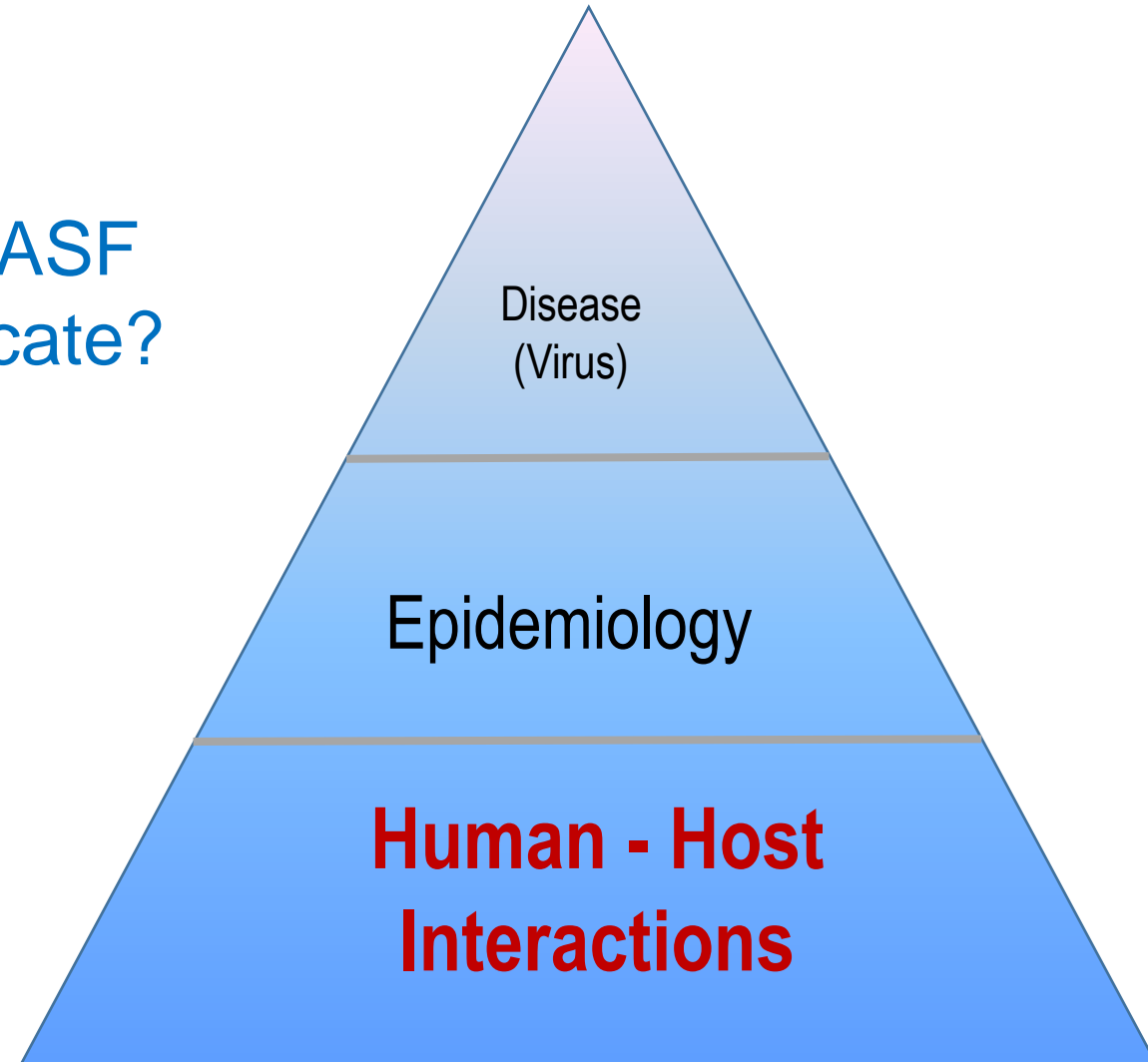


ASF virus resistance and epidemiological features: challenges for control

Klaus Depner

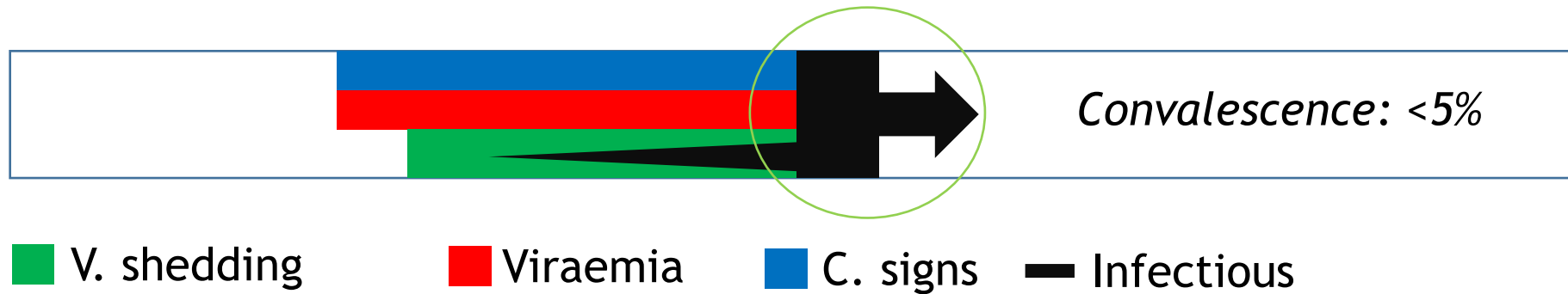
Challenges for control

How much do we need to know about ASF
to be able to prevent, control and eradicate?



