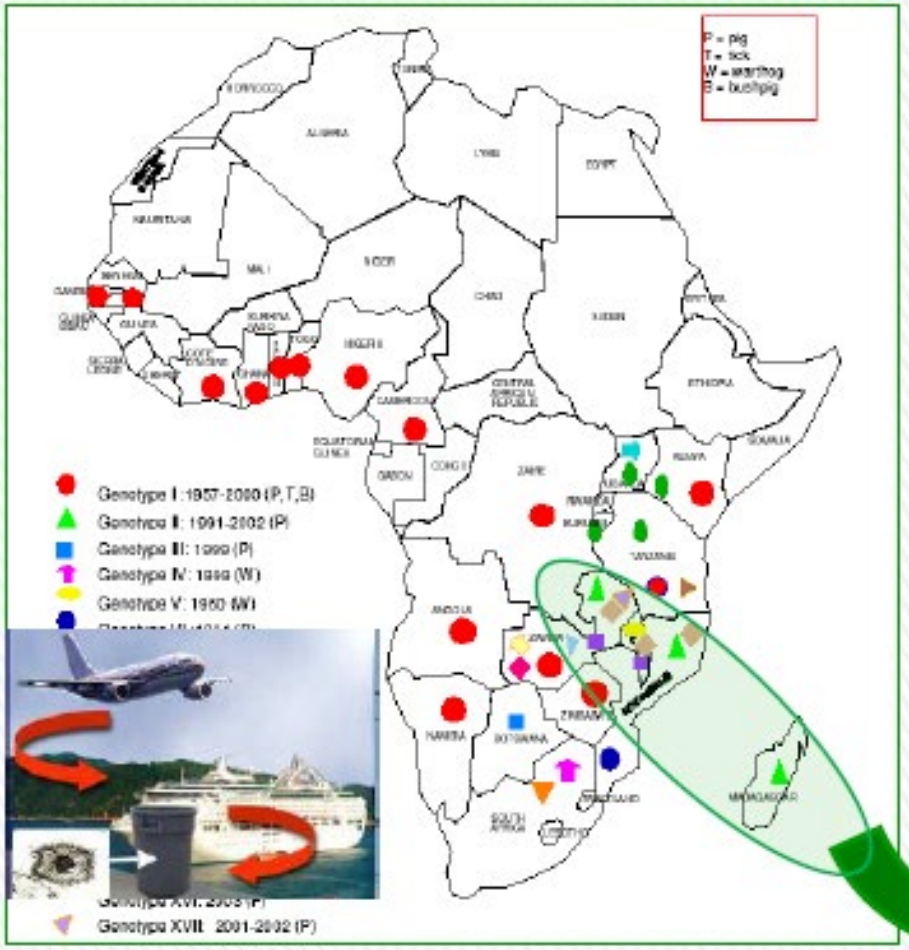
African Swine Fever

- First reported in 1921 in Kenya
- Acute to chronic disease
- characterized by high fever
- Cutaneous hyperemia
- Edema
- Hemorrhagic internal organs
- Abortions
- Can see bloody diarrhea



- Distribution – Sub-Saharan Africa
- Europe, Dominican Republic, Haiti, Cuba and Brazil
- Endemic in Africa and southern Europe

