# European Experience on Managing African Swine Fever

Grzegorz Woźniakowski, PhD, ScD, Associate Professor

Head of Department of Swine Diseases

NATIONAL VETERINARY RESEARCH INSTITUTE IN PULAWY, POLAND

# NVRI location – 7500 km away…

## National Reference Laboratory for African swine fever

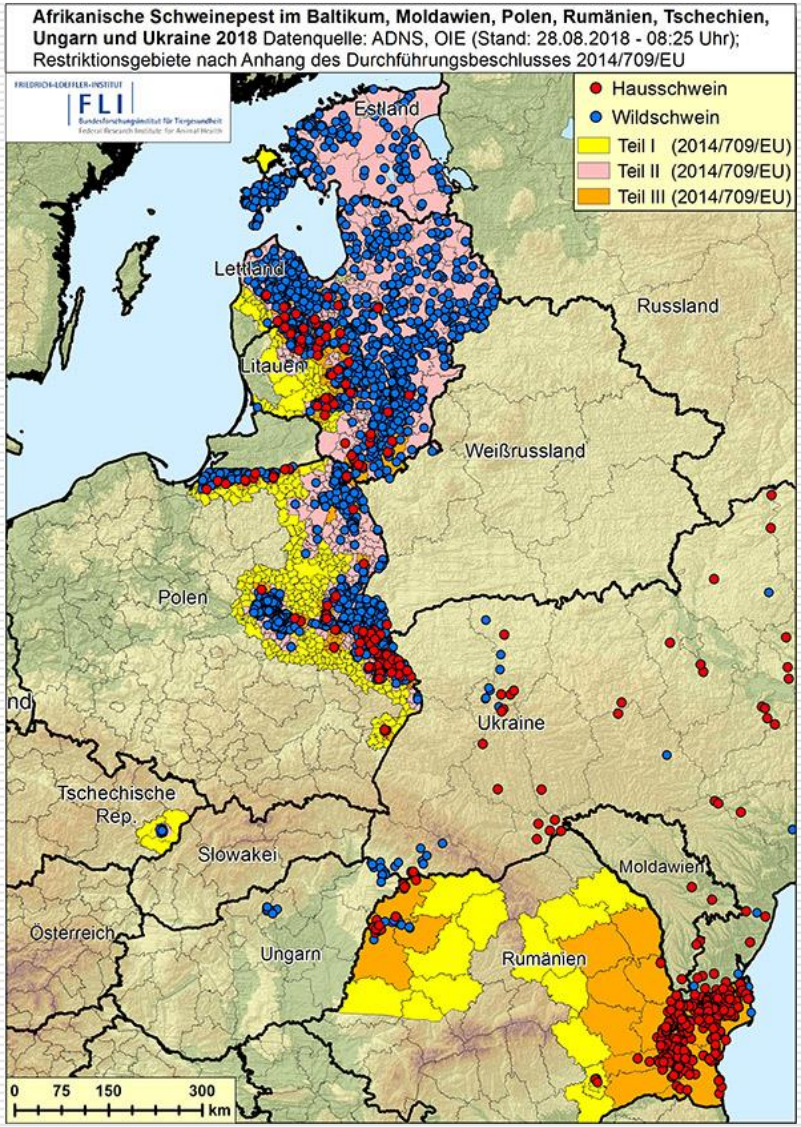
# African swine fever (ASF)

- Infectious, **low contagious** disease of domestic pigs and **wild boars.**

- Aetiological agent – ASFV – unique member of the *Asfarviridae* family.

- Currently in Europe only genotype II.

- ASFV strains circulating in Poland and other Baltic states share 99 - 100% similarity with Georgia/2007 (Frączyk et al. 2016)



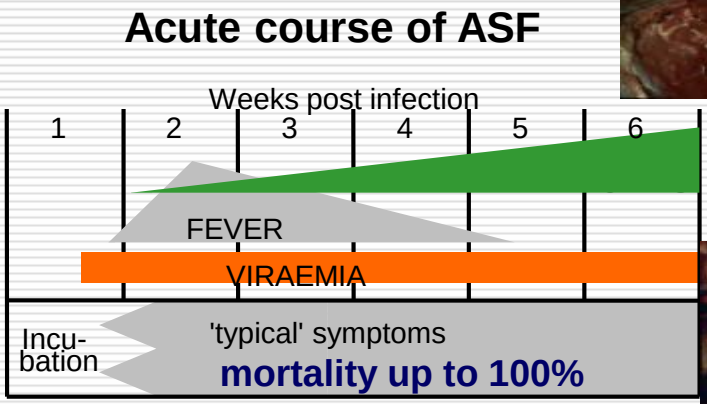
**At the moment of ASF emergence in wild boar population**

**NOBODY**

**expected the possible spread of the disease in wildlife**

# Basic data about ASF

- ✓ Scientific information available
- ✓ Knowledge about ways & routes of transmission
- ✓ Diagnostic tools available