High case fatality (>90%)

A domestic pig infected with ASFV will in most cases develop a severe haemorrhagic disease ending with death within a couple of days (Plowright, 1994)



*Described by Eustace Montgomery in
East Africa (Kenya), 1921*



High tenacity



ASF virus is relatively stable

ASFV survives the process of
putrefaction and carcasses
may remain infectious for weeks

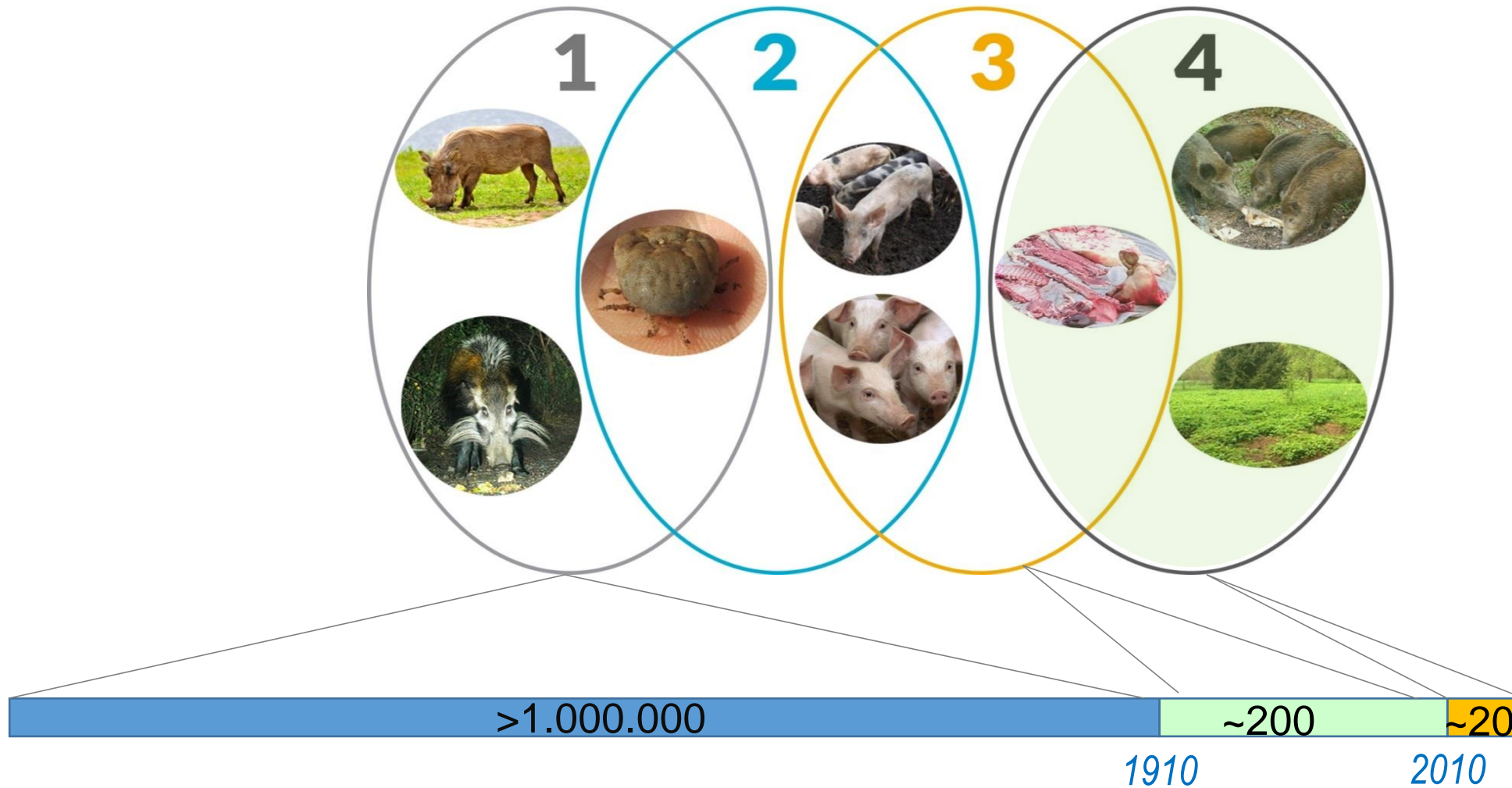
- frozen meat: indefinitely
- dry meat and fat: almost one year
- blood, salted meat and offal: more than 3 months
- faeces: over one week

Temperature plays an important role in decreasing the survival duration of ASF virus in any material.

Disease/Virus

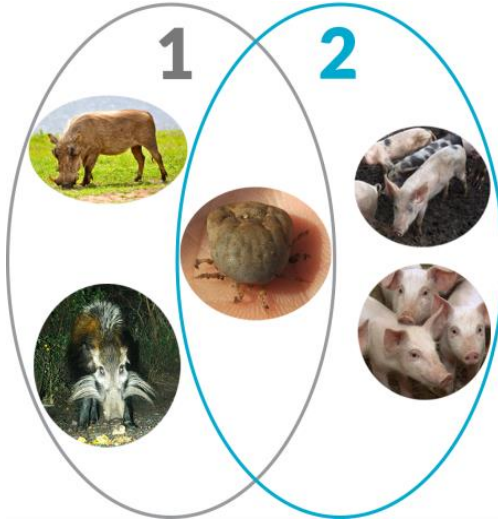
- Hemorrhagic disease, clinically not distinguishable from CSF
- Nearly all animals which pick up infection will die (case fatality >90%)
- Mainly acute course, lasting around 10 days until death (incubation: ~5 days)
 - High fever
 - Hemorrhages
- Virus is ferly resistant, survives days and weeks in the environment
- Good diagnostic tools available
- No vaccine, no treatment

A short history of ASF



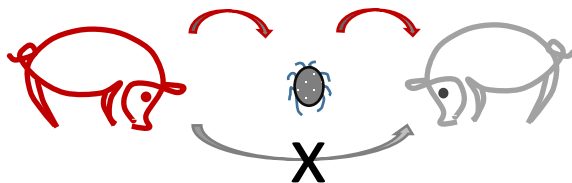
Four cycles

Non-contagious ASF



1. Sylvatic
2. Tick-Pig
3. Domestic
4. Wild Boar

parenteral transmission (tick bite)