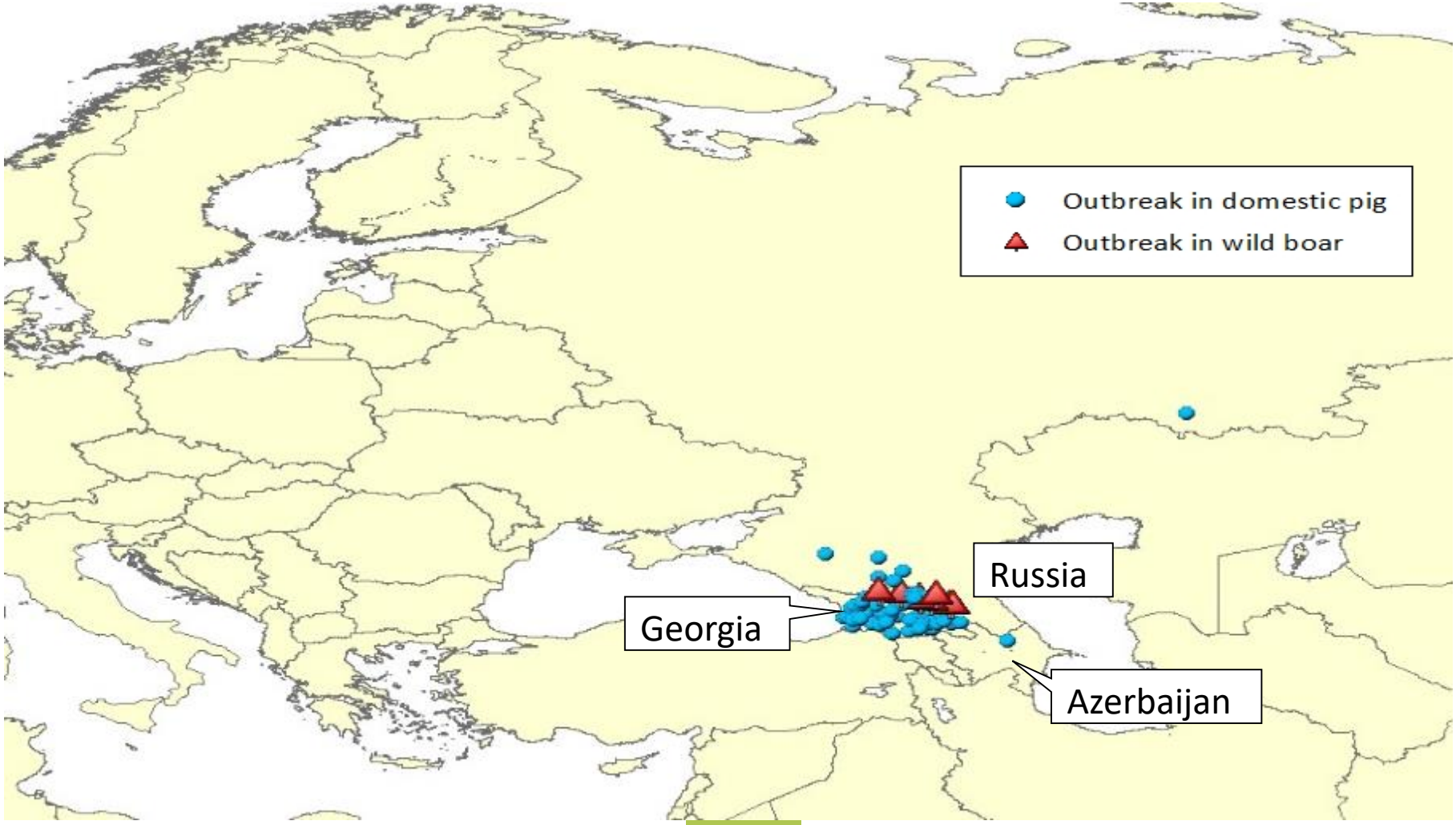
Tracing the origin



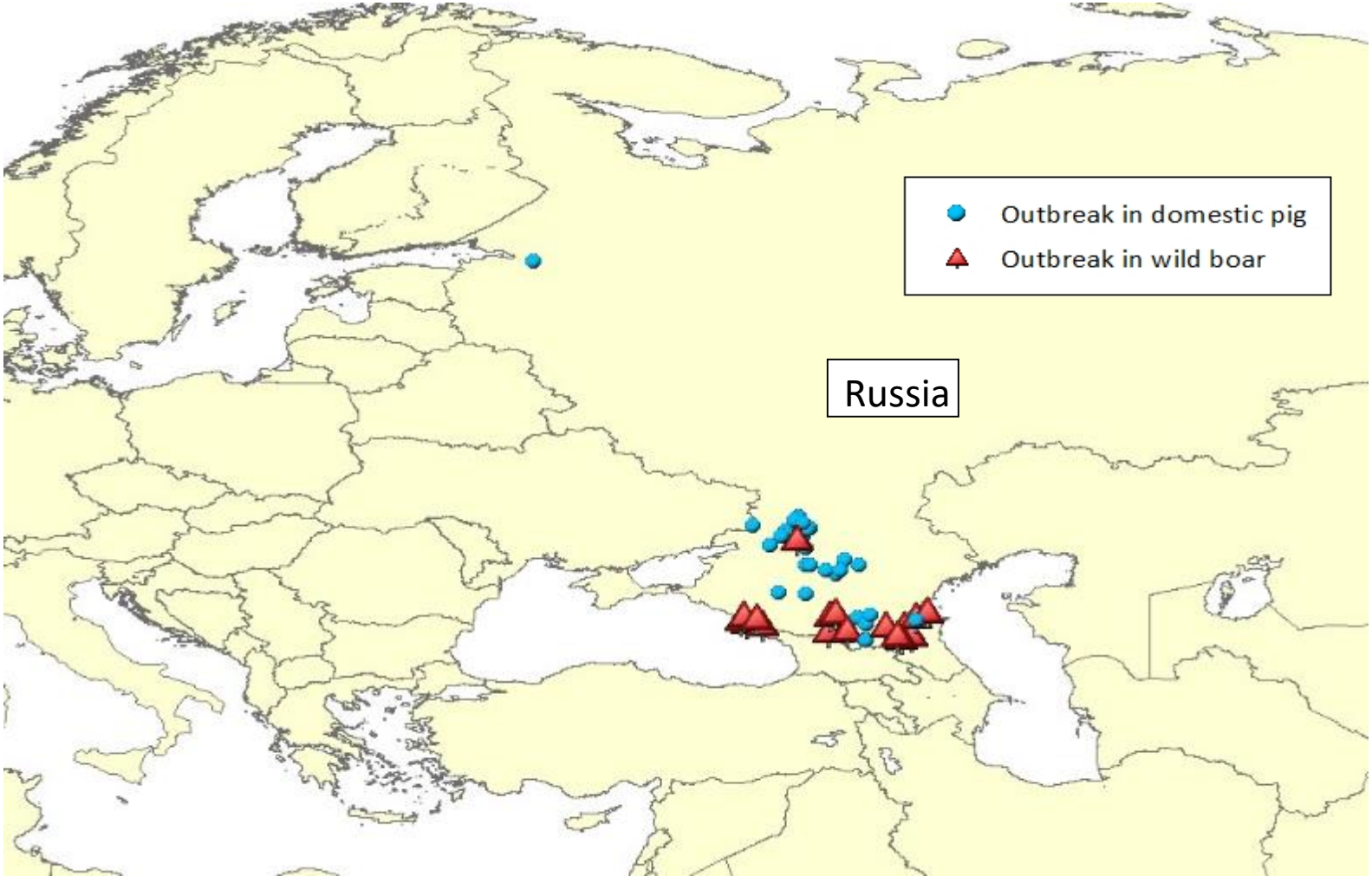
Georgia
June 2007

Outbreaks reported in Eastern Europe (2007)