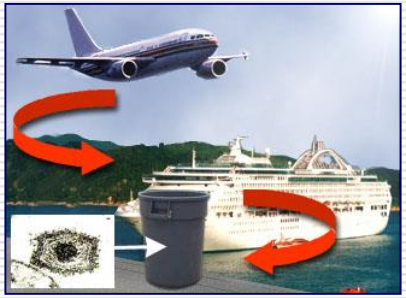



**If we do not manage to fight with ASF, it's not because of lack of knowledge…**

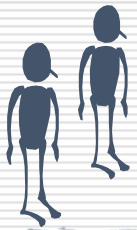
# ASF transmission routes

*Transmission*

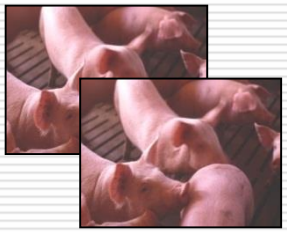
Indirect

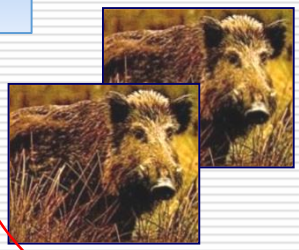


Origin of most outbreaks
Until now

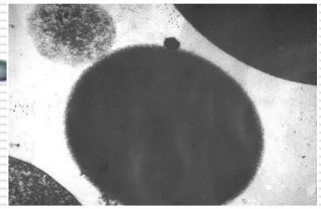


Direct





Biological Vectors

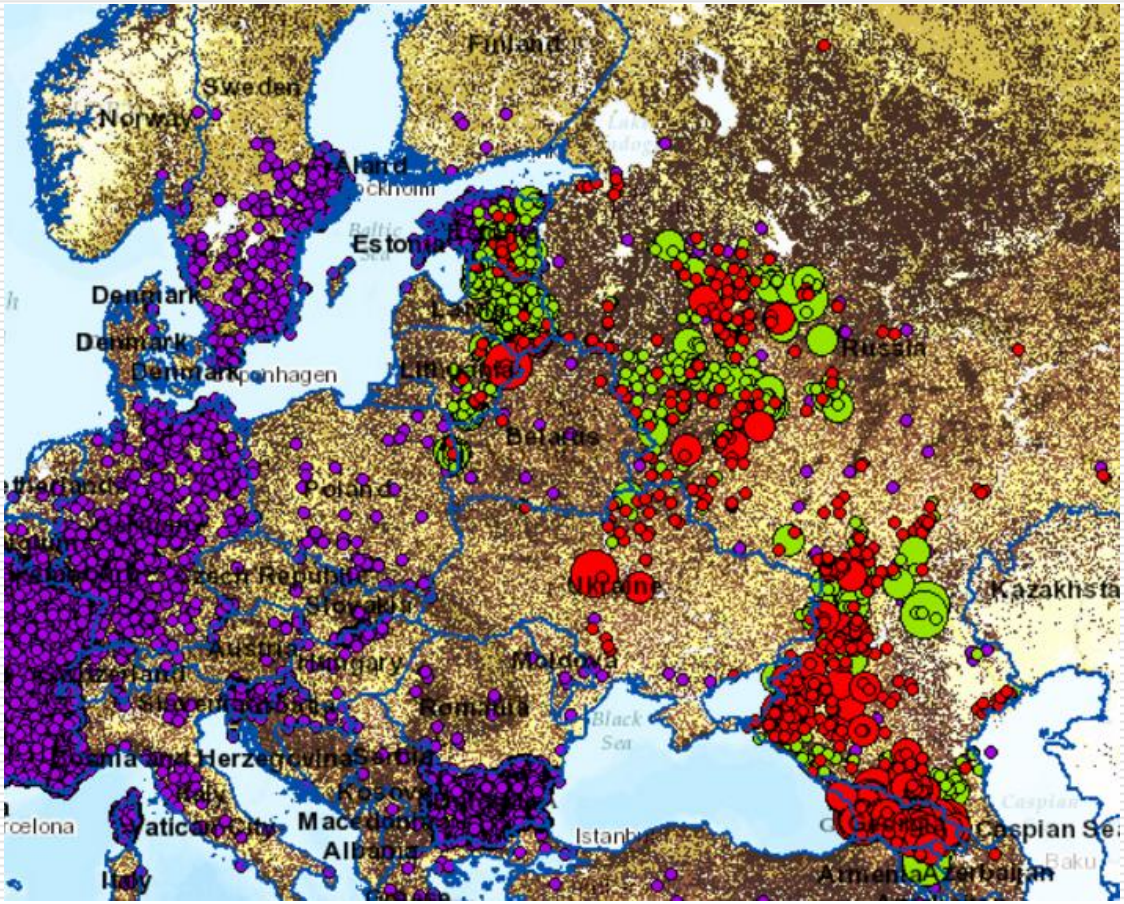


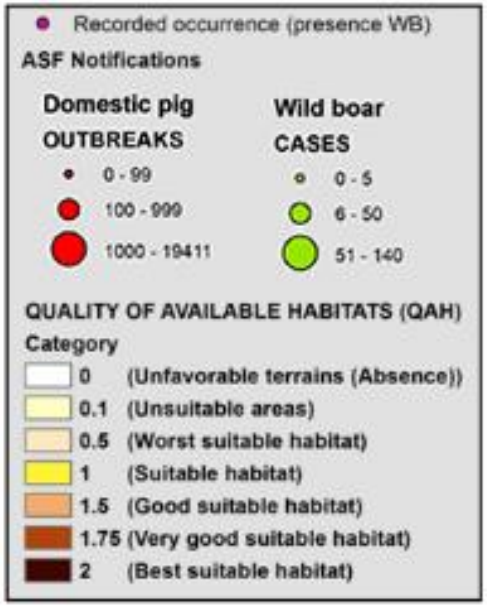
Only influenced in Local SPREAD
Outdoor productions

ASF is NOT a very transmissible disease
Less than: FMD, PRRS, CSF…
But it goes everywhere

# Why ASF spreads in EU so rapidly?

## Bacause of the high density of wild boar in the EU

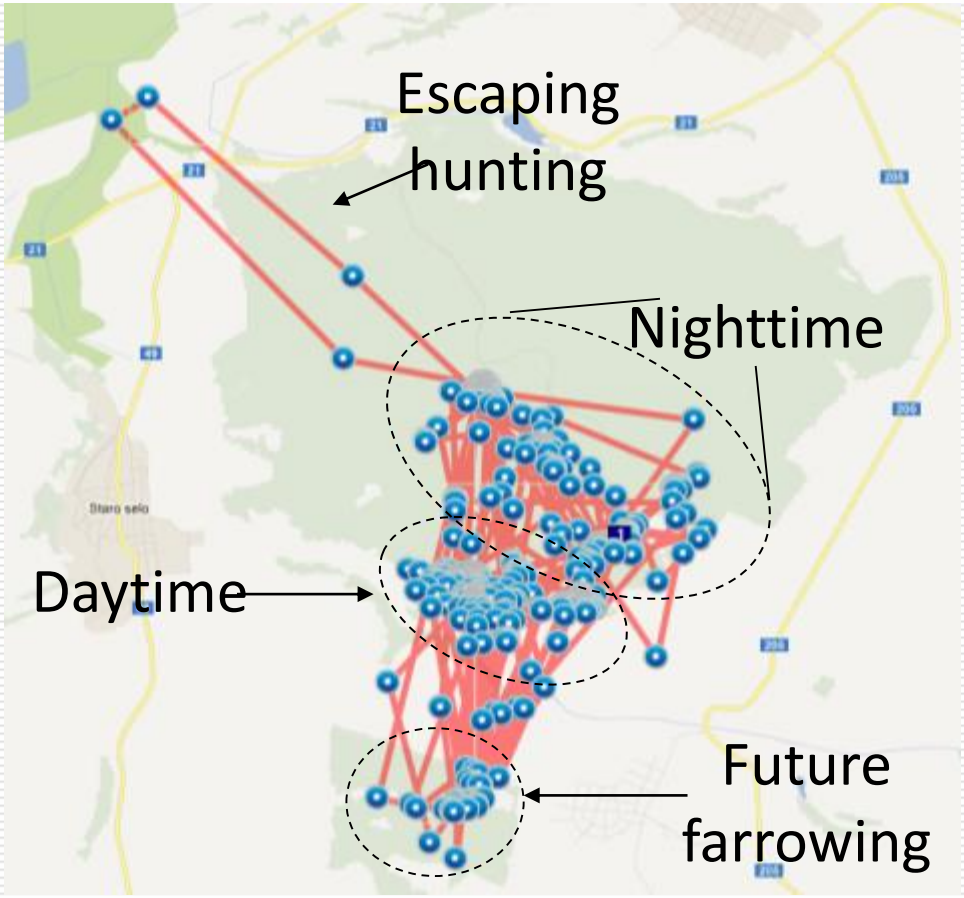



Bosch et al., 2016

# Wild boar different habitats – from pure nature to urban zone

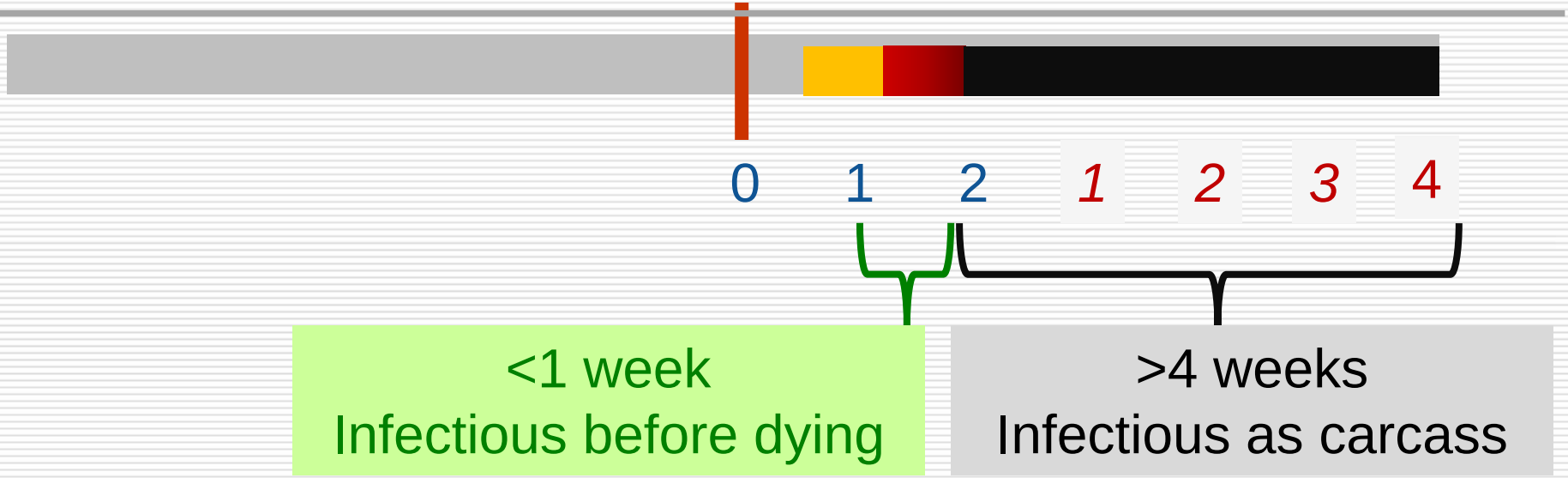
# Wild boar movements




- WB normally small home ranges (5-8 $km^2$)
- Mostly sedentary
- Disrupted by food availability or disturbance

1 hour resolution movements of a tracked wild boar sow in Bulgaria

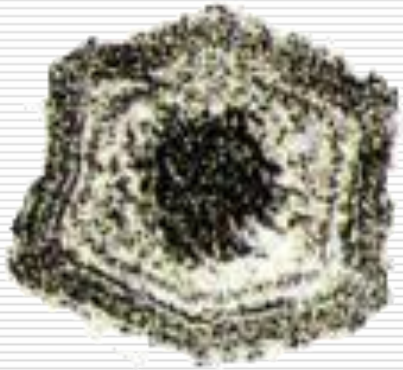
# The importance of living and dead wild boar in ASF spread




- An infected animal is only a few days infectious before dying
- Carcasses of infected animals may stay infectious for weeks/month
- For successful infection a susceptible animal has to be in direct contact with a carcass or a sick animal

