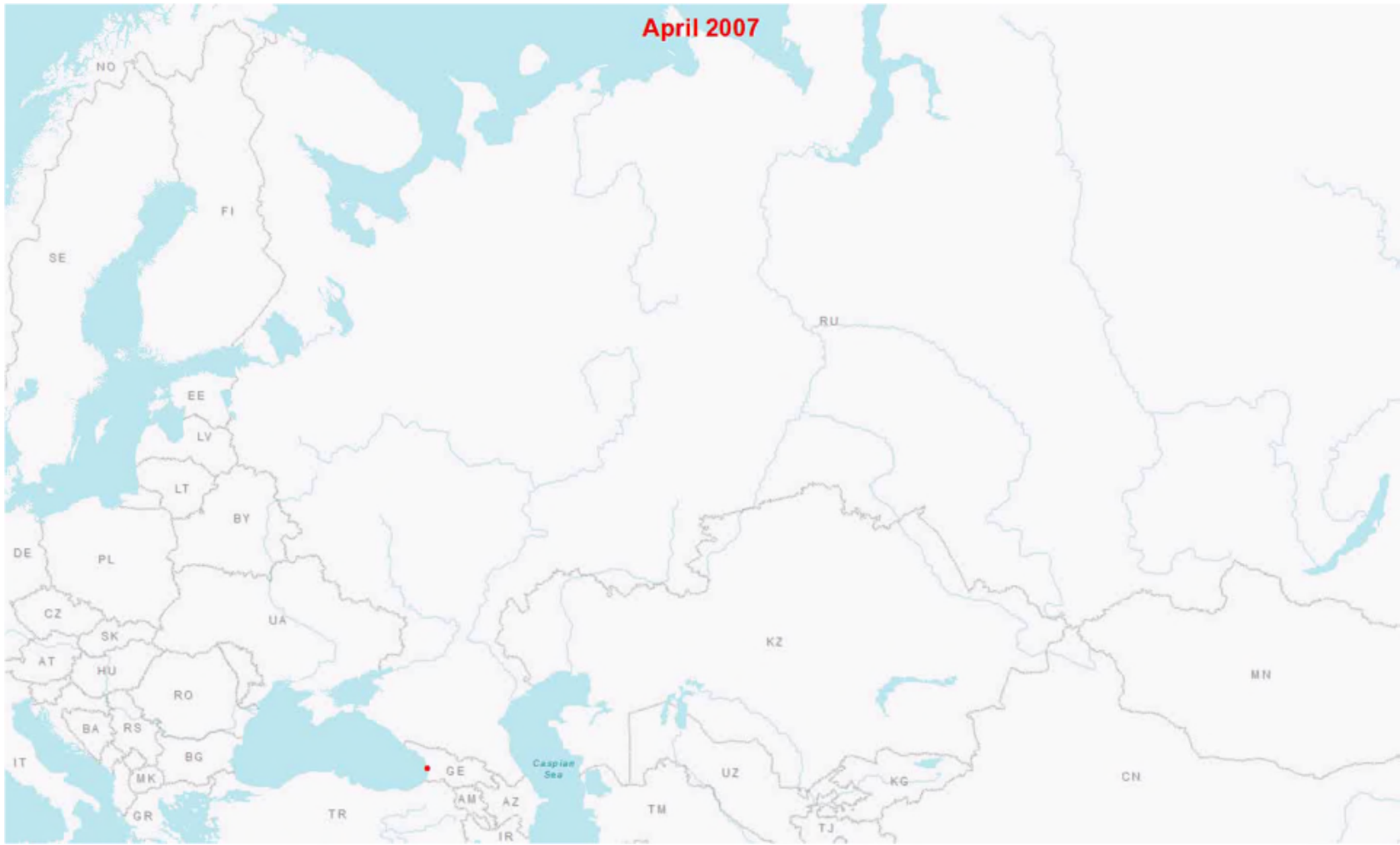
Epidemiological analyses of African swine fever in the Baltic States and Poland

(Update September 2016–September 2017)