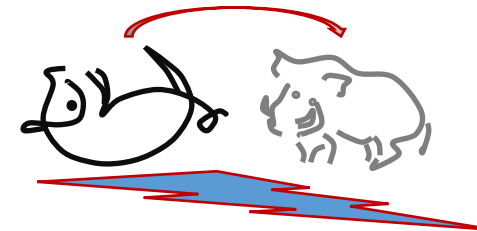


Vector born disease

Contagious ASF



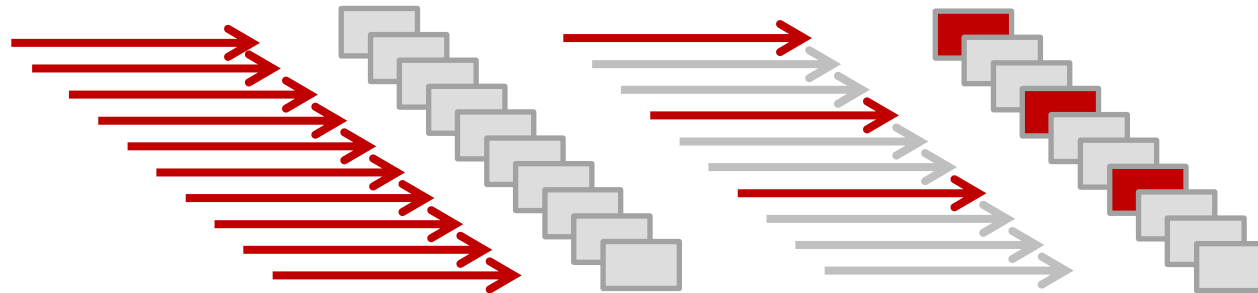
oral infection



Habitat disease

Contagiousness

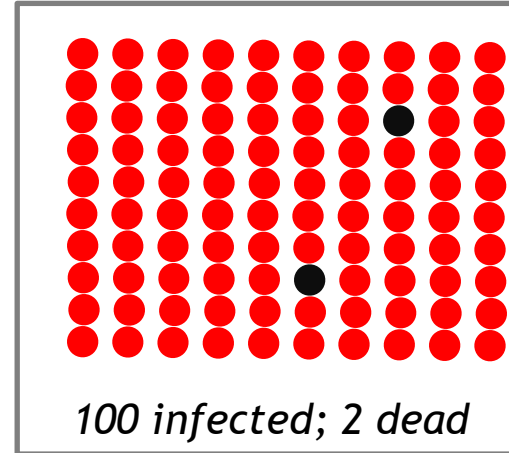
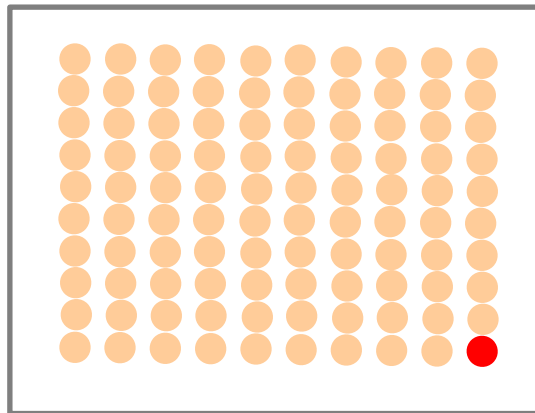
Probability of infection after contact with a pathogen
Percentage of animals which get infected after contact



It is NOT an indicator for disease severity and impact!!!

- *Low contagious diseases with severe course and high impact*
- *Highly contagious diseases with mild course and low impact*