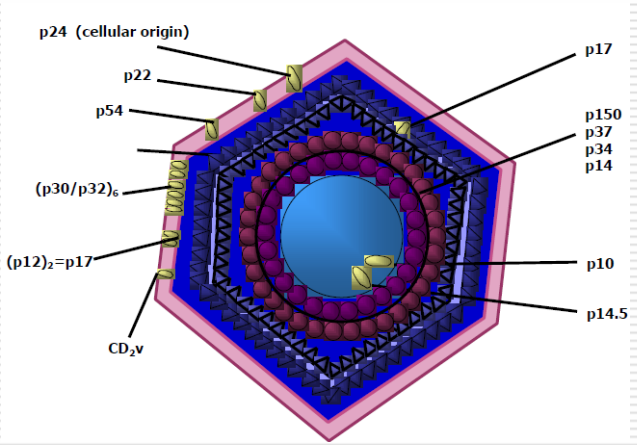
# African swine fever virus (ASFV)

- very resistant to enviromental factors



**Persistance:**

- 399 days in Parma ham
- 180 days in bone marrow
- 18 months in pig blood at 4°C
- 11 days in faeces at 20°C
- At least 20 days in decomposed carcass of wild boar



# ASF vaccine???

- the vaccine accessibility within few years is not likely because:
- the ASF can be eliminated only by the administrative EU regulations (stamping out, protective and surveillance zone introduction),
- after infection/vaccination no neutralizing antibodies are produced,
- ,

USDA gives Zoetis the opportunity to seek licensure for African Swine Fever Virus

October 16, 2018

zoetis

Zoetis has applied to license a vaccine candidate, and USDA has given Zoetis the opportunity to develop an ASF vaccine and seek licensure for it in the future.

African swine fever was recognized as a significant transboundary threat years ago. The Zoetis Center for Transboundary and Emerging Diseases team has been engaged in working towards a solution, and the development of a vaccine with the USDA is one of them.

# ASF historical distribution

2007

1998

2001

1985
1974
1975
1994
1980
1984
1981
1981
2006
2005
1992
1999

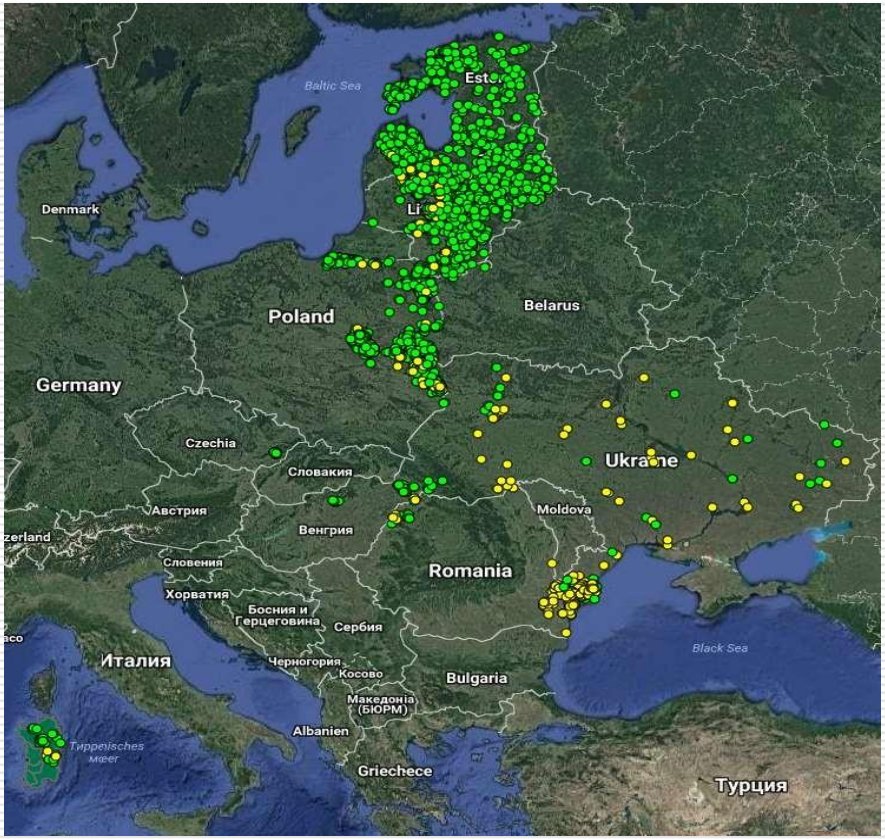
50°N
30°N
0°N
30°S
60°S

No information available
Disease suspected
Disease restricted to certain zones
Disease present
Absent in the period (year of last occurrence)
Never occurred

Source: OIE

# ASF in 2018: EU and China

| ADNS DATA up to 17/09/2018 | wild boar in 2017 | wild boar in 2018 | domestic pigs 2017 | domestic pigs 2018 |
|---|---|---|---|---|
| POLAND | 741 | 2042 | 81 | 109 |
| LITHUANIA | 1328 | 1295 | 30 | 50 |
| LATVIA | 947 | 591 | 8 | 8 |
| ESTONIA | 637 | 200 | 3 | 0 |
| CZECH REPUBLIC | 202 | 28 | 0 | 0 |
| ROMANIA | 0 | 83 | 2 | 1061 |
| HUNGARY | 0 | 41 | 0 | 0 |
| BULGARIA | 0 | 2 | 0 | 1 |
| BELGIUM | 0 | 54 | 0 | 0 |
| CHINA | 0 | 0 | 0 | 52? |



# ASF in 2018: ESTONIA

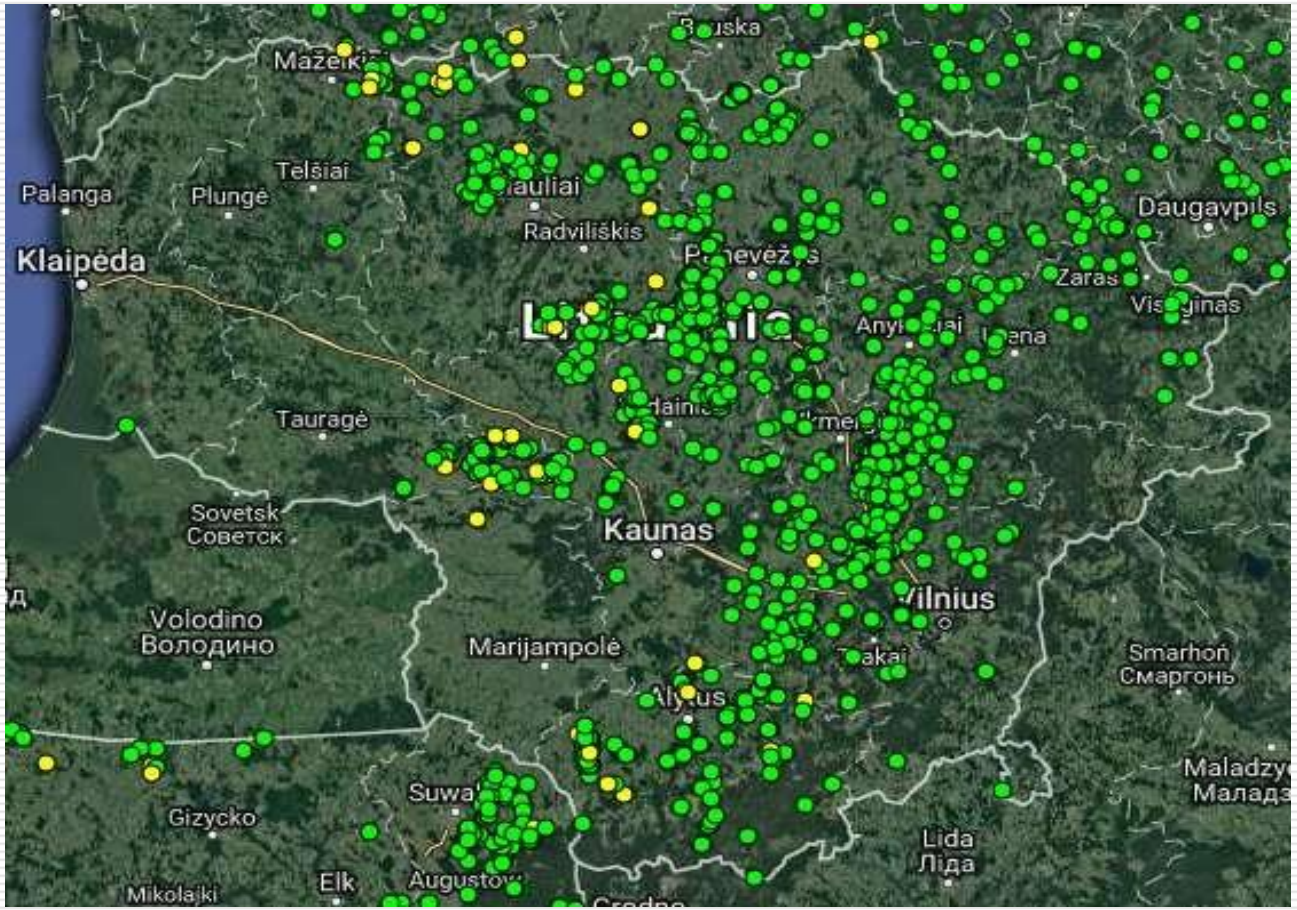
- 200 cases in wild boar
- no outbreaks in pigs