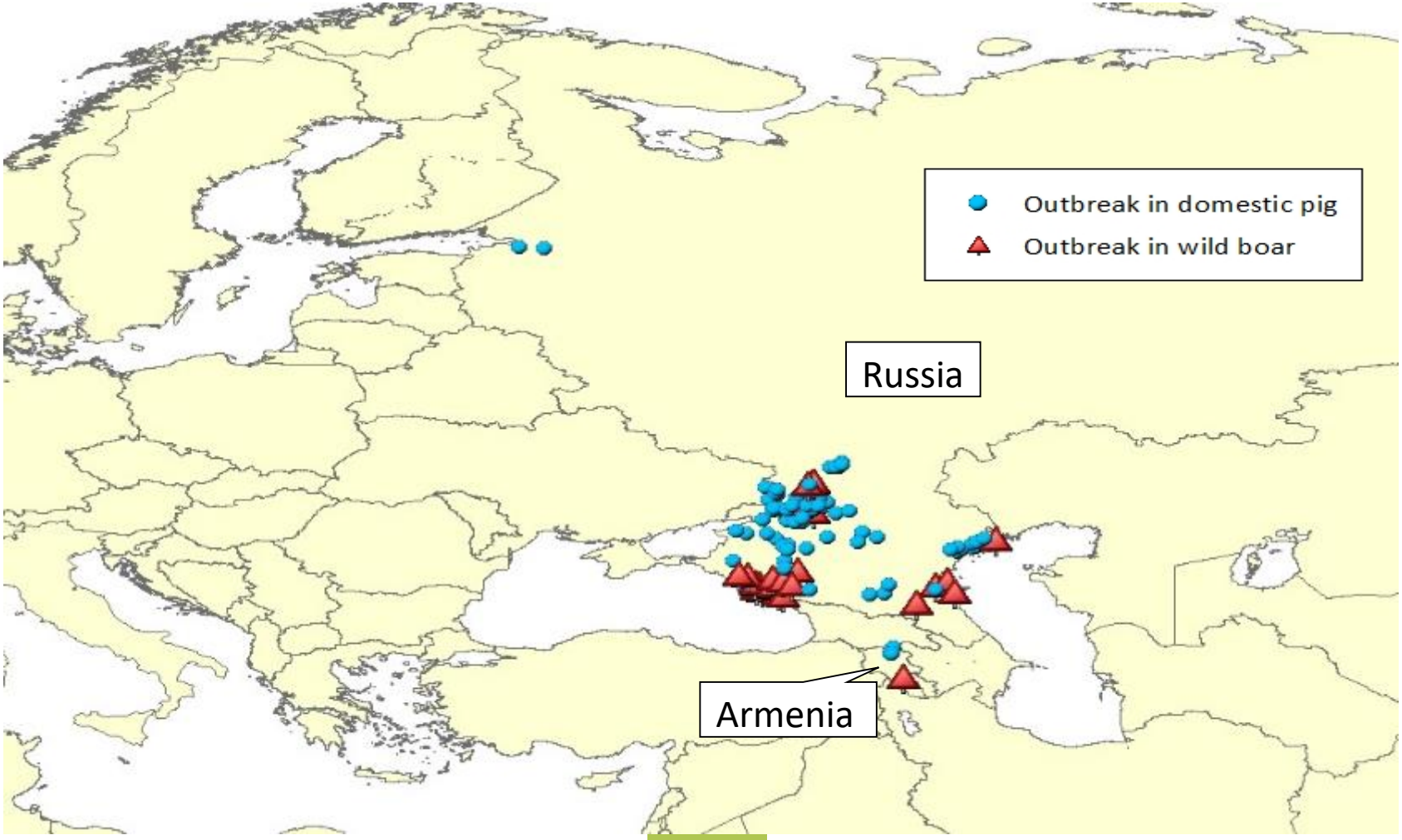
Outbreaks reported in Eastern Europe (2008)



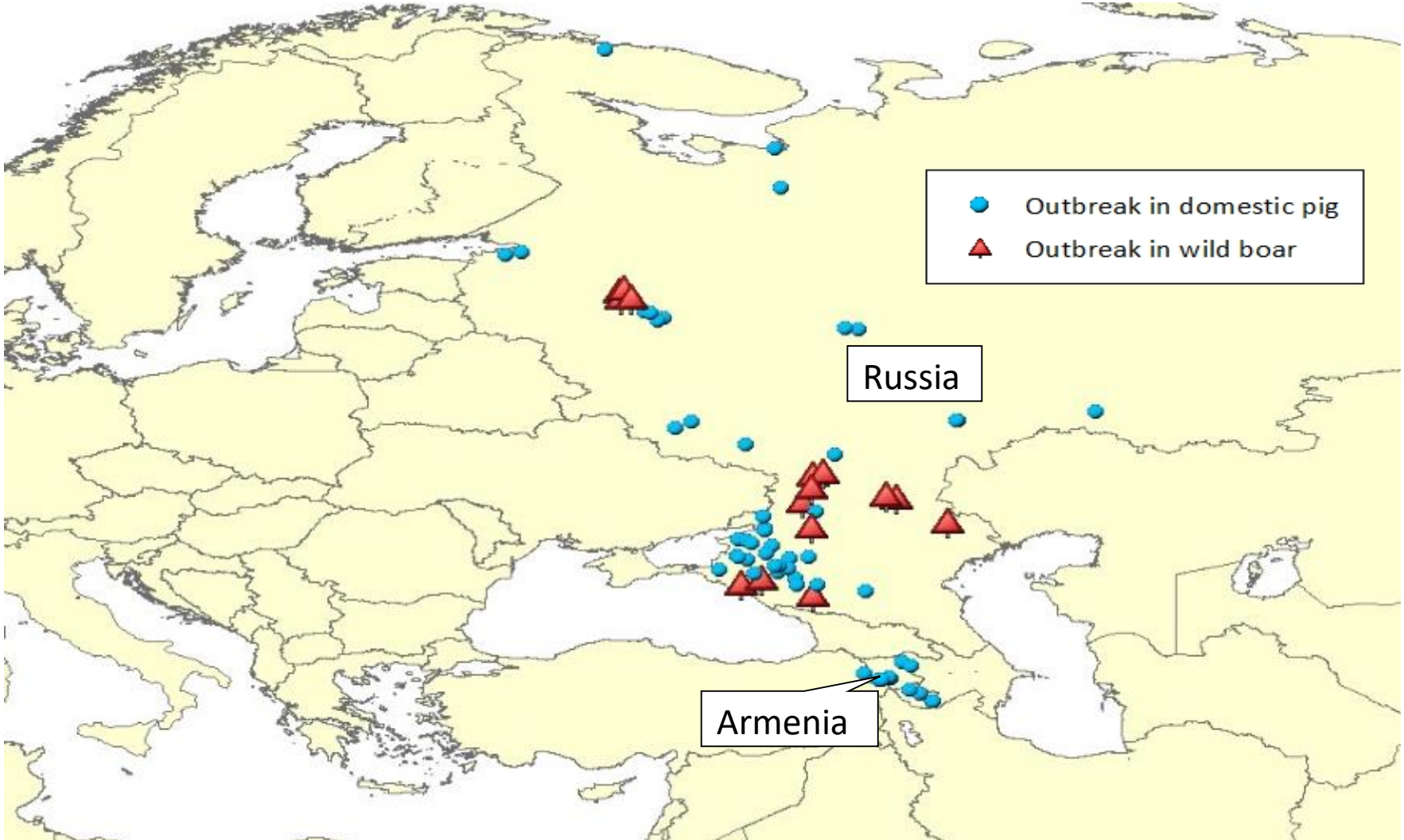
Outbreaks reported in Eastern Europe (2009)