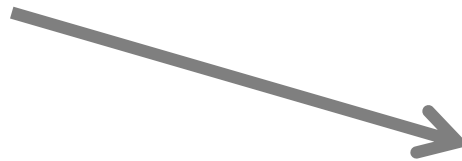
ASF - CSF - FMD



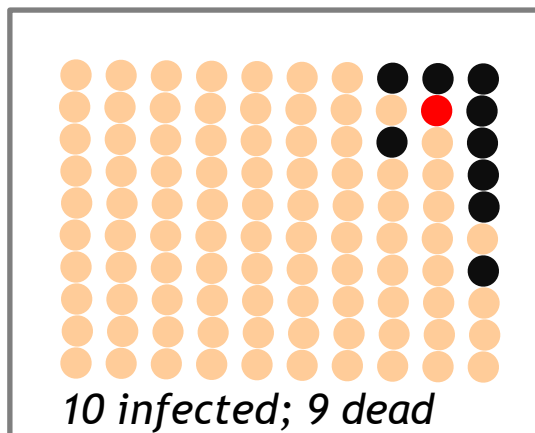
FMD

Prevalence: 100%
Mortality: 2%
Lethality: 2%

Contagiousness: +++



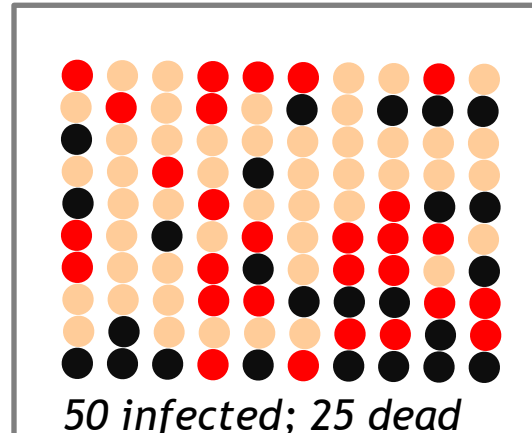
● Infected ● dead



ASF

P: 10%
M: 9%
L: 90%

Contagiousness: +

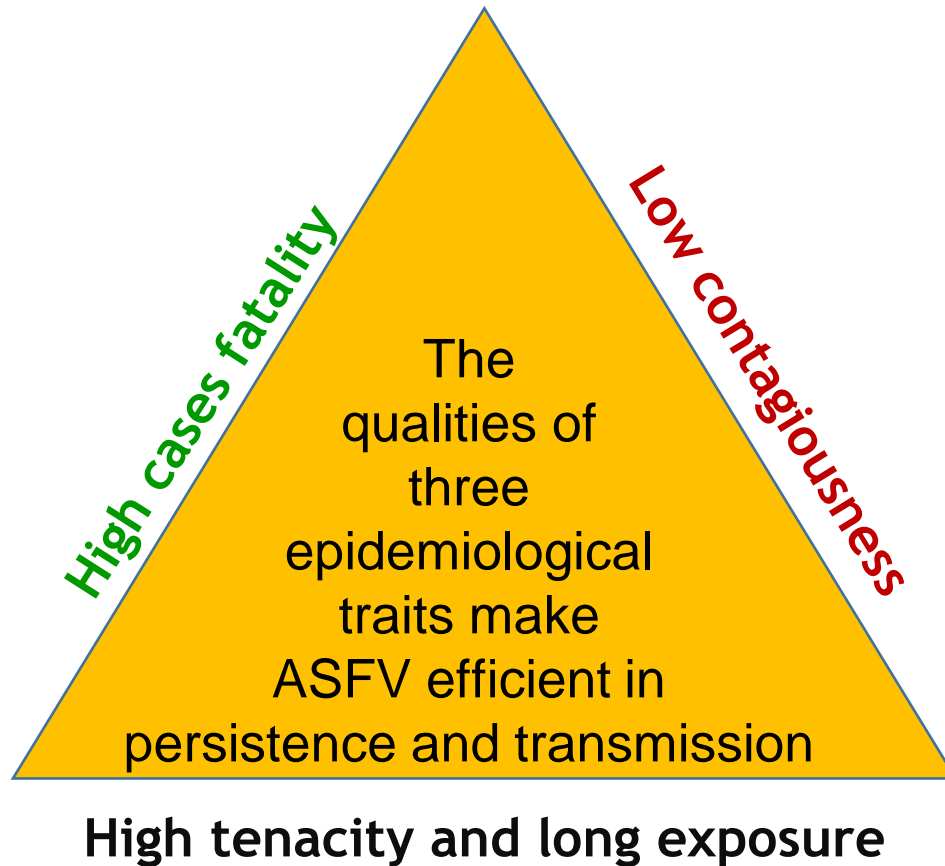


CSF

P: 50%