# Estonia – disposal of wild boar carcass

# ASF in 2018: LITHUANIA

| No of pigs in farm | No of outbreaks |
|---|---|
| 934-944 | 2 |
| 230 | 1 |
| 12-43 | 6 |
| 1-9 | 41 |
| **Total** | **50** |

- 1295 cases in wild boar



# Lithuania - largest ASF outbreak in 2018

**ADNS No.41, 06/08/2018**

- Farm with **20171** pigs kept;
- Within 3 days 24 fattening pigs died in one stable. Random 12 samples were taken from dead pigs and delivered for testing.
- ASF was confirmed using RT-PCR in 11 out of 12 tested dead pigs;

# ASF in 2018: LATVIA

| No of pigs in farm | No of outbreaks |
|---|---|
| 178 | 1 |
| 20-27 | 2 |
| 11-16 | 2 |
| 4-5 | 3 |
| **Total** | 8 |

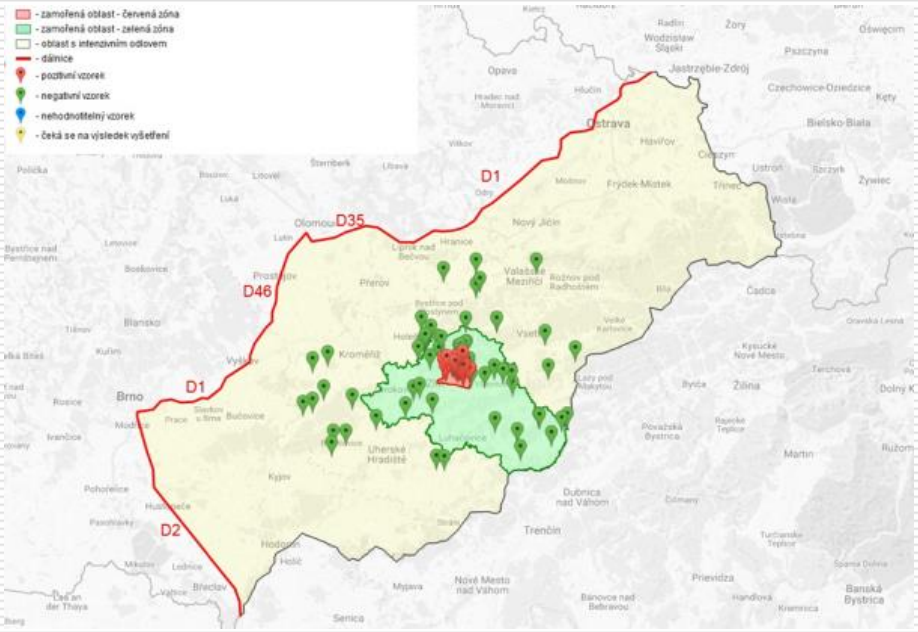
- **591 cases in wild boar**

# ASF in 2018: CZECH REPUBLIC


- **ASF cases in wild boar in 2018 – 28**
- **Last case – 19/04/2018! –** ***effective ASF eradication?***

# ASF in Czech Republic

The virus was identified for the first time in wild boar found dead close to the Hospital of Zlin city. The probable source of infection were wastes (raw pork meat – SALO) brought to the hospial by Ukrainian workers.




# ASF in Czech Republic

CT 24

http://www.africkymorprasat.cz

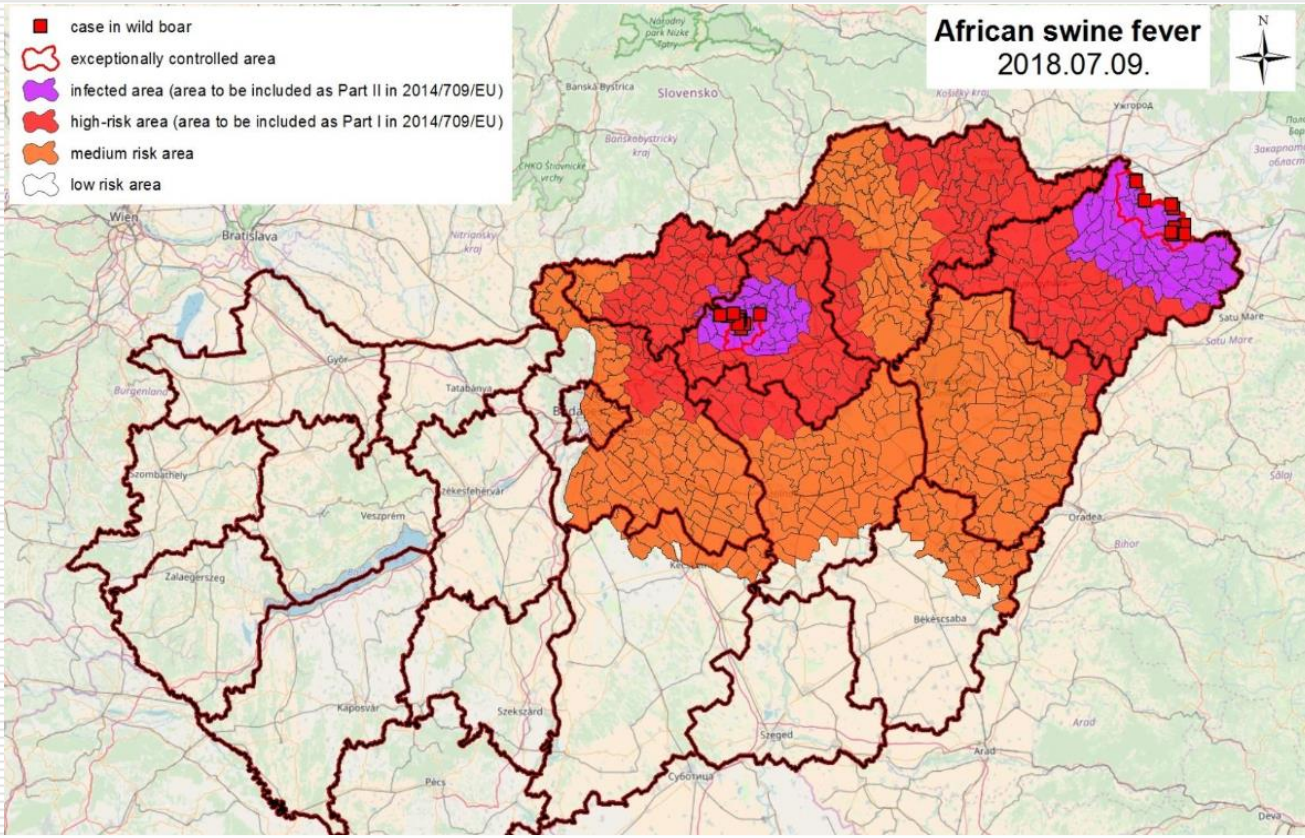
# ASF in 2018: ROMANIA

- recent outbreak in Galati – 70 km "jump" or coming from over a border
- less than 20 km from Bulgarian border

# ASF in 2018: HUNGARY

**Identified at 24/04/2018 in dead wild boar within Heves district, then a wave of cases at - Szabolc-Szatmár-Beerg district close to Romanian border.**