Standing committee on Plants, Animals Food and Feed
November 30, 2017, Brussels

efsa
European Food Safety Authority

ASF SITUATION IN EASTERN EUROPE



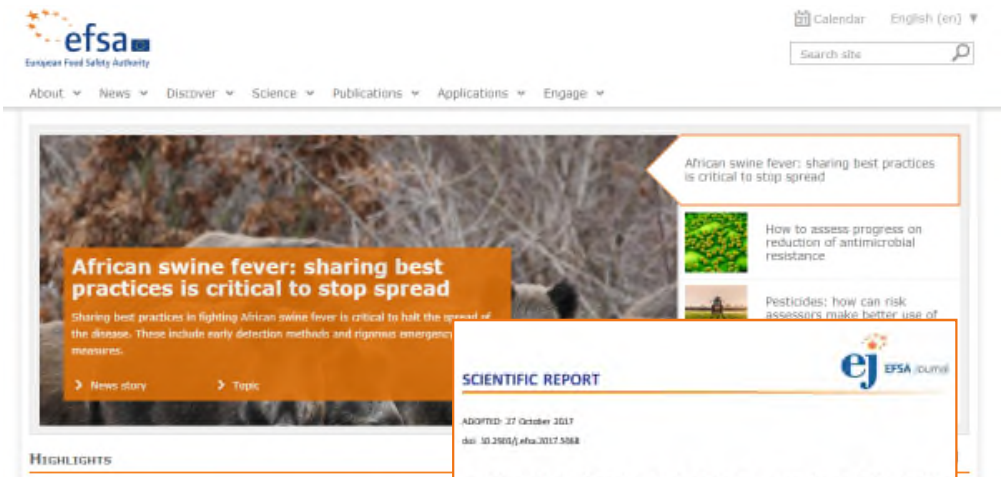
TERMS OF REFERENCE

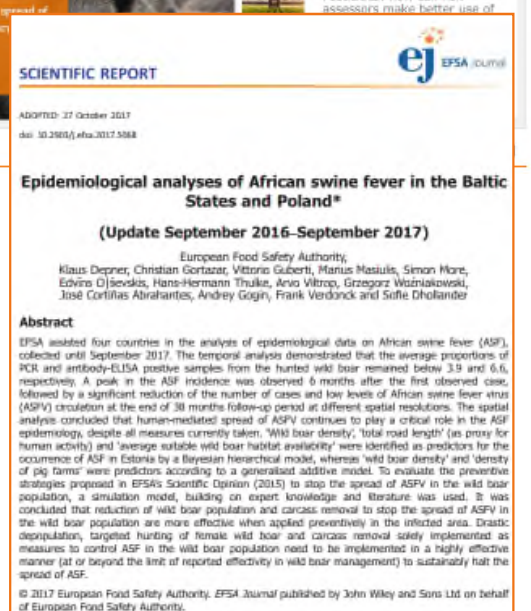
1. **Analyse the epidemiological data on ASF** from affected Member States
   - Include an analysis of the **temporal and spatial patterns** of ASF in wild boar and domestic pigs.
   - Include an analysis of the **risk factors** involved in the occurrence, spread and persistence of the ASF virus

2. **Review the management options for wild boar** identified in the EFSA Scientific Opinion of June 2015

STRUCTURE

1. **Extensive literature overview**
2. **Descriptive epidemiological analysis**
   - Update of the ASF situation
   - Temporal distribution
   - Spatial distribution
1. **Risk factor analysis**
   - Bayesian hierarchical model (BYM)
   - Generalized additive model (GAM)
2. **Review of the management options for wild boar (EpiModel)**




SCIENTIFIC REPORT

Epidemiological analyses of African swine fever in the Baltic States and Poland*

(Update September 2016–September 2017)