M: 25%
L: 50%

Contagiousness: ++

Persistence triangle



Low contagiousness: prevents fast and complete depletion of the host population

High case fatality: makes the virus largely available in the form of carcasses

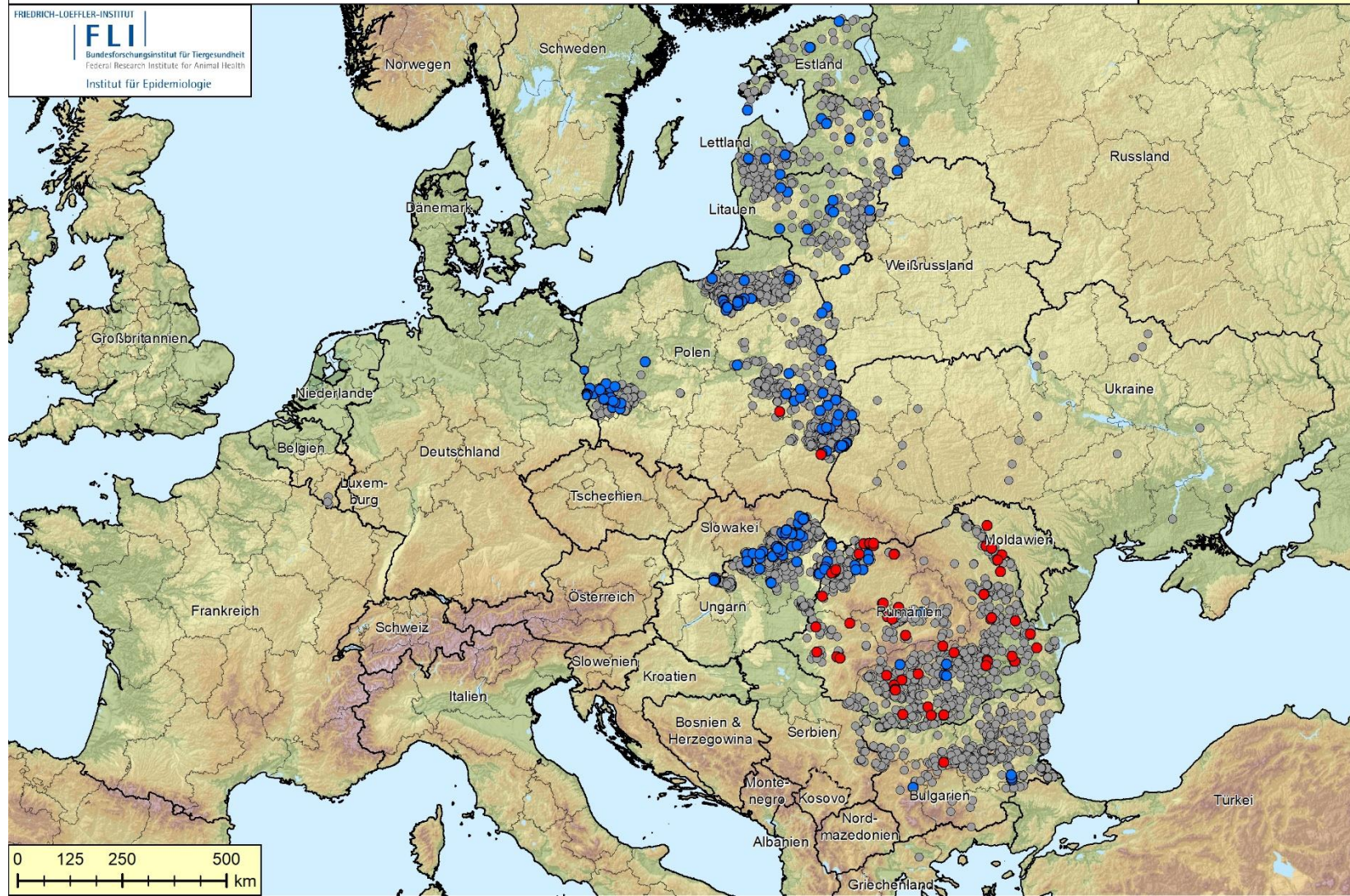
High tenacity: ensures long term virus persistence in the environment