**So far 41 cases**



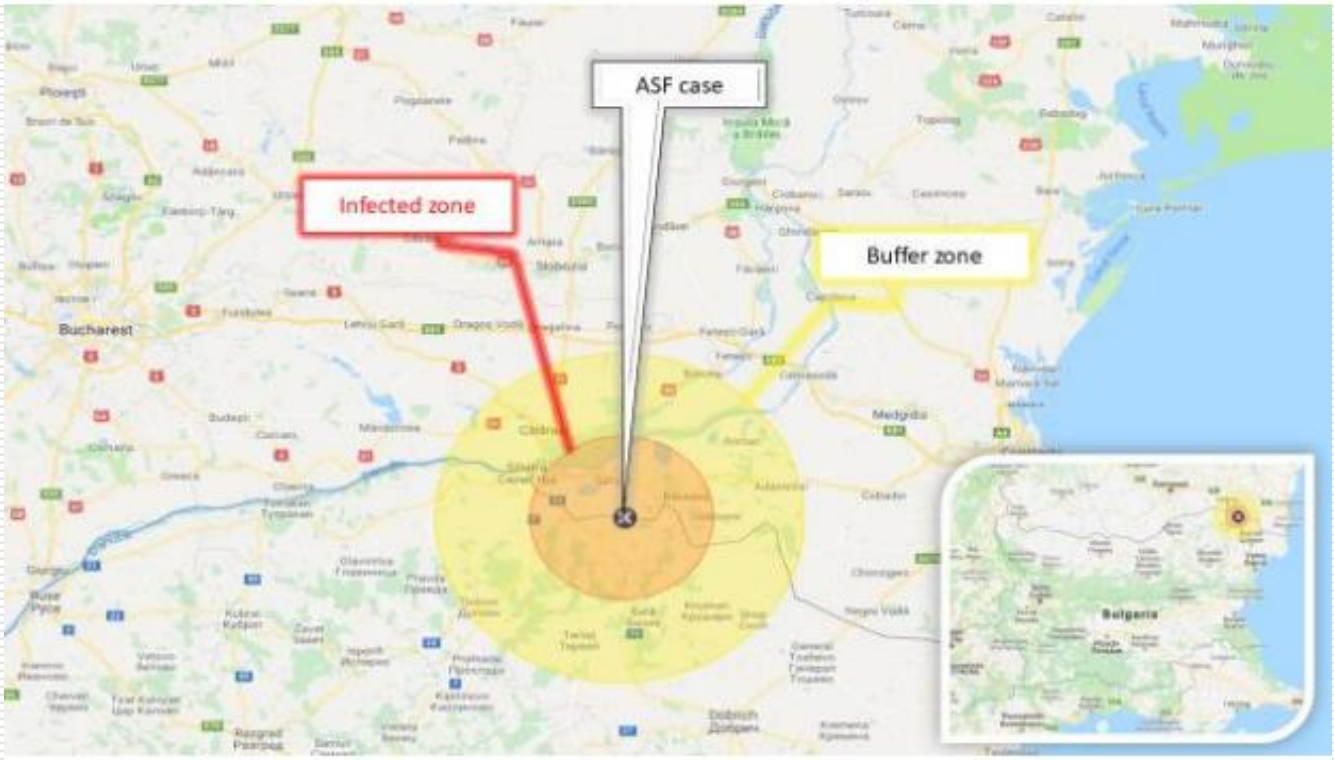
# The first ASF case in Hungary in wild boar

- A **dead wild boar** was found around the locality of Gyöngyös (Heves county) on **19 April**.
- Sample was taken and sent to the NRL (Veterinary Diagnostic Directorate of National Food Chain Safety Office, Budapest)
- **ASF virus** presence **was confirmed** on **21 April** by **PCR** test
- **National Disease Control Centre** (NDCC) was set up on 23 April.
- Possible source of the infection was **waste from pork product illegally imported by workers from neighbouring countries.**

# ASF in 2018: BULGARIA

## 1 outbreak in backyard holding of pigs – possible source – Romania?,

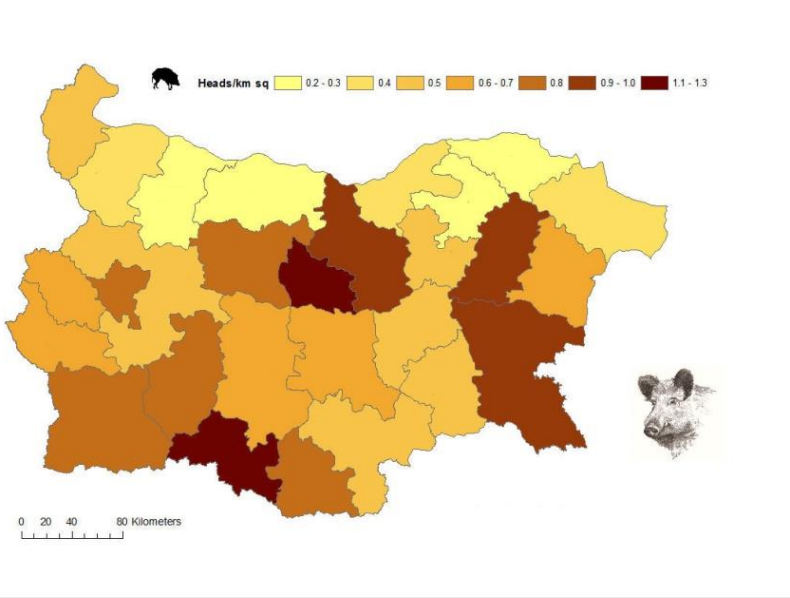
## 2 cases in wild boars – 20 km wide protective zones!







# Hunting and wild boar surveillance and control

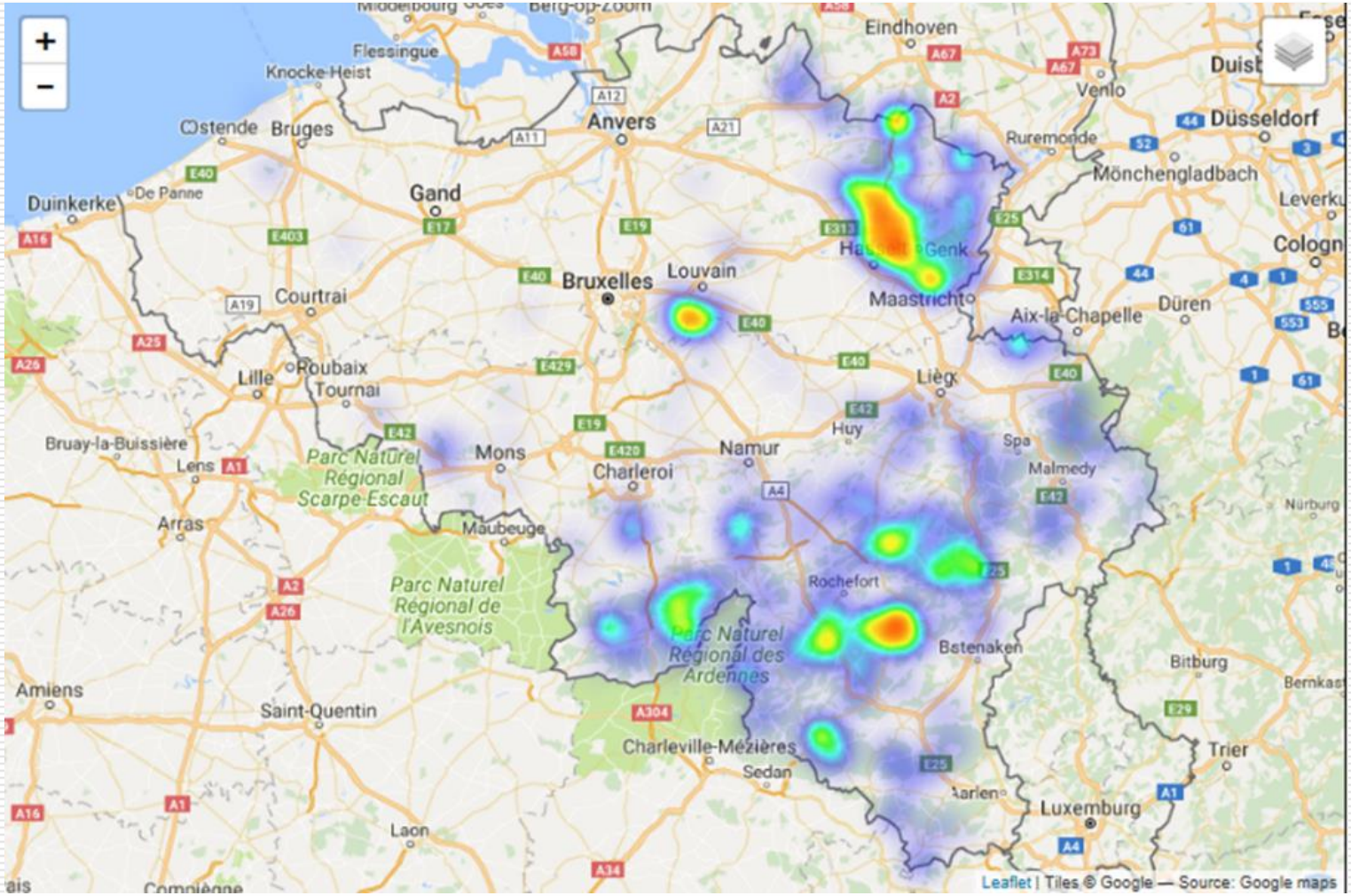



- **Development of a software/app for hunters; the results from *Trichinella* testing will be provided only if an ASF sample is also submitted;**
- **Ban on trade of wild boar into the territory of Bulgaria;**
- **Trainings of hunters on epidemiology, sampling and enhanced biosecurity measures;**
- **Building of dedicated pits for WB carcasses and ABPs disposal in hunting grounds;**
- **Enforced passive surveillance in WB**
- **Individual hinting all over the year.**

# ASF in 2018: BELGIUM

First case of ASF in dead wild boar 13/09/2018 close to border with France. Possible source – illegaly hunted wild boar transfer? Nearest ASF case in Zlin, Czech Republic – 1000 km away from this event.