European Food Safety Authority,
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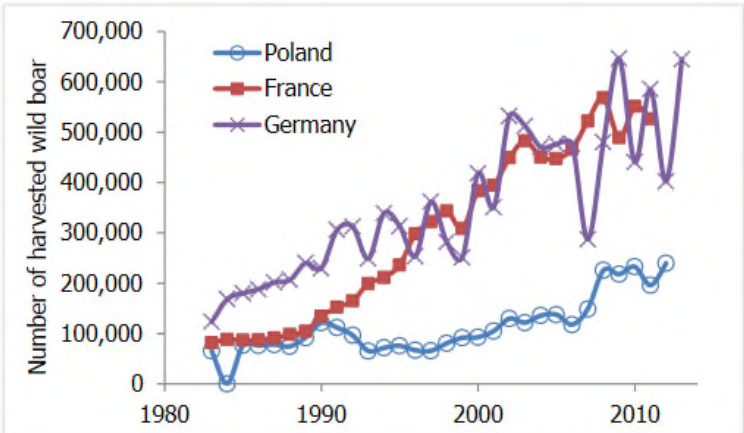
Abstract

EFSA assisted four countries in the analysis of epidemiological data on African swine fever (ASF), collected until September 2017. The temporal analysis demonstrated that the average proportions of PCR and antibody-ELISA positive samples from the hunted wild boar remained below 3.9 and 6.6, respectively. A peak in the ASF incidence was observed 6 months after the first observed case, followed by a significant reduction of the number of cases and low levels of African swine fever virus (ASFV) circulation at the end of 38 months follow-up period at different spatial resolutions. The spatial analysis concluded that human-mediated spread of ASFV continues to play a critical role in the ASF epidemiology, despite all measures currently taken. 'Wild boar density', 'total road length' (as proxy for human activity) and 'average suitable wild boar habitat availability' were identified as predictors for the occurrence of ASF in Estonia by a Bayesian hierarchical model, whereas 'wild boar density' and 'density of pig farms' were predictors according to a generalised additive model. To evaluate the preventive strategies proposed in EFSA's Scientific Opinion (2015) to stop the spread of ASFV in the wild boar population, a simulation model, building on expert knowledge and literature was used. It was concluded that reduction of wild boar population and carcass removal to stop the spread of ASFV in the wild boar population are more effective when applied preventively in the infected area. Drastic depopulation, targeted hunting of female wild boar and carcass removal solely implemented as measures to control ASF in the wild boar population need to be implemented in a highly effective manner (at or beyond the limit of reported effectivity in wild boar management) to sustainably halt the spread of ASF.

http://onlinelibrary.wiley.com/doi/10.2903/j.efsa.2017.5068/pdf

1. EXTENSIVE LITERATURE REVIEW: CONCLUSIONS

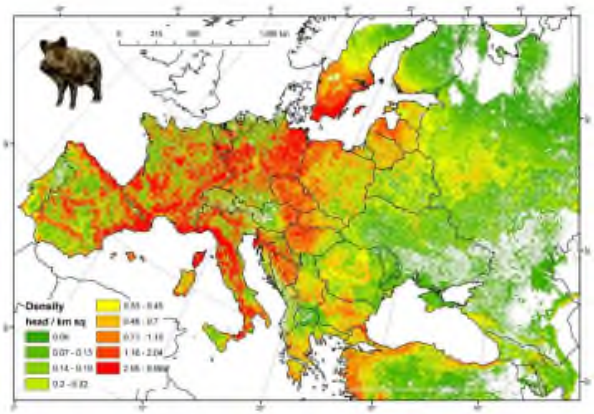
- The **capacity and willingness of hunters,** the social context and regional diversity need to be integrated into policy to manage wild boar populations
- **There is a need for a better understanding of the wildlife population dynamics** and for good baseline data on wildlife population trends



1. EXTENSIVE LITERATURE REVIEW

- **Rapid detection and removal of contaminated carcasses is regarded as an important control measure** against ASF in wild boar

- **Wild boar** are unlikely to stop their current (mostly northward) **expansion** and **population growth** unless changes in game management take place