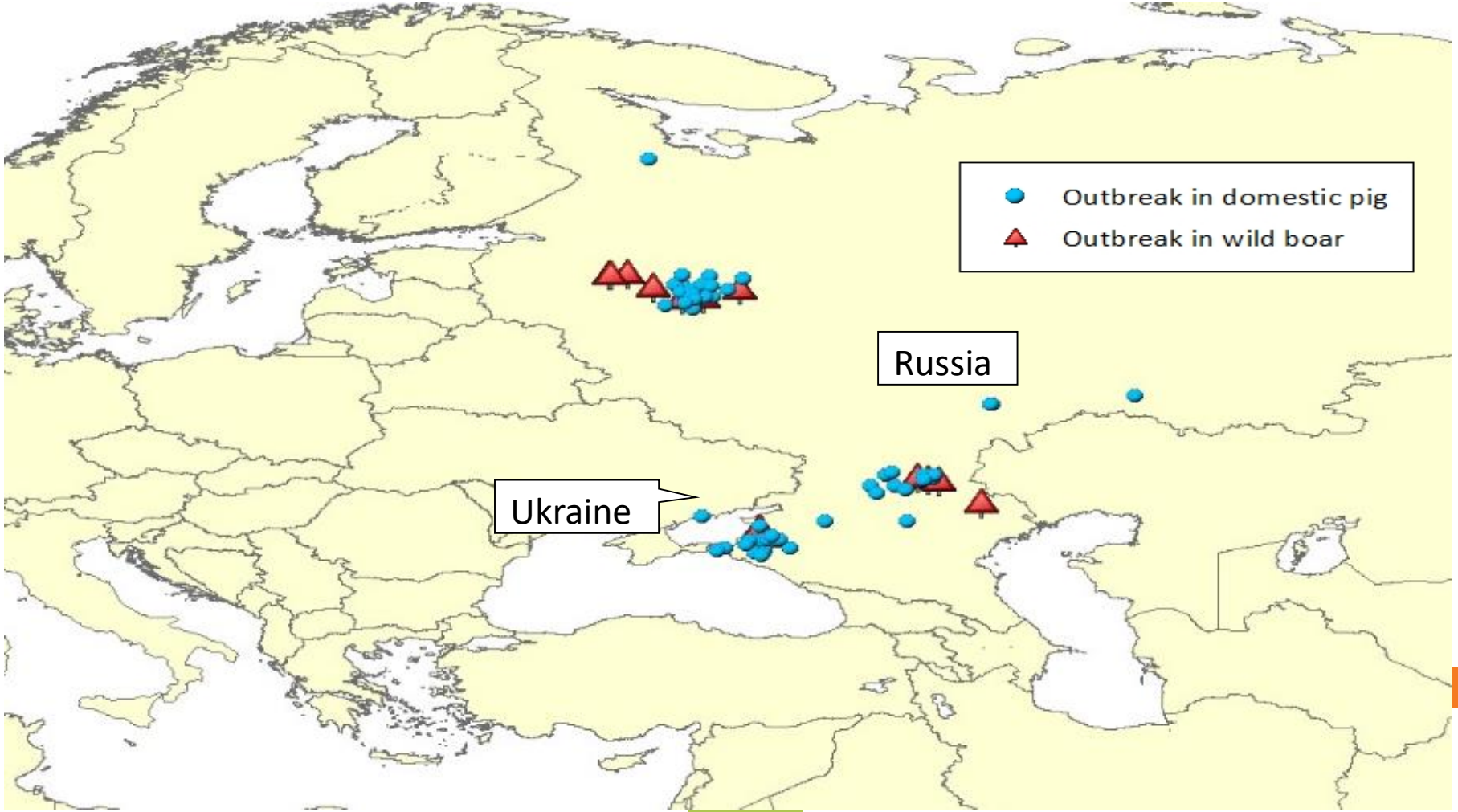
Outbreaks reported in Eastern Europe (2010)



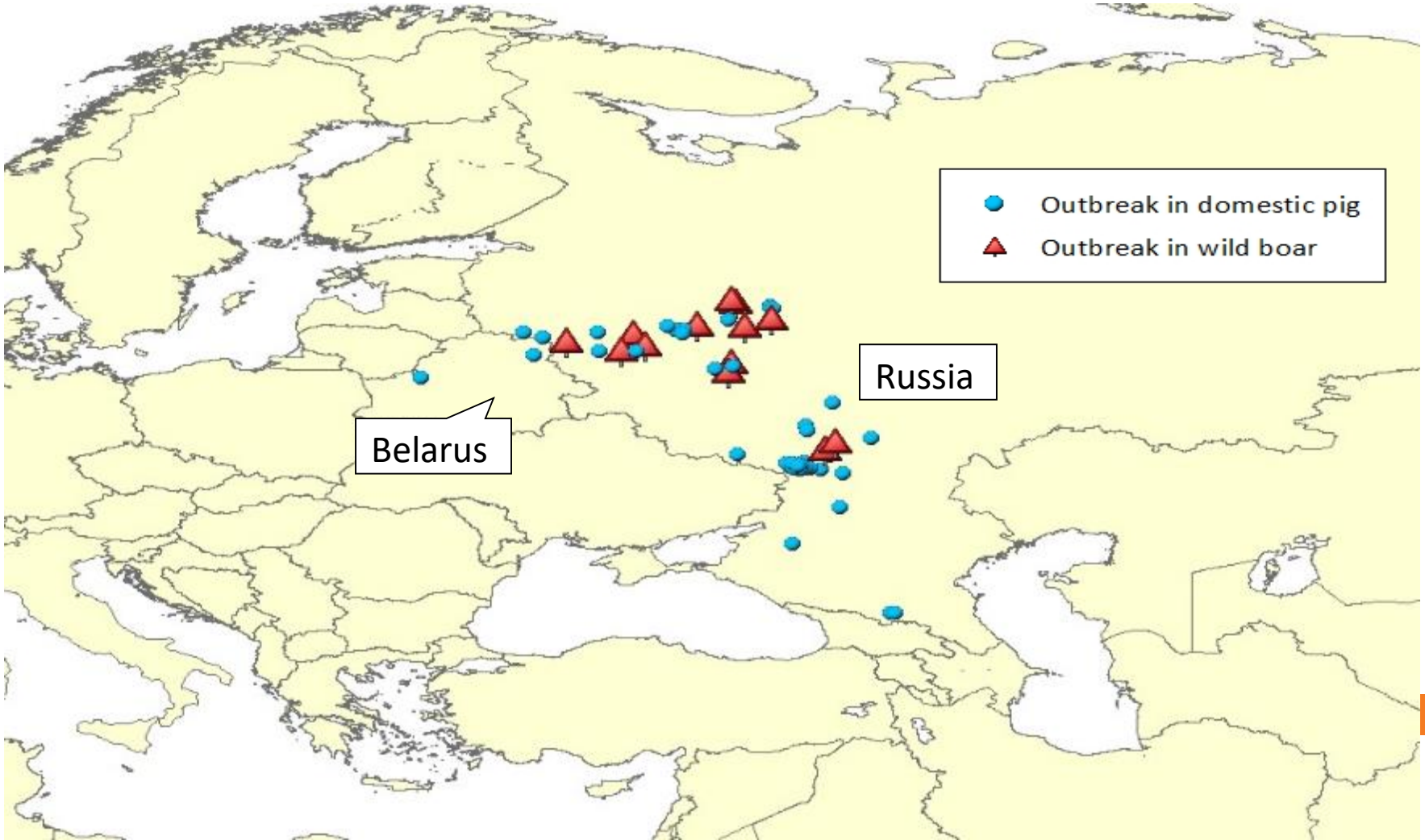
Outbreaks reported in Eastern Europe (2011)