# Wild boar density



# Measures taken

According to Council Directive 2002/60/EC

**Infected zone was established (630 km²)**

confirmed by Commission Implementing Decision (EU) 2018/1242 of 14 September 2018 concerning certain interim protective measures relating to African swine fever in Belgium

Competent authorities:

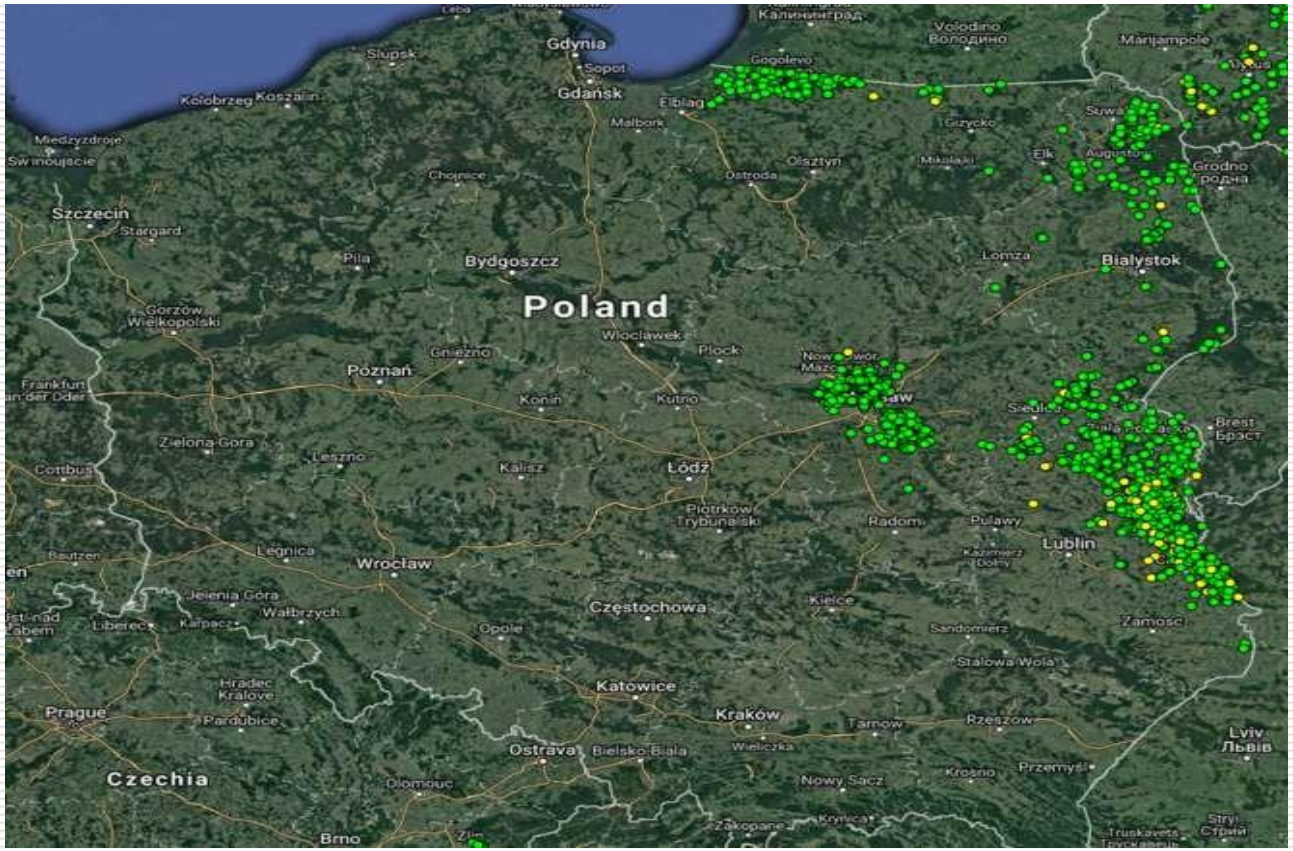
✓Pigs and other kept animals: federal state

✓Wild boar and other wild animals: regions

**Coordination at all levels!**

# ASF in 2018: POLAND

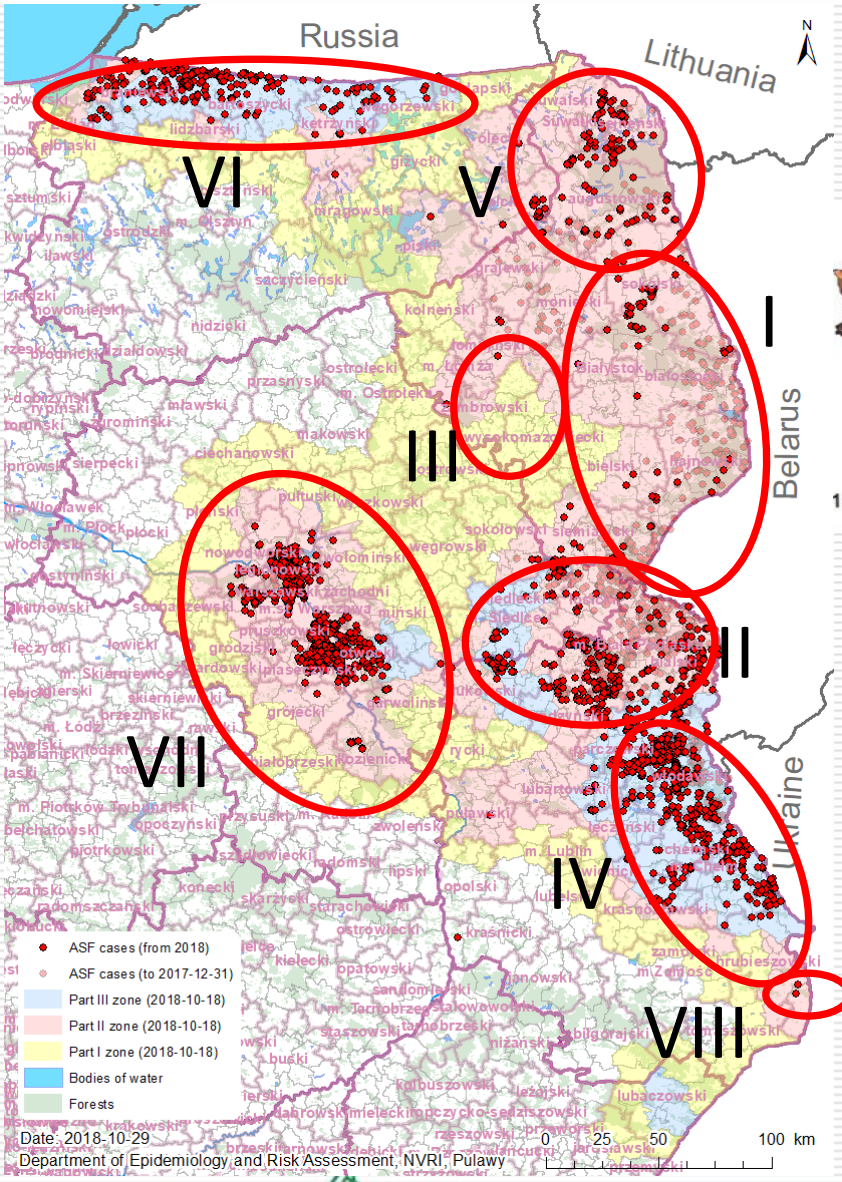
| No of pigs in farm | No of outbreaks |
|---|---|
| 1000-6000 | 7 |
| 100-700 | 15 |
| 10-90 | 55 |
| 1-9 | 32 |
| **Total** | 109 |

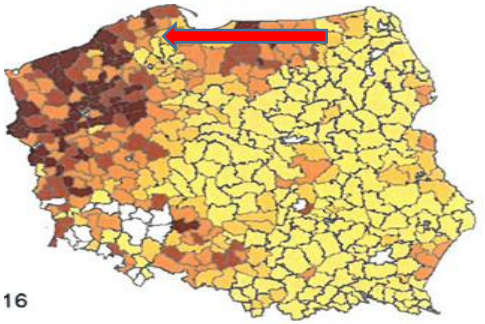



- **33 outbreaks in Chelmski district**
- **20 outbreaks in Parczewski district**
- **2042 cases in wild boar**