Source FAO/ASFORCE, MAY 2015

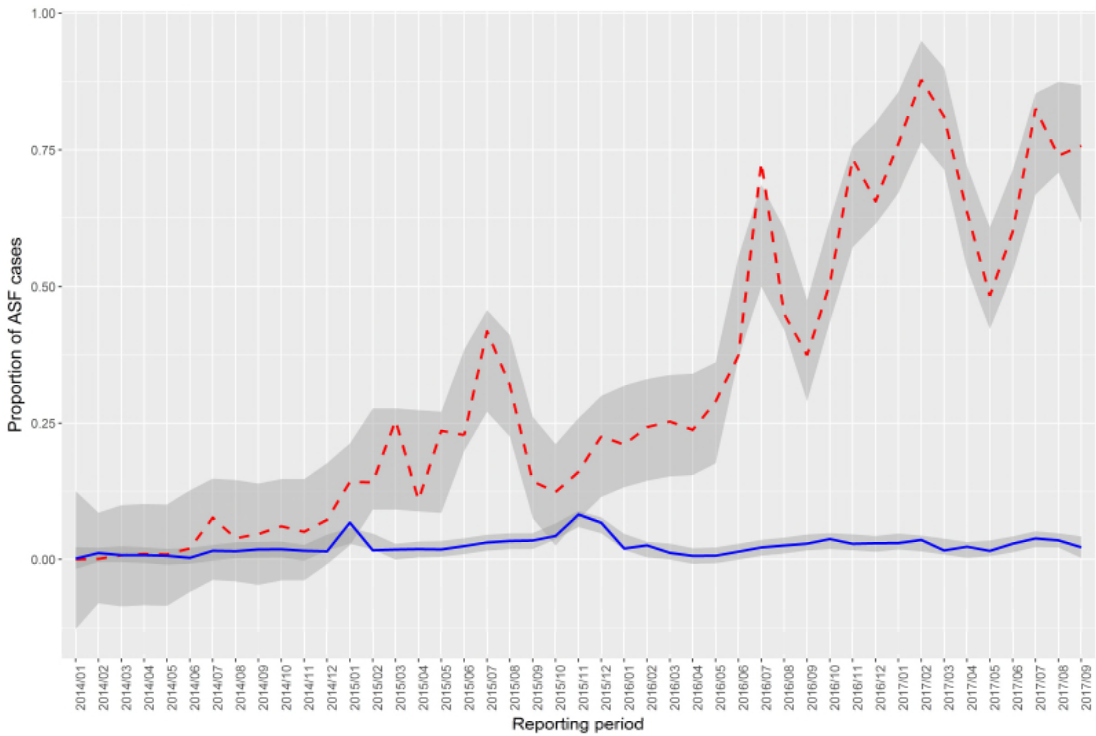
2. DESCRIPTIVE EPIDEMIOLOGY

- **Spatio-temporal data of ASF detections**
  - ADNS
  - Laboratory tests
    - ✓ Sample based
    - ✓ Positive and negative
    - ✓ Collected via DCF directly from LIMSs
- **Population distribution data (contain temporal component)**
  - Wild boar population size and density
  - Number and distribution of domestic pigs
- **Spatial data**
  - Shape files (administrative units or hunting grounds)
  - Environmental data, human settlements and regional roads