The interaction of these three parameters maximize local persistence and limits fast geographical spread

Site fidelity & long distance jumps

Afrikanische Schweinepest im Baltikum, Belgien, Bulgarien, Deutschland, Griechenland, Moldawien, Polen, Rumänien, Serbien, Slowakei, Ukraine und Ungarn 2020 Datenquelle: ADNS, TSN (Stand: 13.10.2020 - 14:20 Uhr)

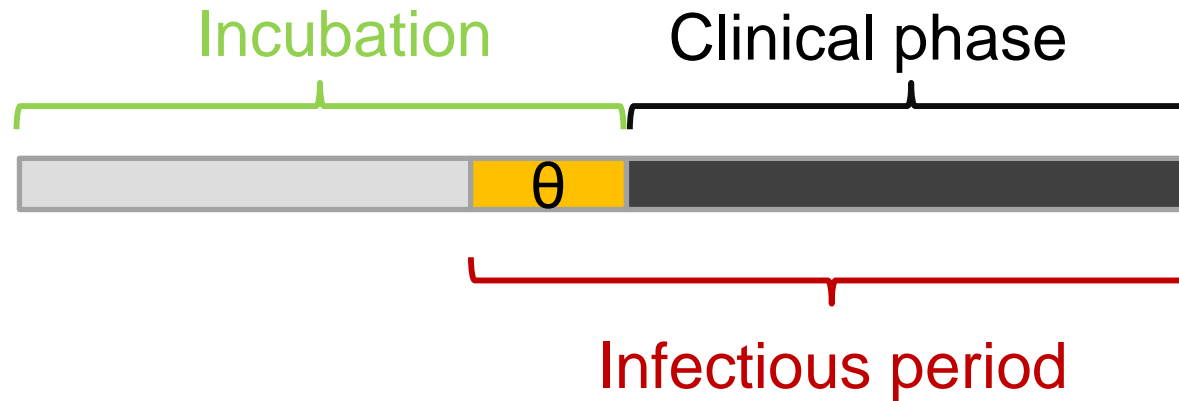
- Hausschwein (letzten 14 Tage)
- Wildschwein (letzten 14 Tage)
- Haus- & Wildschwein (2020)



Lessons learned in recent years

- **ASF in the field is not highly contagious**
 - *High case fatality (>90%)*
 - *Low (initial) mortality (<5%)*
 - *Low prevalence (<5%)*
 - *Virus perpetuation not necessarily a density dependent process*
- **Slow spreading with site fidelity (*habitat disease*)**, easy to control in domestic pigs, difficult in wild boar
- **Survivors are not necessarily carriers and carriers are not shedders:** no epidemiological relevance in an epidemic without tick involvement
- **Early detection only by passive surveillance**
- **Few secondary infections**

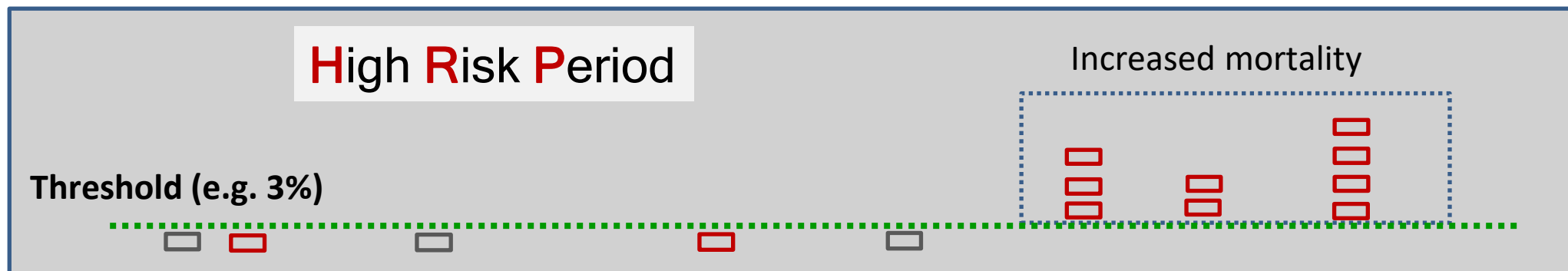
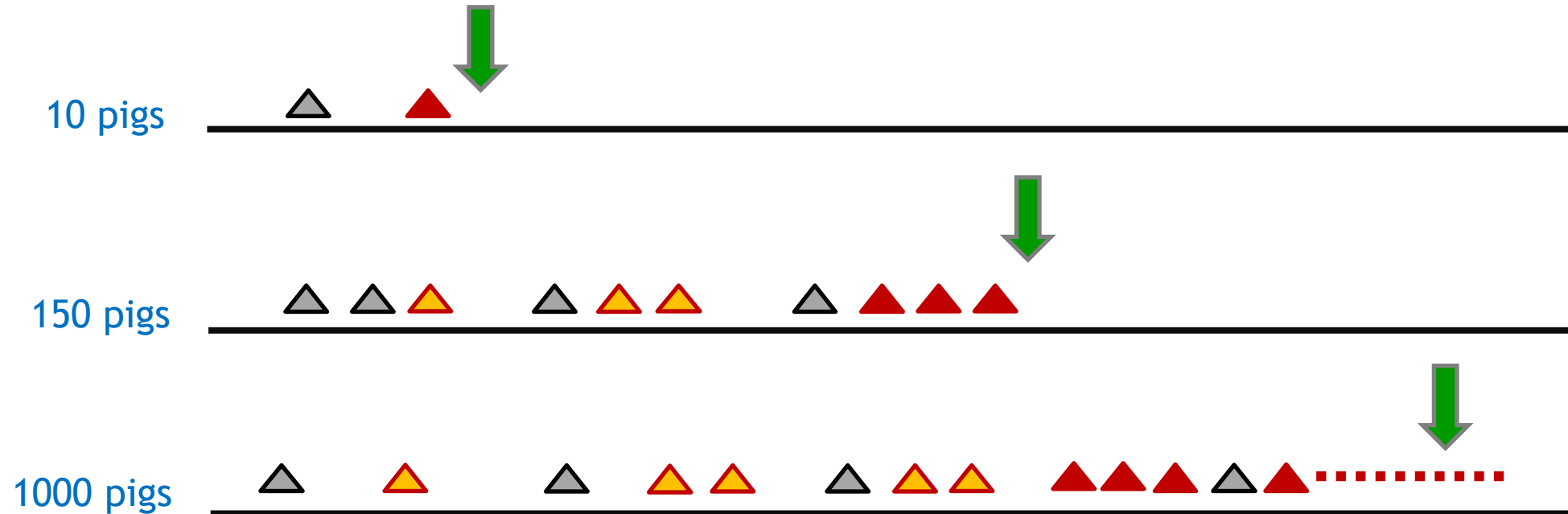
Reactive disease control strategy