# Eight active ASF clusters in Poland – November, 2018.

**In total until 12.11.2018 Almost 3000 ASF cases**



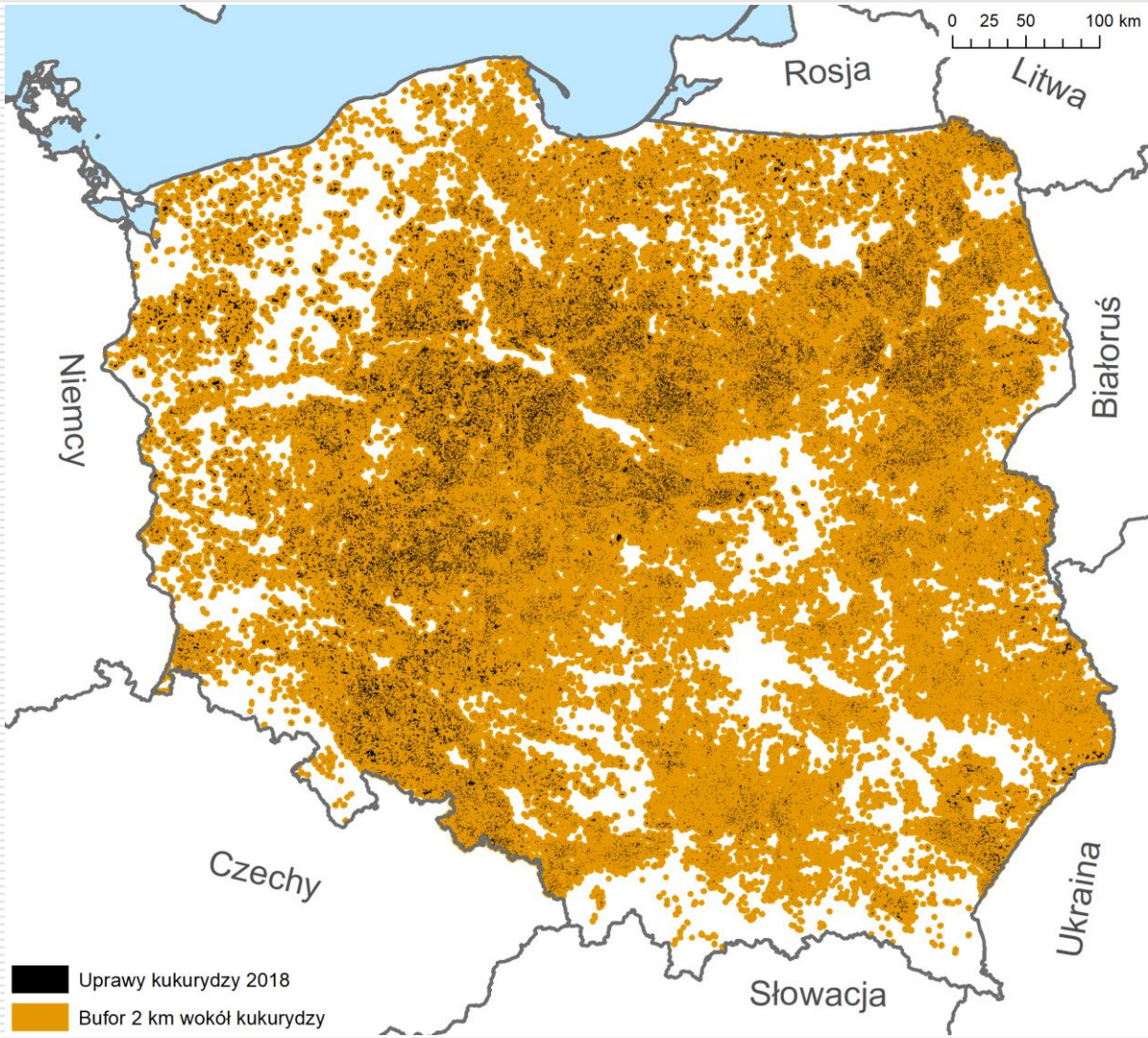
**Density of wild boar population**

# Huge concern – wild boars within towns and cities

- 6,2% area of Poland 19 389 square km – corn production

- buffer zone (2 sqare km) 215 679 km² (69% area of Poland)

- potential ecological corridors for WB

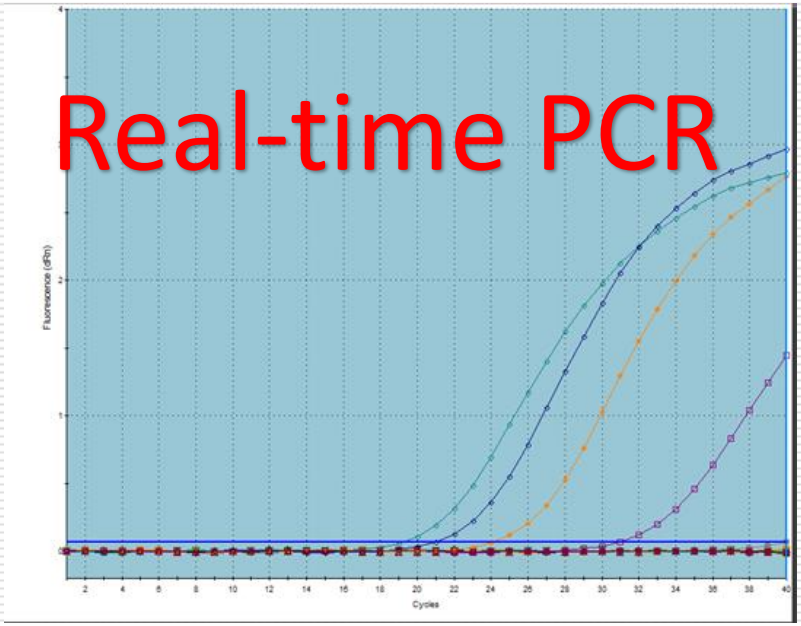



17.02.2018 09:17:11
51.9988N 21.2161E
Pecław

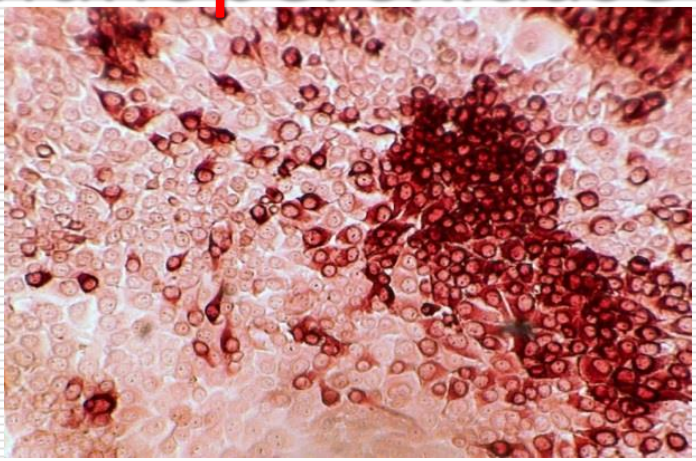

PL
2221760
27.12.2017 15:06:44
52°5'27,69147"N 21°5'27,33228"E
Konstancin-Jeziorna

# 2018 – Routine procedures for ASF

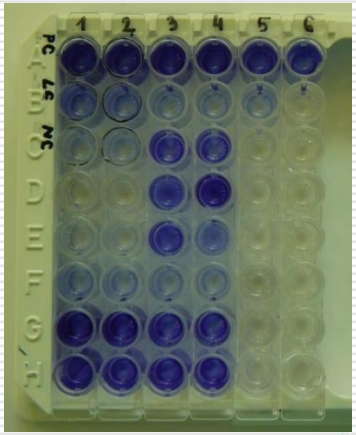
## Real-time PCR



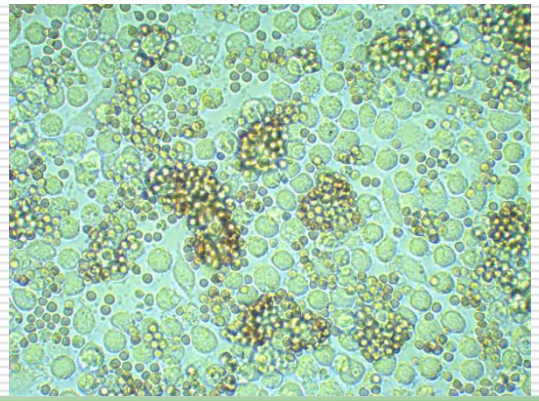
## Immunoperoxidase test



## ELISA



## Virus isolation



# Surveillance programme – number of tested animals

| Year | 2011 - 2013 | 2014 | 2015 | 2016 | 2017 | January – 12 September 2018 | Total number animal tested 2011 – 2018 |
|---|---|---|---|---|---|---|---|
| Number of wild boar tested | 13 063 | 15 881 | 13 356 | 14 965 | 24 698 | 24 207 | 106 170 |
| Number of pigs tested | 2 124 | 23 629 | 15 092 | 85 580 | 179 139 | 359 475 | 665 039 |