2. DESCRIPTIVE EPIDEMIOLOGY

Temporal distribution

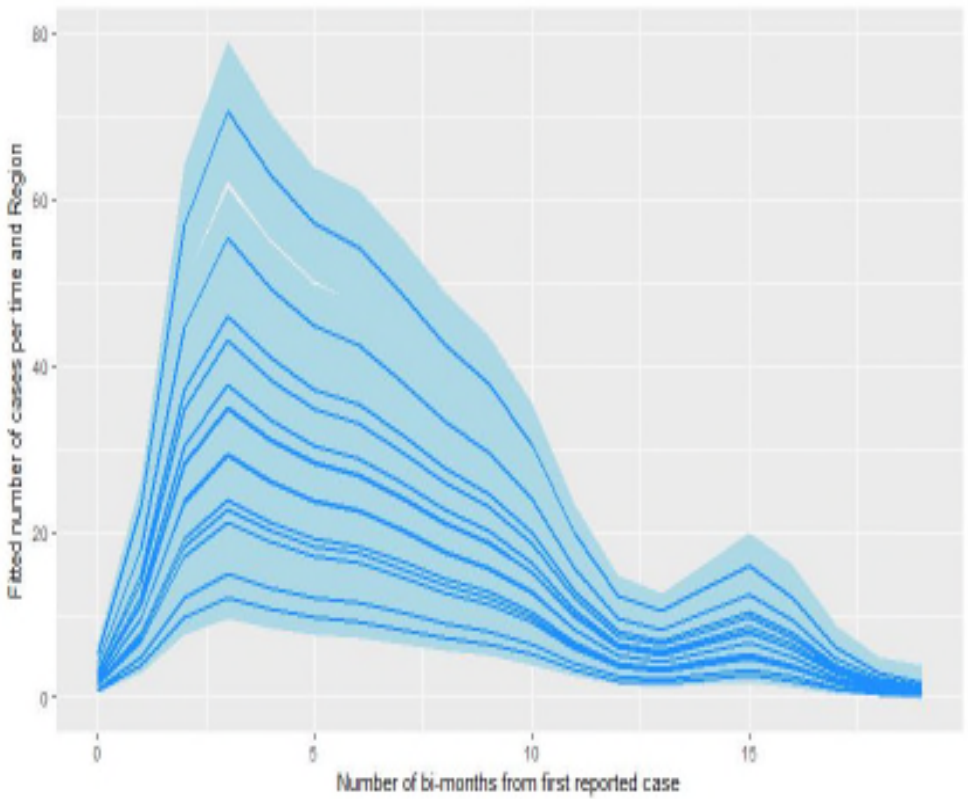
Both the **proportions of PCR and antibody positive samples** from the hunted wild boar of Estonia, Latvia and Lithuania **remained low** since the first detection of ASF.



2. DESCRIPTIVE EPIDEMIOLOGY

Temporal distribution

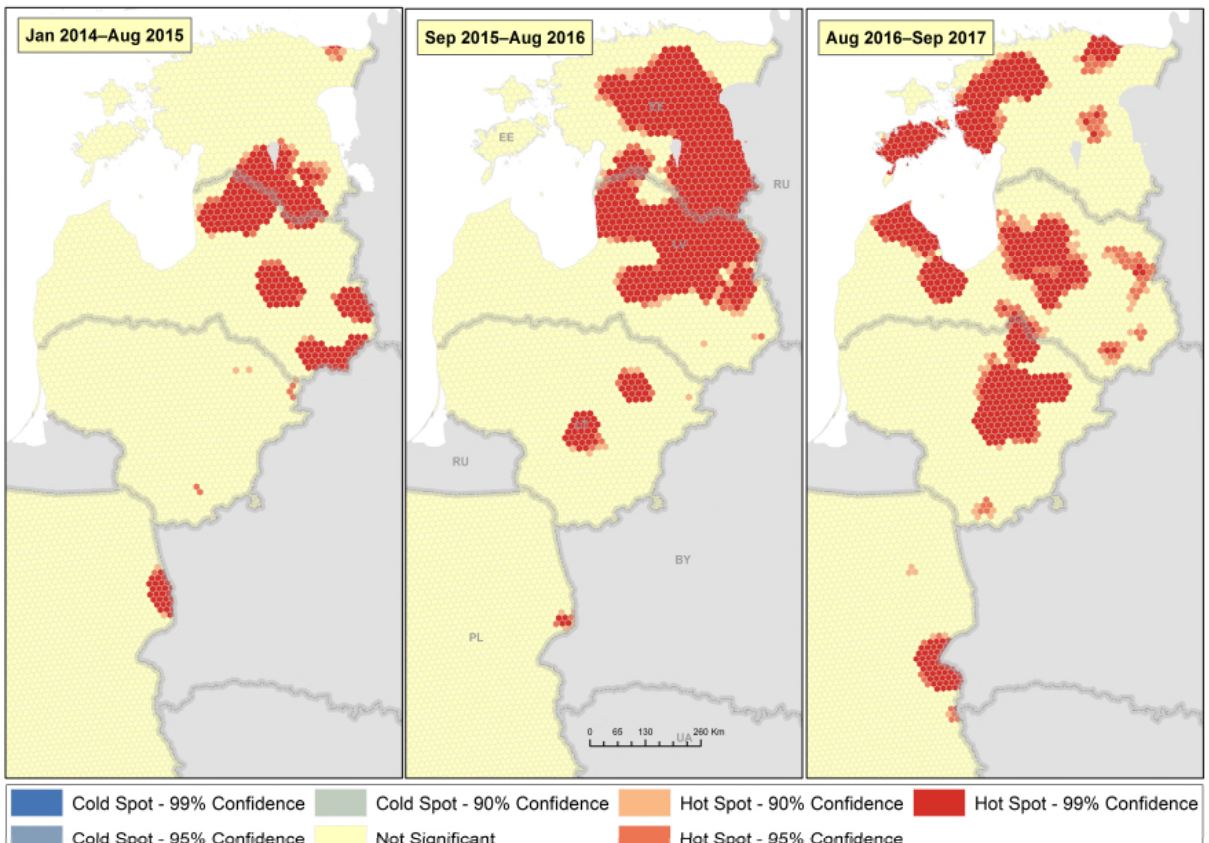
The modelled time trends indicated a **peak in the number of ASF cases around 6 months** after the first case was reported. At the end of the follow-up period of 38 months, a **significant reduction** of the number of cases was predicted, but at the same time there the possibility for ASF to **circulate at low levels**