- if θ is small, transmission occurs after disease is apparent (**ASF!!!**)
- if θ is large, transmission occurs also before disease is apparent

The success of reactive disease control strategies is influenced by the fraction of transmission occurring before signs appear

High risk period & farm size



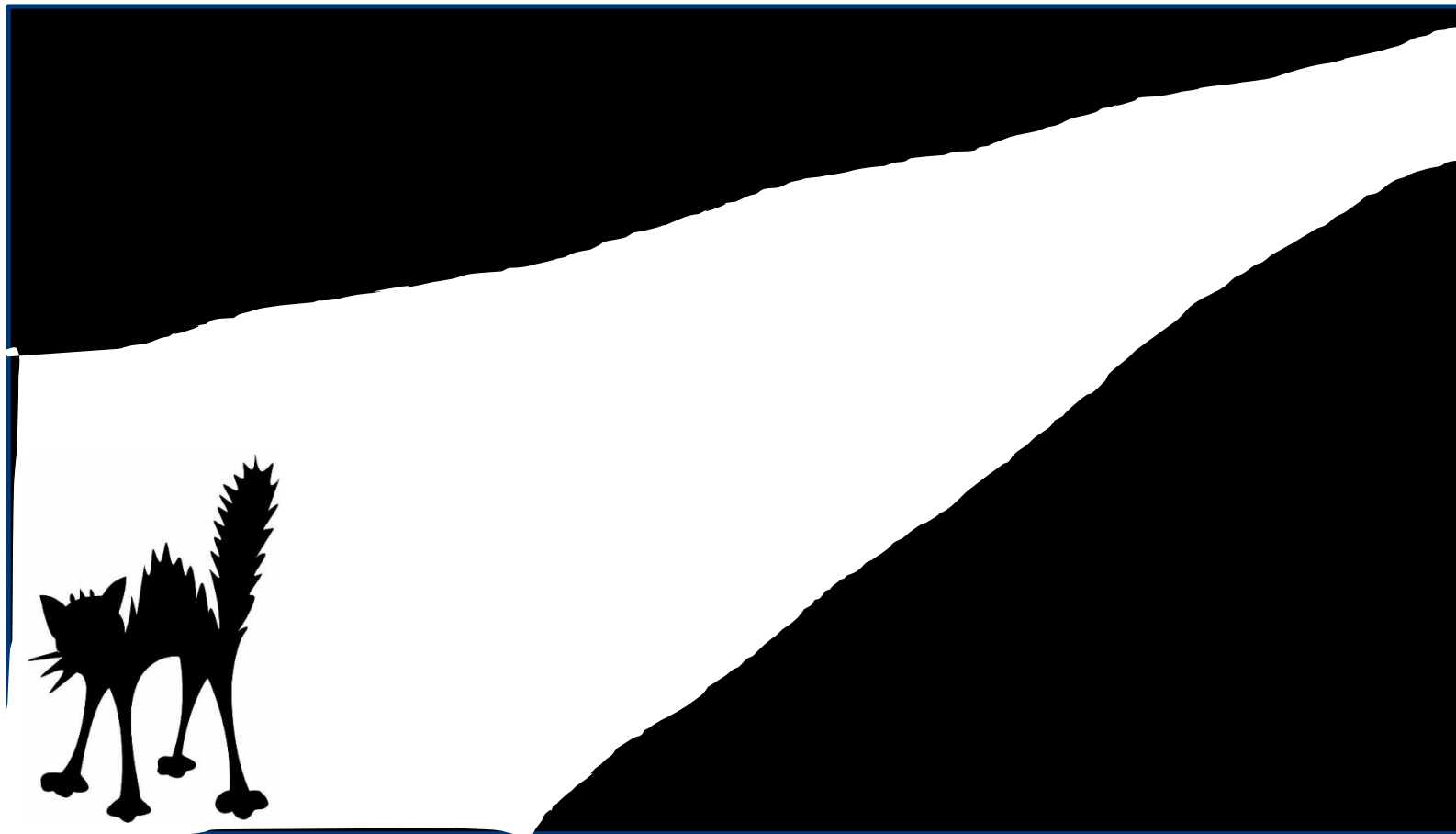
Enhanced passive surveillance

SANTE/7113/2015 – WORKING DOCUMENT ASF Strategy for affected countries

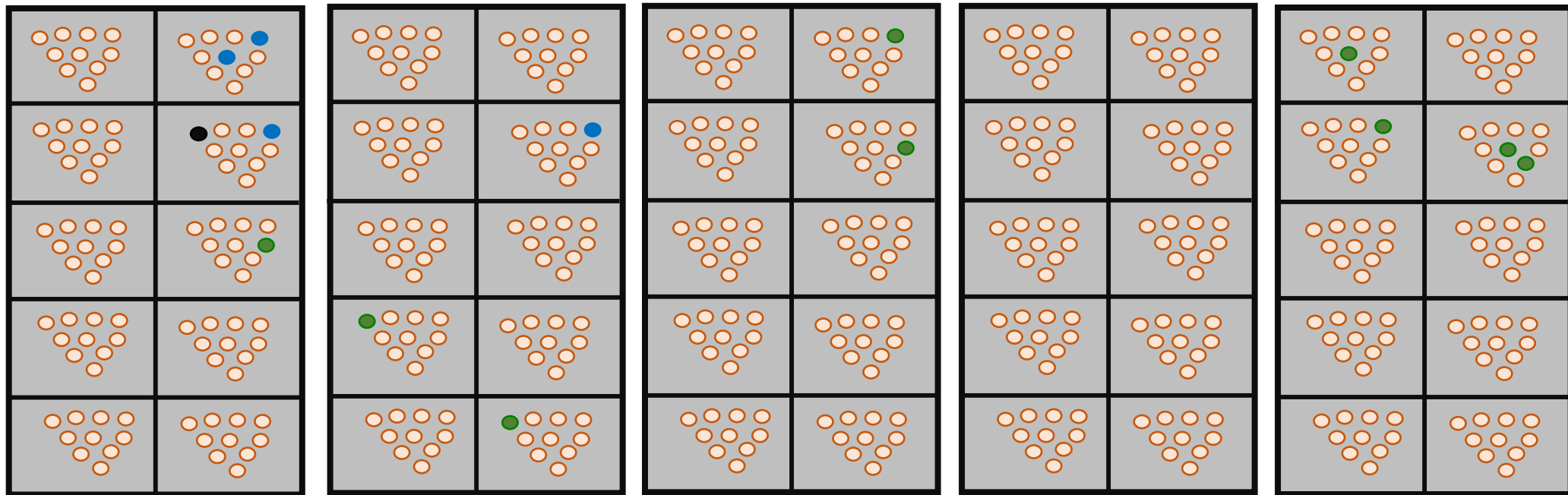
2.1.5. Sampling for laboratory investigations will be performed

- a) In case of clinical signs resembling ASF (e.g. fever or haemorrhagic lesions). If necessary, sampling should be repeated to exclude ASF when specific clinical signs occur.
- b) Each week, in the form of virological testing of at least the first two deaths (post weaning pigs or pigs older than 2 months) in each production unit.
- c) ~~When ante or post mortem signs raise suspicion at home slaughtering at least within the area covered by Commission Decision 2014/709/EU.~~