# Passive surveillance

Examination of WB found dead, killed in road accidents and animals showing clinical signs before hunting

| Year | Part II and III (infected) | | | | | |
|---|---|---|---|---|---|---|
| | Found dead | | | Car accidents | | |
| | tested | + | % | tested | + | % |
| 2014 | 115 | 46 | 40% | 68 | 0 | 0 |
| 2015 | 130 | 67 | 51% | 53 | 0 | 0 |
| 2016 | 149 | 63 | 42% | 95 | 3 | 3.15 |
| 2017 | 1241 | 879 | 70.8% | 137 | 6 | 4.38 |
| 2018 | 2611 | 1991 | 76.25% | 167 | 31 | 18.56 |

# Active surveillance – hunted wild boars

| Year | Part II and III (infected) | | |
|---|---|---|---|
| | tested | + | prevalence |
| 2015 | 3387 | 14 | 0.41% |
| 2016 | 4221 | 24 | 0.56% |
| 2017 | 6015 | 117 | 1.95% |
| 2018 | 4592 | 85 | 1.85% |

# Challenges to management – population size and disease control

**Hunting methods**

Driven hunt:

- effective
- disturbing
- non-selective
- ‘dirty’

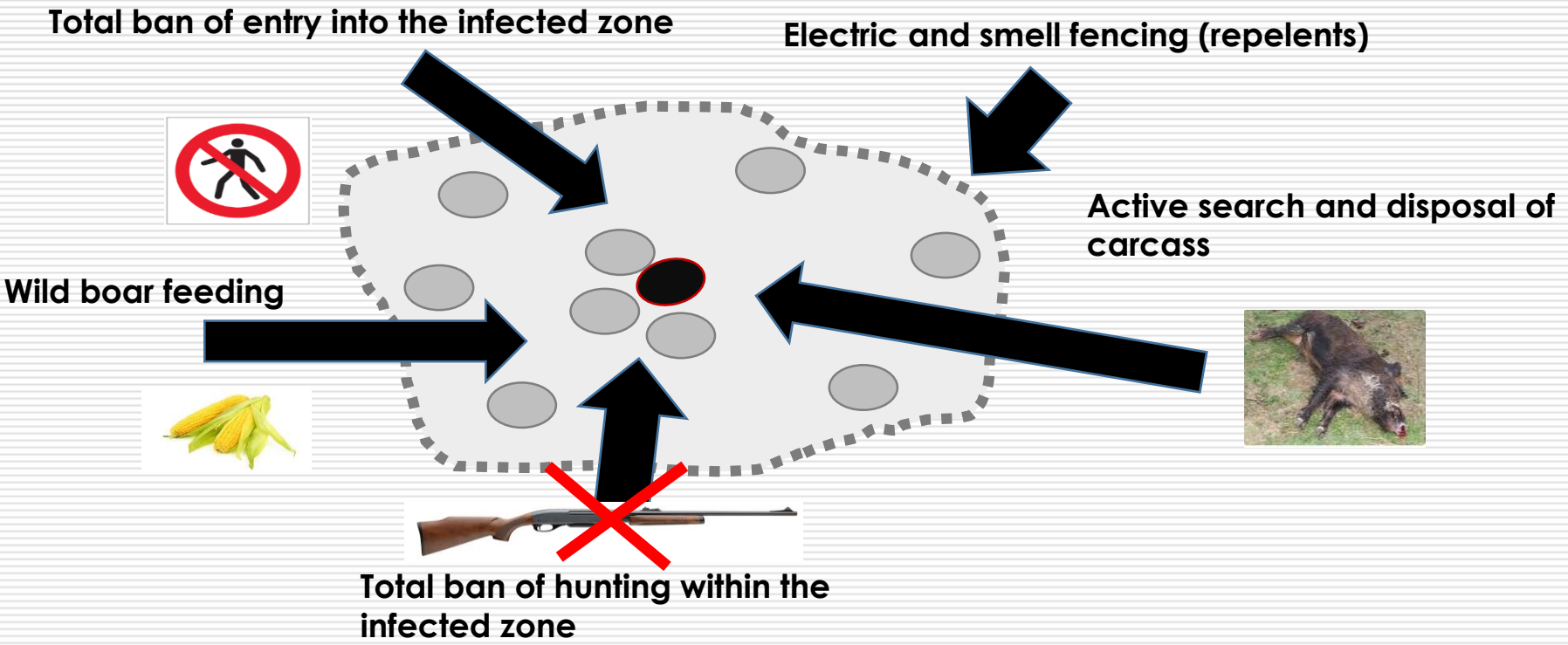
Single hunt:

- time-intensive
- silent
- selective
- ‘clean’

# Challanges to management – disease control

## Offal and carcass disposal


# Measures based on ASF biology



# ASF outbreaks in Poland

**Outbreaks 1. – 3. (STAGE I.)**

**21.07.2014 – 26.06.2016**
**as far as 9 km from the border**

**Outbreaks 4. – 23. (STAGE II.)**
**27.06.2016 – 30.09.2016**
**as far as 110 km from the border**

**Outbreaks 24. – 103. (STAGE III.)**
**25.11.2017 – 10.01.2018**

**Outbreaks 104. – 108. (STAGE IV.)**
**23.02.2018 – Outbreak 108. (630 pigs)**

**Outbreaks 109. - 213. (STAGE V.)**
**May 2018 - 20.09.2018**

# Clinical signs and lesions – nothing new

# BIOSECURITY
# - the only way of separation of ASF in wild boars from pigs

# ASF prevention – awarness campigns

# Destruction of carcasses

- **Burial**
  - Peoples skills and knowledge
  - Environmental issues
  - Concerns of local people


Photos: www. postimees.ee

# Stamping out

All pigs from  holdings located in the radius of 10 km from ASFV **case** can be stamped out **after risk assesment.**

**Stamping out are always  applied** to holdings located in the radius of 10 km from ASF **outbreak.**



# Outbreak no. 1

historia



## 19.07.2014

**The owner (peasant) used grass feed from neighbourhood (close to the forest) to feed pigs; significant numer of wild boar lived around.**

**The owner of holdings informed vet. about bad health condition of his animals as well as single pig death.**

**Laboratory confirmation of ASF – 21.07.2014.**

# Possible source of ASFV infection in pigs

| Outbreak | Number of days from the clinical signs onset to the ASF diagnosis | The most possible source of infection introduction |
|---|---|---|
| 1 | 2 | Wild boar |
| 2 | No data | Wild boar |
| 3 | No data | Pig swill |
| 4 | 5 | Wild boar |
| 5 | 7 | Pig swill |
| 6 | 5 | Straw/bone |
| 7 | 16 | Illegal trade of infected pigs |
| 8 | No detailed information, probably few days | Illegal trade of infected pigs |
| 9 | No detailed information, probably few days | Illegal trade of infected pigs |
| 10 | 8 | Illegal trade of infected pigs |
| 11 | 9 | Pig swill |
| 12 | 2 | Illegal trade of infected pigs |

# It is unlikely that the grain, hay and straw were the source of ASFV capable of causing the (infectious) disease (EFSA, 2017).

However, the use of grass, straw and hay from the areas where ASF was confirmed in wild boar pose a potential threat of virus introduction into the pig farm.

Procedures should be implemented: inactivatin of ASFV or storage for at least 30 days

Permit for use of straw from areas where ASFV occurs, only after virus inactivation or storage for at least 90 days (EFSA, EU 2017)

# Other ASFV – insect vectors should be considered…

Survival and localization of African swine fever virus in stable flies (*Stomoxys calcitrans*) after feeding on viremic blood using a membrane feeder

Ann Sofie Olesen[a] Mette Frimodt Hansen[b] Thomas Bruun Rasmussen[a] Graham J. Belsham[a] Rene Bødker[b] Anette Bøtner[a] *

[a] DTU National Veterinary Institute, Technical University of Denmark, Lindholm, DK-4 1 Kalvehave, Denmark
[b] DTU National Veterinary Institute, Technical University of Denmark, Kemitorvet, building 202, DK-2800 Kgs. Lyngby, Denmark

Using qPCR ASFV DNA was detectable in mouth parts of flies for at least 12 h and remained in head and body samples from the flies for up to three days following feeding. Infectious virus was detected in fly body samples prepared at 3 h and 12 h after feeding.

The presence of infectious ASFV in stable flies following feeding on viremic blood means that such flies are capable of transporting infectious virus. The detection of ASFV DNA in the flies for up to three days following feeding suggests that qPCR analysis of blood-feeding flies during ASFV outbreaks could be a useful method to elucidate the role of these flies in ASFV transmission under field conditions.

# Conclusions

- In most of EU countries ASFV steadily expand within WB population; WB are main source and vector of ASF among swine.
- In majority of European countries the number of ASF cases in WB population increased significantly during last year.
- New vectors of ASFV spread in Eastern Europe should be investigated
- There is no way to eradicate ASF among WB without transparent and close cooperation between neighbouring countries

# Acknowledgements

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**Dr Mārtiņš Seržants**
**Dr Petr Šatrán**

# Thank you