Outbreaks reported in Eastern Europe (2012)



Outbreaks reported in Eastern Europe (2013)

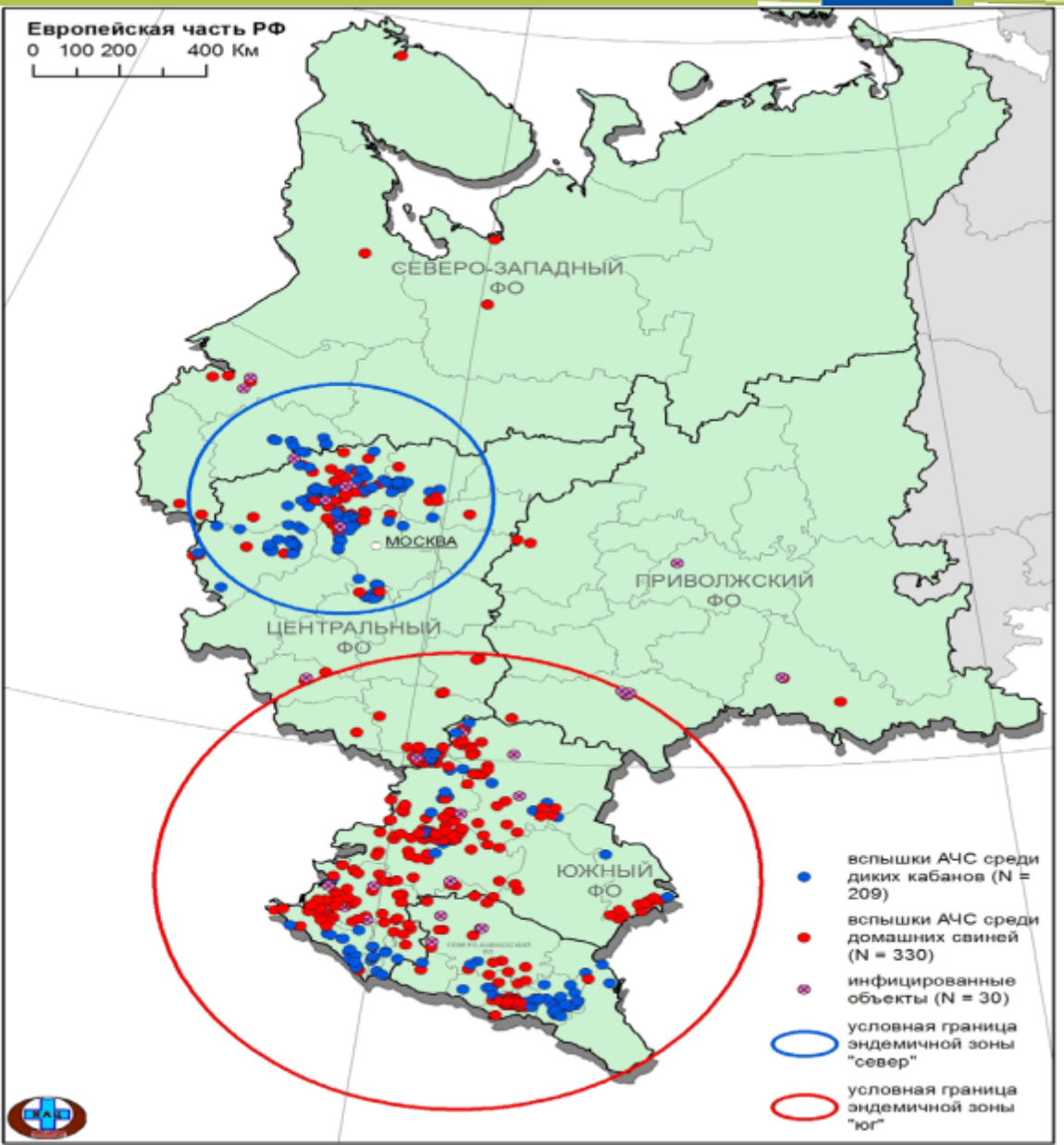


From the GENETIC DATA

All Eastern European ASFV isolates characterized clustered within p72 genotype II

Single introduction → Since its introduction in 2007 in Georgia all ASFV isolates circulating in Eastern and Central Europe are classified within p72 genotype II.

ASF spread


Европейская часть РФ
0 100 200 400 Км
СЕВЕРО-ЗАПАДНЫЙ ФО
МОСКВА
ЦЕНТРАЛЬНЫЙ ФО
ПРИВОЛЖСКИЙ ФО
ЮЖНЫЙ ФО
вспышки АЧС среди диких кабанов (N = 209)
вспышки АЧС среди домашних свиней (N = 330)
инфицированные объекты (N = 30)
условная граница эндемичной зоны "север"
условная граница эндемичной зоны "юг"

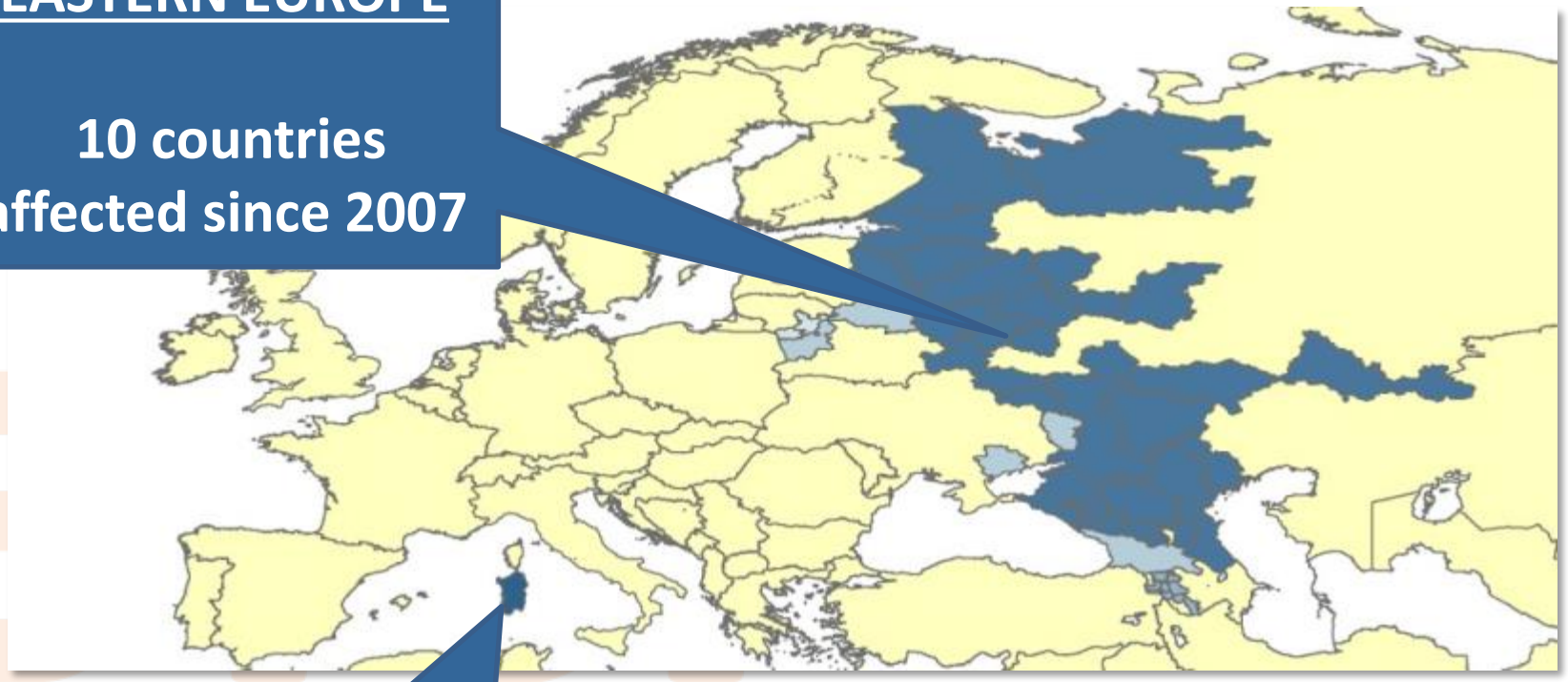
2007-2013

ASF spread

- **6 affected countries in Eastern Europe** (Georgia, Azerbaijan, Armenia, Russian Federation, Ukraine, Belarus)
- **Ongoing spread of ASFV towards west affecting eastern European countries**, such as Ukraine (2012) and Belarus (2013)