2. DESCRIPTIVE EPIDEMIOLOGY

3. Spatial distribution

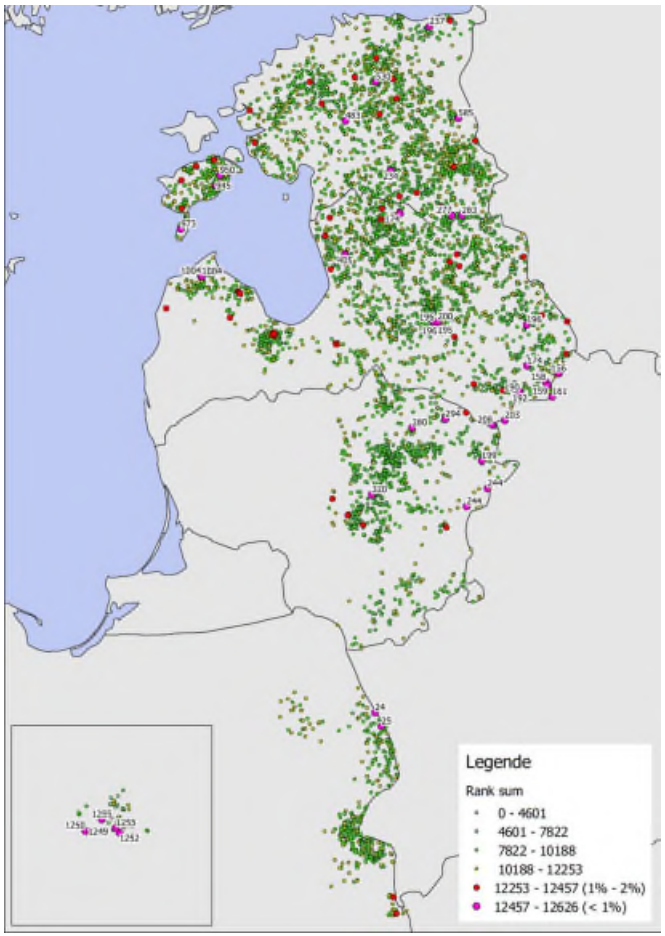
Identification of hot-spots: behaviour hot spots difficult to predict



2. DESCRIPTIVE EPIDEMIOLOGY

3. Spatial distribution

Human-mediated spread of ASFV continues to play a **critical role** in ASF epidemiology, despite all measures currently taken



3. RISK FACTOR ANALYSIS (ESTONIA)

- According to both models the **wild boar density** was a **significant indicator** for the occurrence of ASF in the wild boar population
- **BYM: the total road length** (as proxy of human activity) and the **average suitable wild boar habitat**
- **GAM: the density of pig farms** are significant indicators associated with the occurrence of ASF

Human-mediated spread

4. ASSESSMENT OF WB MANAGEMENT OPTIONS

Parameters:

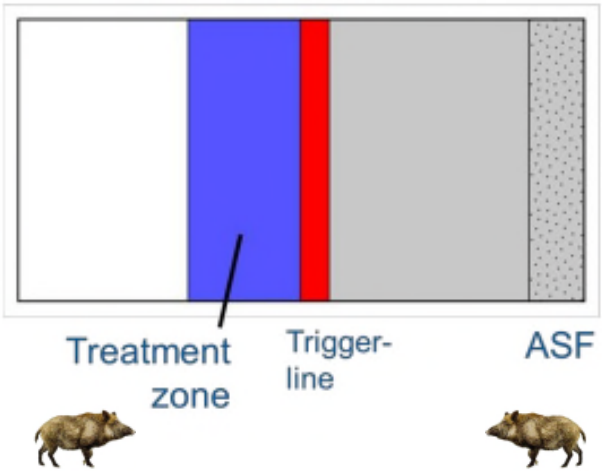
- **Width of the treatment zone**
- **Efficiency of proposed measures** in terms of percentage achievement
  - **Depopulation**: 30%, 50%,…, 90%)
  - **Targeted Hunting**: Percent effective (30%, 50%,…, 90%)
  - **Carcass removal**: 0%, 30%, 50%,…, 90%)

Simulate control approach

Drastic reactive measure
Depopulation in one campaign

Soft reactive measure
Multiple reproductive seasons targeted hunt of females

Model landscape representation



4. ASSESSMENT OF WB MANAGEMENT OPTIONS

- **Measures** to reduce wild boar population to finally halt the expansion of ASFV, are the **most effective** when applied **in the regions outside or adjacent** to already affected part (treatment zone)

- Additionally, any carcass should be **removed as fast as possible** from the infected areas as well as its surrounding areas

4. ASSESSMENT OF WB MANAGEMENT OPTIONS

- Drastic depopulation, targeted hunting of female wild boar and carcass removal implemented as only measure to control ASF in the WB population need to be implemented in a highly effective manner (at or beyond the limit of reported effectivity in wild boar management) to sustainably halt the spread of ASF

- Carcass removal 2 to 6 weeks after death of the infected wild boar (median 4 weeks) would provide a very limited contribution to the success of control measures

4. ASSESSMENT OF WB MANAGEMENT OPTIONS

- The model predicted that **a very limited effect** of the simulated measures for a wild boar population density **above 1.5/km²** in the model landscape prior to reproduction. Early management would be required to preventively reduce greater population densities.

- **Early detection** of entry of ASFV might facilitate the implementation of intensive focused emergency measures different from those on large spatio-temporal scales studied in the model simulations.

RECOMMENDATIONS

- This report, including the model simulations, will need to be **updated** if new scientific knowledge in contradiction to the assumptions used in the model becomes available.

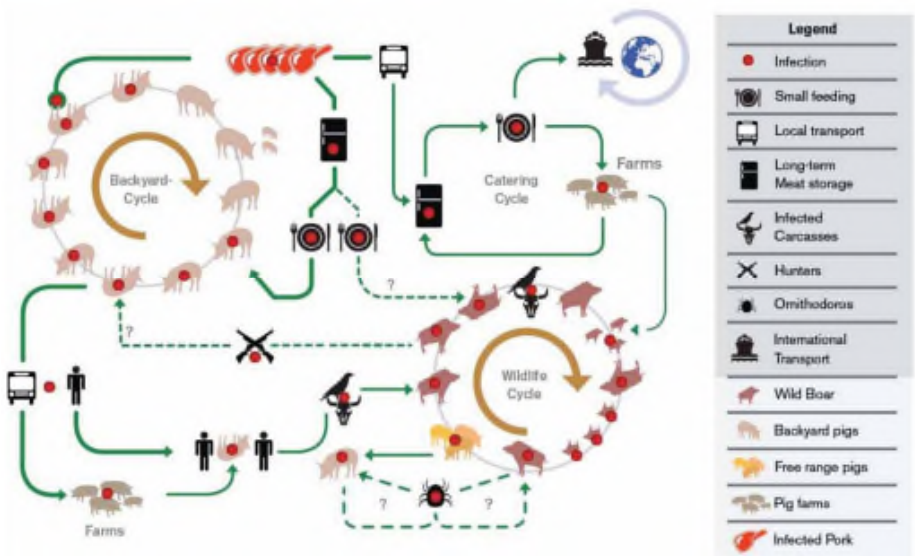
- Detailed analysis using simulations on **true landscapes** with multiple habitat predictors would improve the understanding of the performance of the measures.