Surveillance



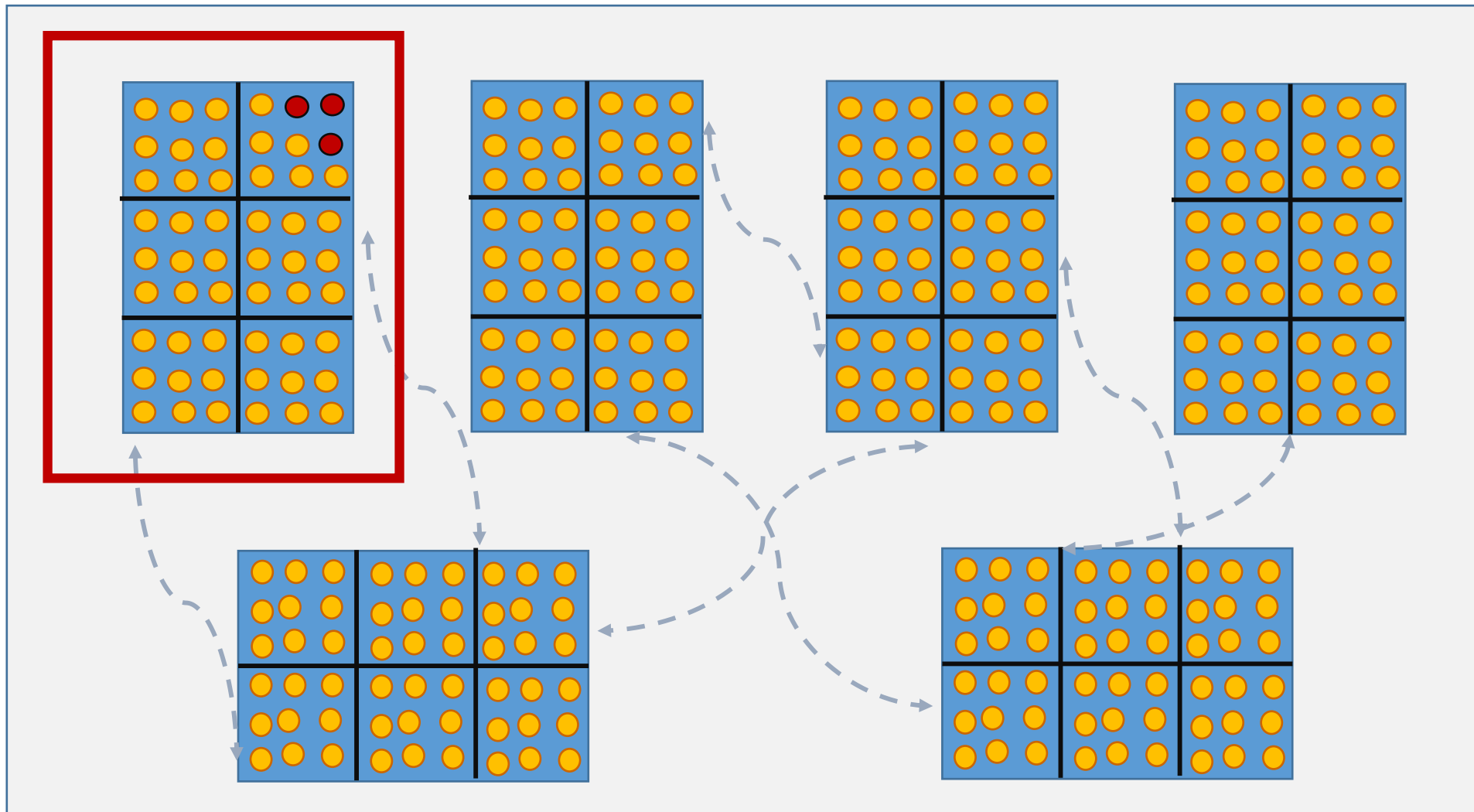
Pig farm in an early stage of ASF



- Healthy pig
- ASF infected pig (high fever)
- Dead pig (ASF)
- Dead pig (no ASF)

„5/95“ is not working

Dilemma



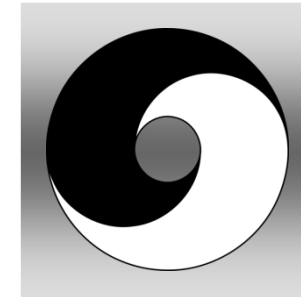
Hardware

Software

(Mindset/Philosophy/Management)



Money



Education

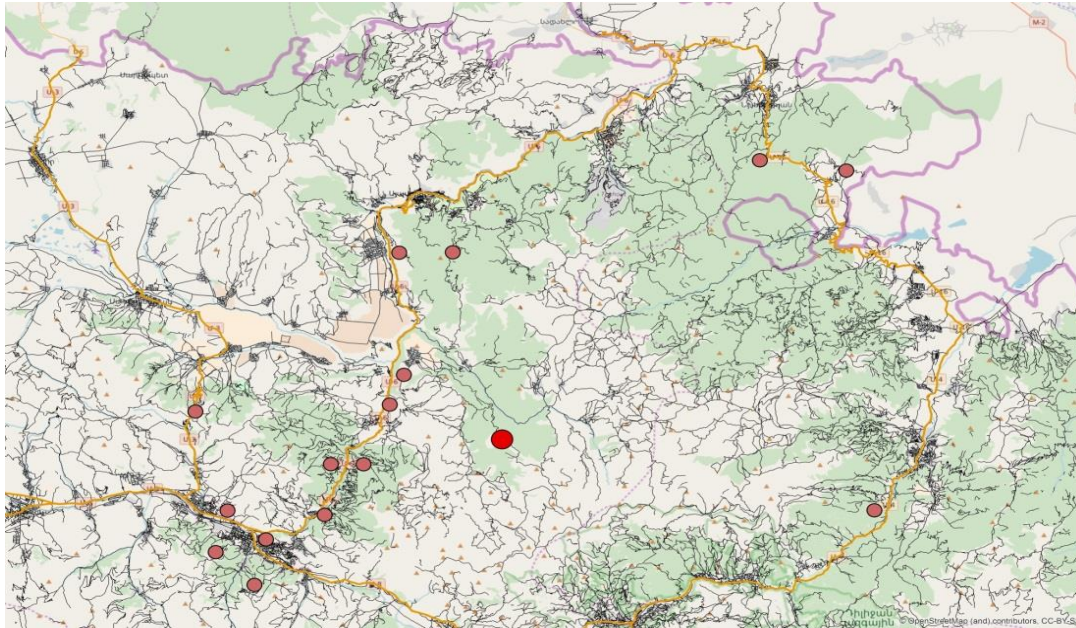


V. Guberti



„ ... the precautions now being exercised beneficially show that under the conditions at present existing the disease is one which can in large measure be avoided“

E. Montgomery 1921



Three basic biosecurity rules

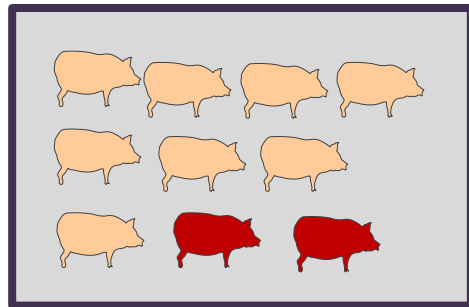
1. No swill feeding
2. No contact with strangers
3. Change boots before entering the stable

Philosophy of ASF control

Key characteristics of ASF:

- low contagiousness, slow spread, few secondary infections
- **site fidelity** (stable disease / habitat disease),

DP: stable disease

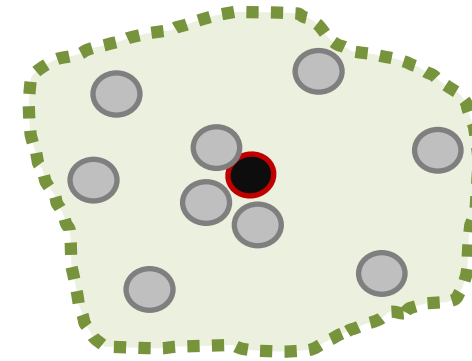


Measures:

1. Standstill
2. Culling
3. C&D

Successful approach!!

WB: habitat disease



Measures:

1. Standstill (no disturbance of WB, no hunting, fence in, (feeding)
2. (Trapping, “silent” hunting)
3. Disposal of carcasses

“Virtual stable” in forest

Humans are the main cause of long distance transmission and virus introduction into pig farms. Thus, it is crucial to include social science when planning prevention, control or eradication measures.

By considering only the biological particularities of the disease

but ignoring the human aspects, the epidemic will not be controlled.

Chenais E, Depner K et al. 2019

**Thank you
for your attention!!!**