EASTERN EUROPE

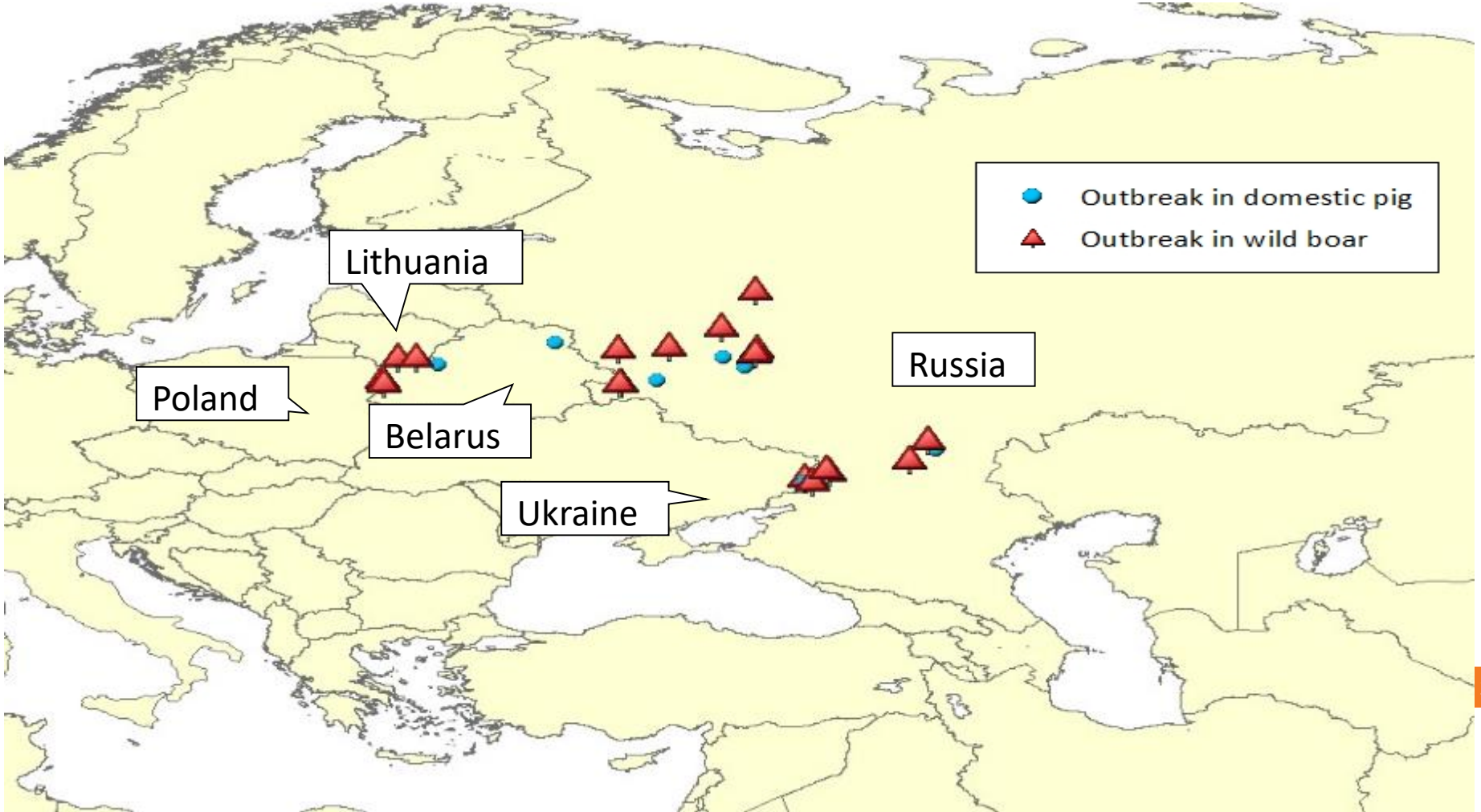
10 countries affected since 2007

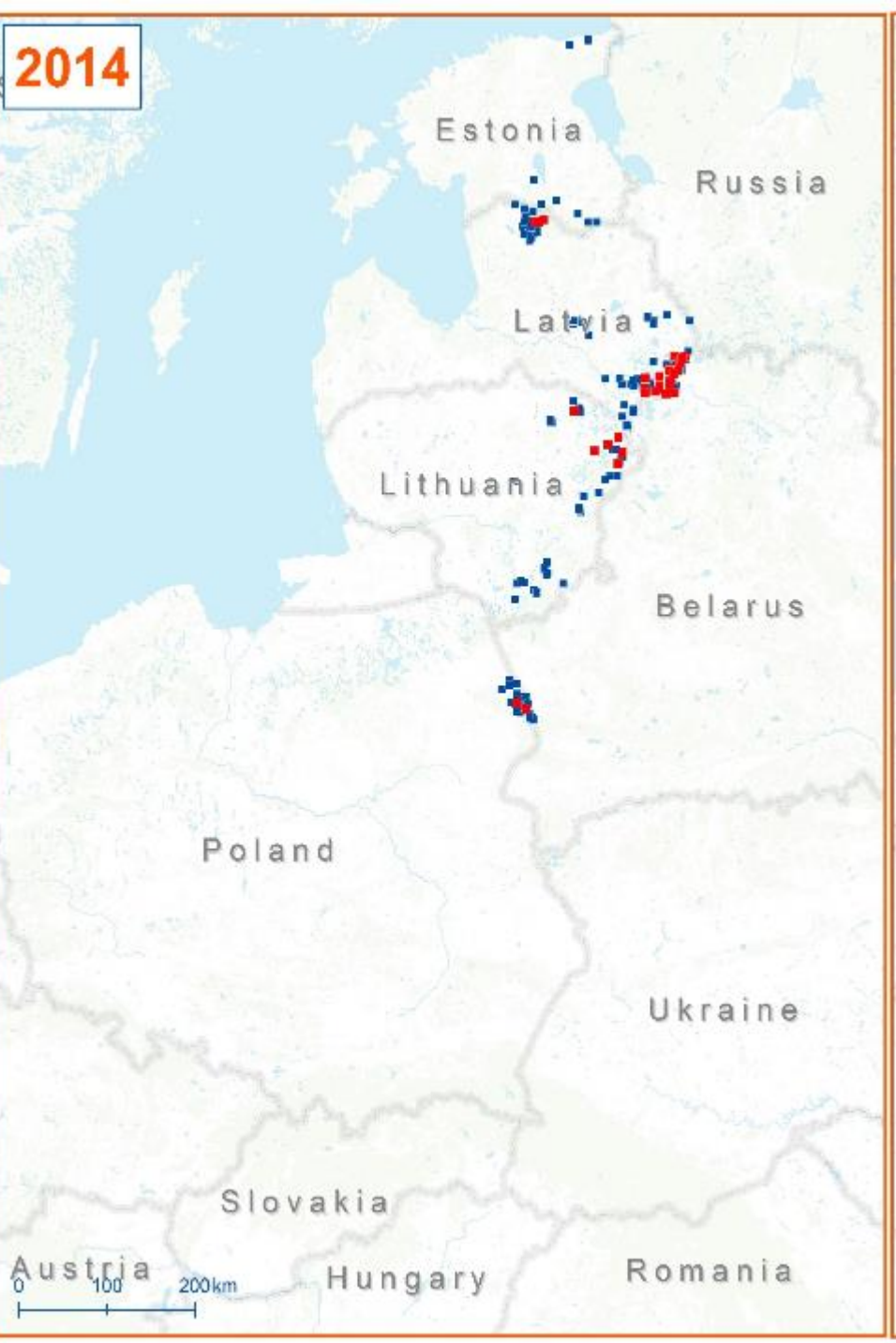


ITALY

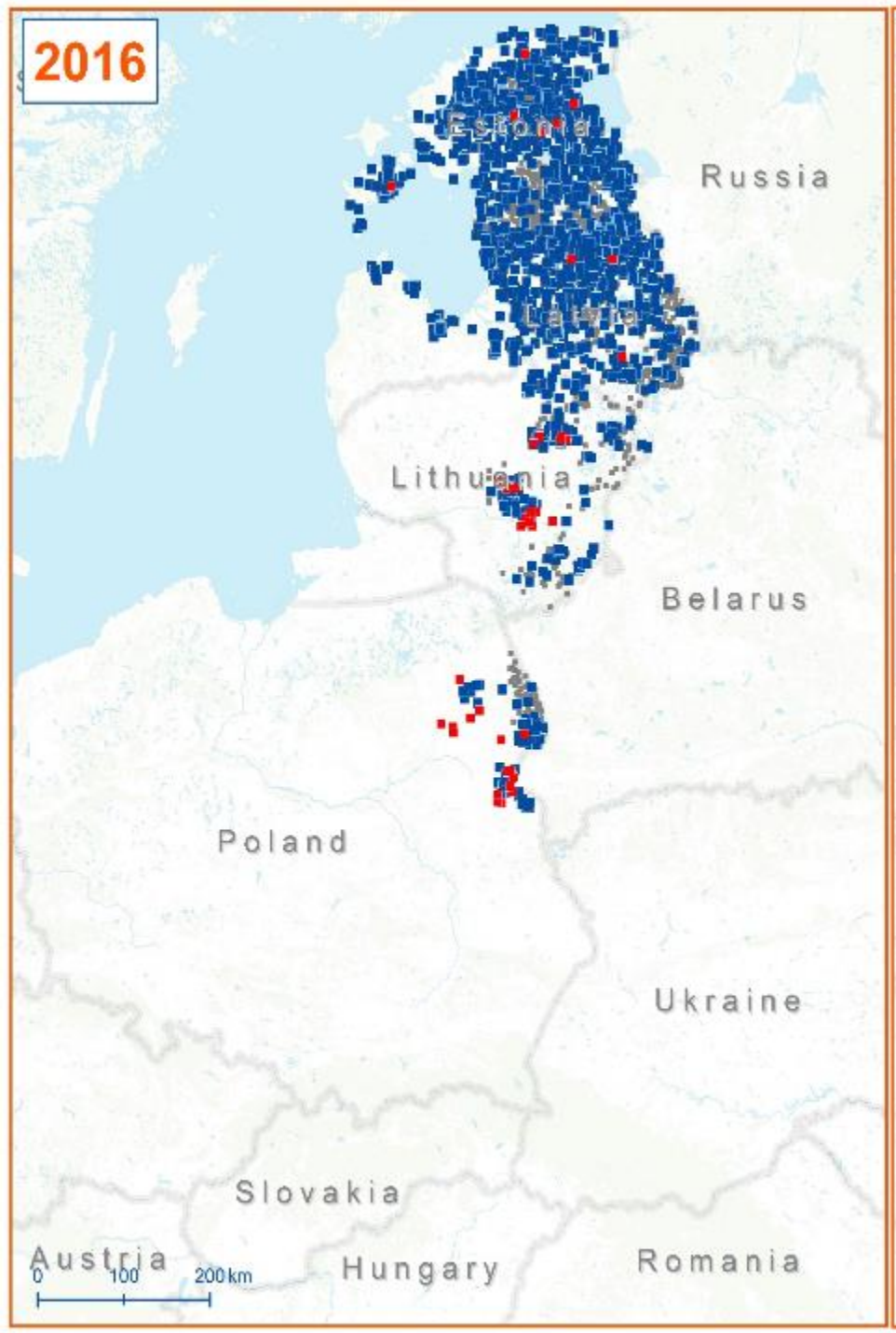
ASF present since 1978

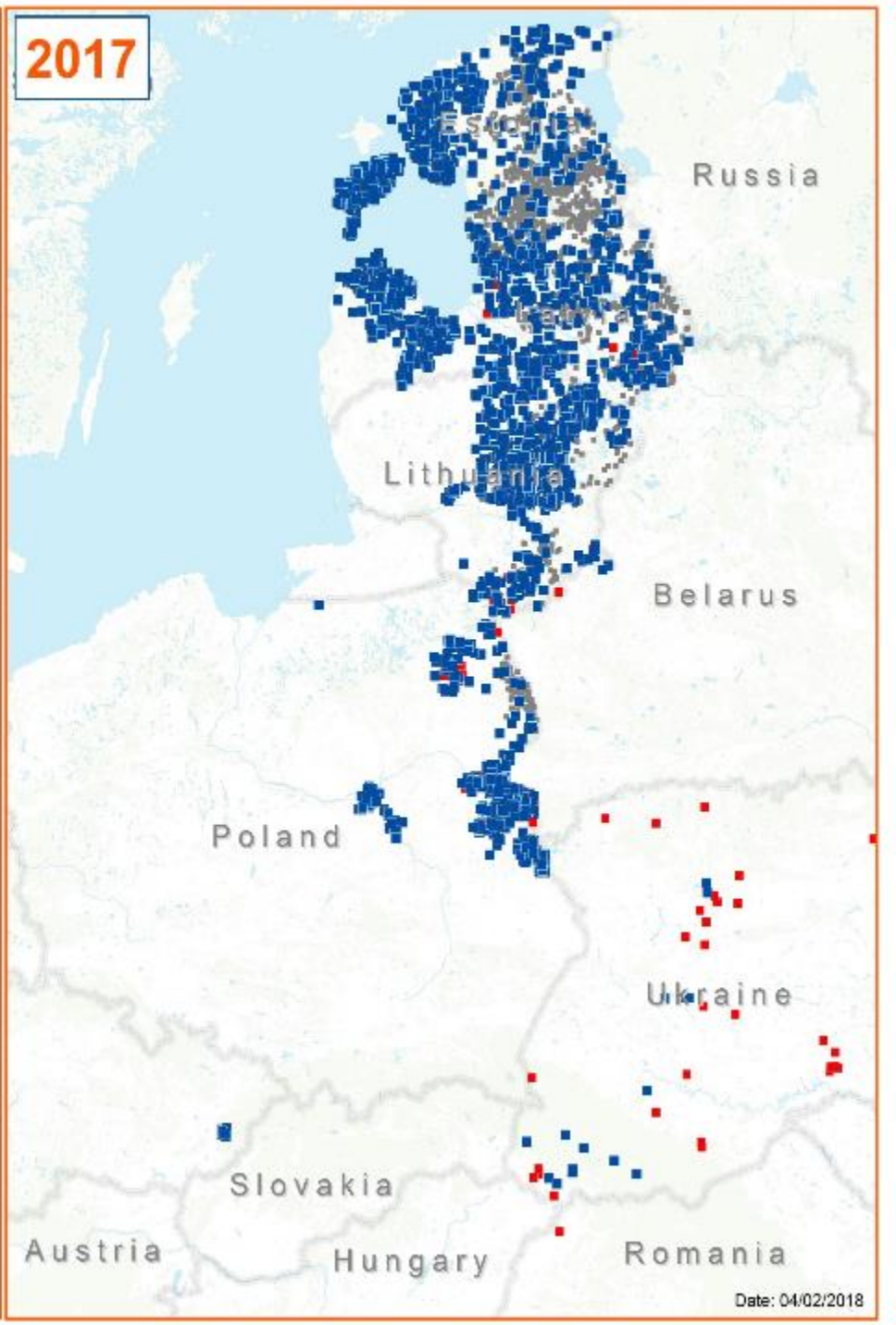
Outbreaks reported in Eastern Europe (Jan-May 2014)