- Standardised methods of **wild boar density** assessment are needed.

RECOMMENDATIONS

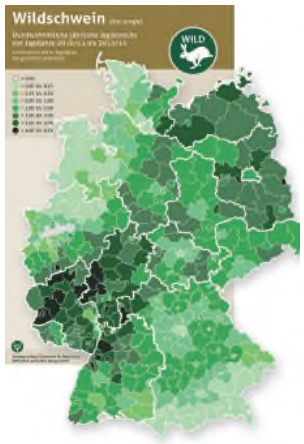
- **Human-mediated spread** needs to be urgently addressed by intensified awareness building of all persons that might be potentially in contact with infected wild boar or pigs

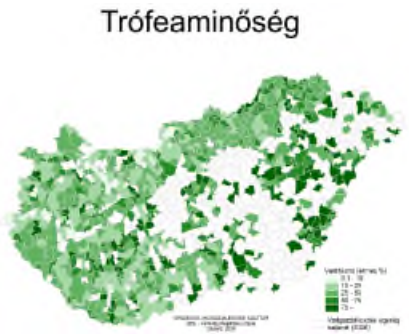
- The existing approaches to local emergency measures using drastic depopulation and/or fencing should be evaluated with existing empirical an epidemiological data.

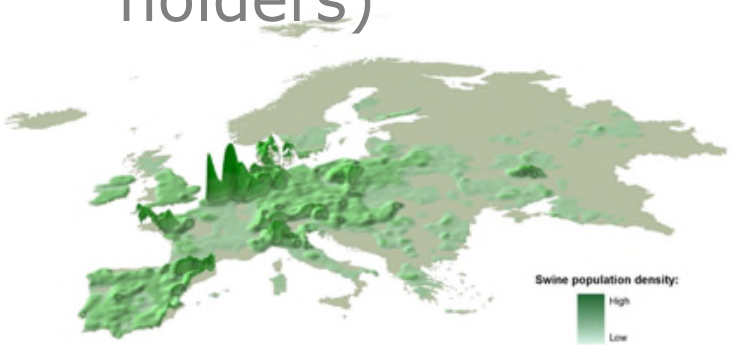


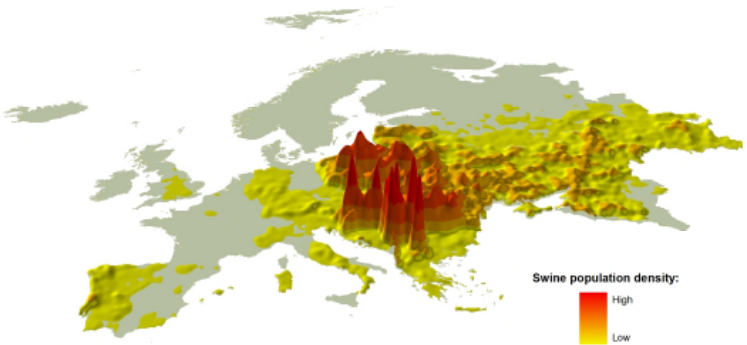
REPORT III

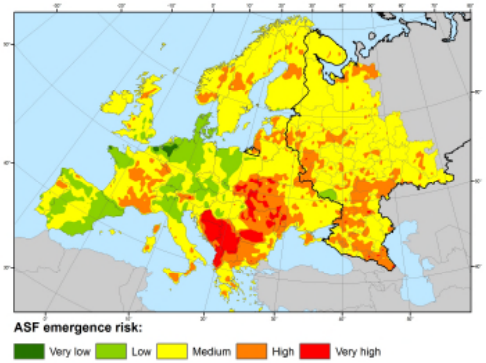
- Countries at risk
- Domestic pigs distribution (location, type, population)
- Wild boar population data
- Contact points – national services and authorities (data holders)











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