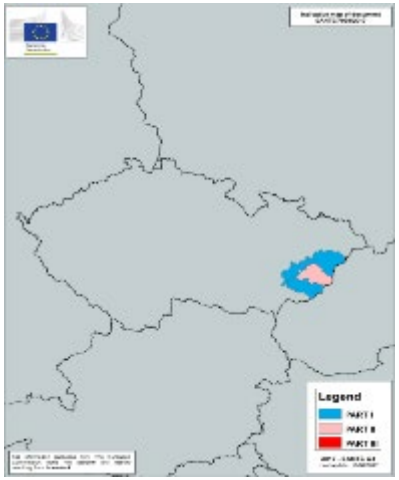

2014
Estonia
Russia
Latvia
Lithuania
Belarus
Poland
Ukraine
Slovakia
Austria
Hungary
Romania
0
100
200km

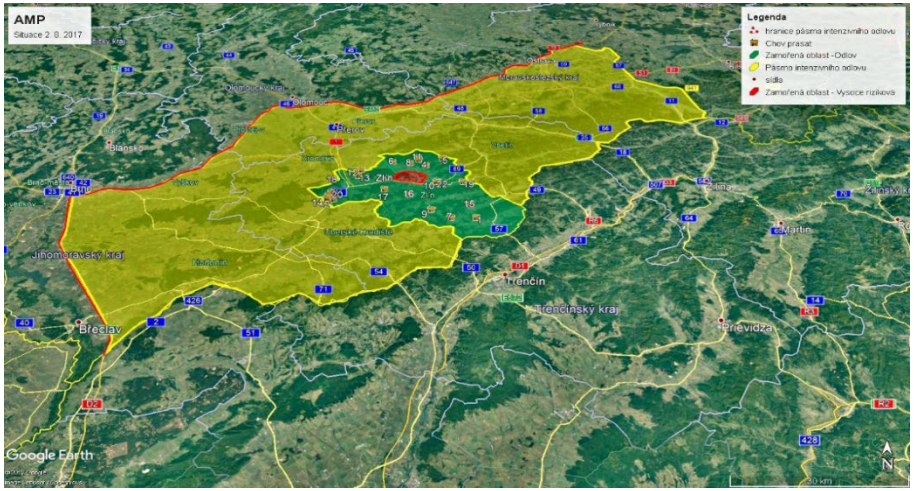

2015
Estonia
Russia
Latvia
Lithuania
Belarus
Poland
Ukraine
Slovakia
Austria
Hungary
Romania
Date: 04/02/2018


2016
Russia
Lithuania
Belarus
Poland
Ukraine
Slovakia
Austria
Hungary
Romania
0
100
200 km

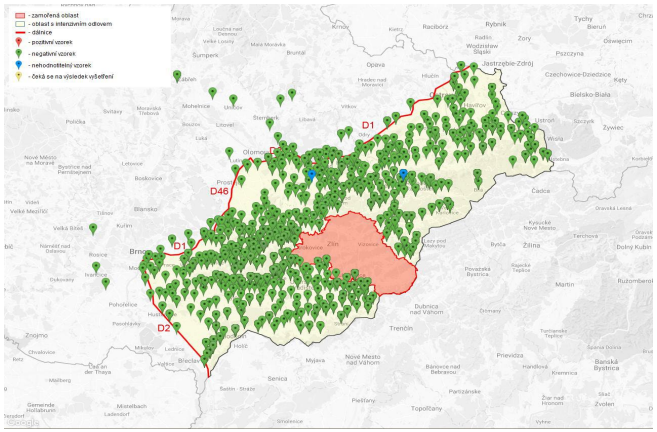

2017
Russia
Lithuania
Belarus
Poland
Ukraine
Slovakia
Austria
Hungary
Romania
Date: 04/02/2018

ASF in Czech Republic (2017-2018)

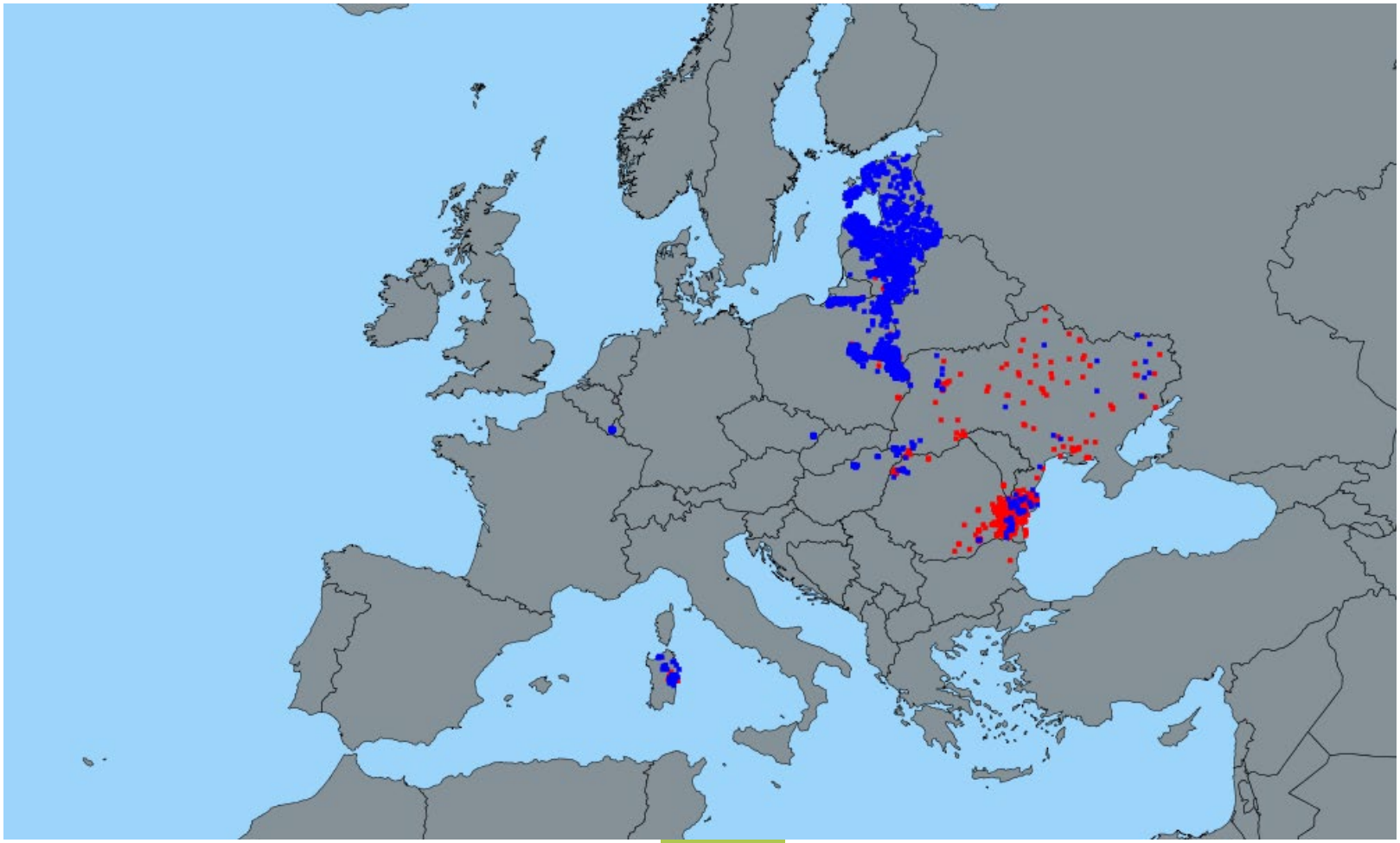




- First ssuccessful elimination of ASF in WB in a limited area!!!
- Outbreak is closed in OIE (September 2018)



2018 (25 Oct)



African swine fever: risks

- *backyard farming*
- *wild boar habitats*
- *free-ranging pigs*
- *movement of contaminated vehicles*
- *illegal movement of animals/animal products*
- *poor on-farm biosecurity*
- *particular species of ticks*
- *and etc.*

How does a pig / wild boar get infected?

ONLY by **direct contact** with infected material or sick animals!

- Feeding on garbage containing infected pig meat and/or pork products or carcasses;
- Contaminated fomites (premises, vehicles, clothes,…);
- Iatrogenic (needles, syringes, instruments…).

Infected blood (blood cells) most risky material!!!!

Aerosol infection is unlikely…

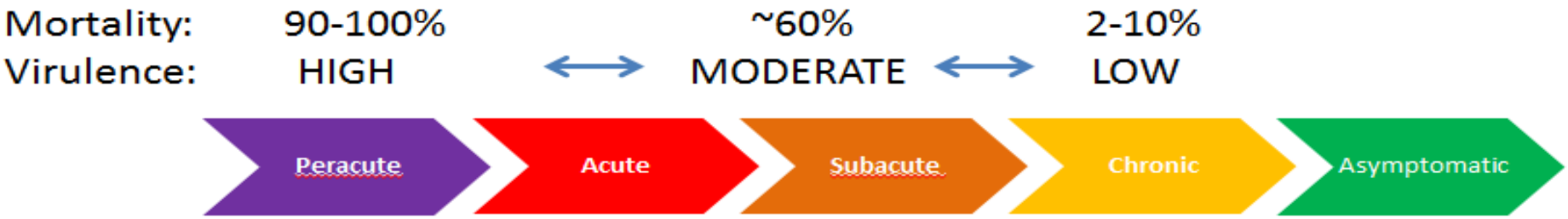
There is no report indicating the occurrence of Ornithodoros spp. in the affected Member States.

http://www.efsa.europa.eu/efsajournal

Clinical presentation

- *Incubation period: 4-19 days (15);*
- *Pigs of all ages and gender;*
- *ASF is not so infectious, so some animals within the herd may not get affected;*
- *The spread of the disease within the herd varies;*
- *Some indigenous resistant breeds observed in Africa;*
- *Wild boar = domestic pigs.*

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;**
- **Sometimes only death is observed;**
- **Clinical course may vary from 20% to 100%.**

ASF in Eastern Europe (acute form)

- Fever of 40-42°C;
- Lack of appetite;
- Animals are weak, lying down and huddling;
- Increased respiratory rate;
- Death within 3-15 days;
- Mortality rates up to 100% ;
- Acute forms are easily confused with other diseases (differential diagnosis);
- Animals usually in good body condition.

Acute form of ASF

One or several of the following:

- **Bluish-purple areas and hemorrhages (spot like or extended) on the ears, abdomen, and/or hind legs;**
- **Ocular and nasal discharges;**
- **Reddening of the skin of the chest, abdomen, perineum, tail, and legs;**
- **Constipation or diarrhea, which may progress to bloody;**
- **Vomiting;**
- **Abortion of pregnant sows at all stages of pregnancy;**
- **Bloody froth from the nose/mouth and a discharge from the eyes;**
- **The area around the tail may be soiled with bloody faeces.**

Note: The color changes and hemorrhages in the skin are easily missed in wild boar and dark-skinned/hairy pig breeds

Clinical signs and symptoms

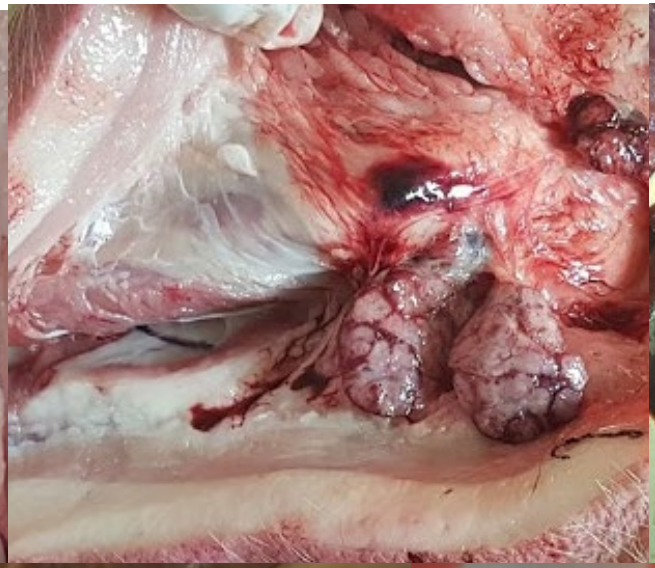
Clinical signs and symptoms

34

Clinical signs and symptoms

Clinical signs and symptoms

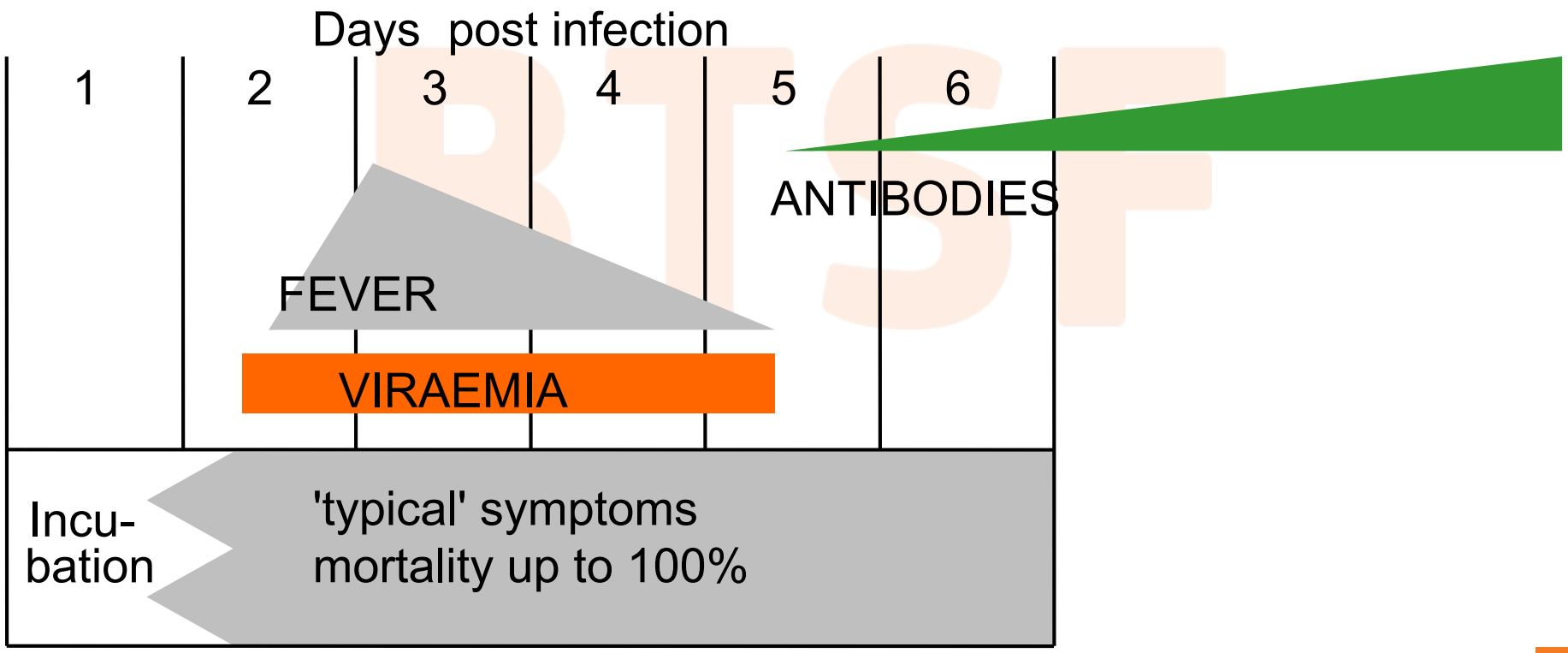
Post Mortem Lesions



Post Mortem Lesions

Post Mortem Lesions

Acute course of ASF



ASF laboratory diagnosis

Virological and serological tests are largely available; ASF diagnosis is not a problem.

MAIN AIM: virus detection with PCR from blood and / or organs – early detection!

Antibodies are important for surveillance, when disease is longer time present in the infected country.

Test results can also be used for indicating the duration of infection

PCR	*Ab-Test*	*duration of infection (estimates)*
pos	**neg**	<12d (or the animal died/sampled before 12d)
pos	**pos**	>12d (or the animal died/sampled after 12d)
neg	**pos**	>24d (or the animals was sampled after 24d

Samples needed by the lab for ASF diagnosis

- Blood in EDTA (0,5%) for PCR

  Plus:

- **Organ samples (spleen, lymph nodes, tonsil, kidney) for PCR;**
- *Bone marrow - in case of old wild boar carcasses;*
- Serum - for ASF antibodies detection.

BLOOD only could give false negative tests….always test ORGANS together with blood

Differential diagnosis

Classical Swine Fever (CSF);

Erysipelas;

Porcine Reproductive and Respiratory Syndrome (PRRS);

Salmonellosis;

Pasteurellosis;

Streptococcal infection;

Leptospirosis;

Circovirus infection;

Coumarin poisoning.

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Food safety