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

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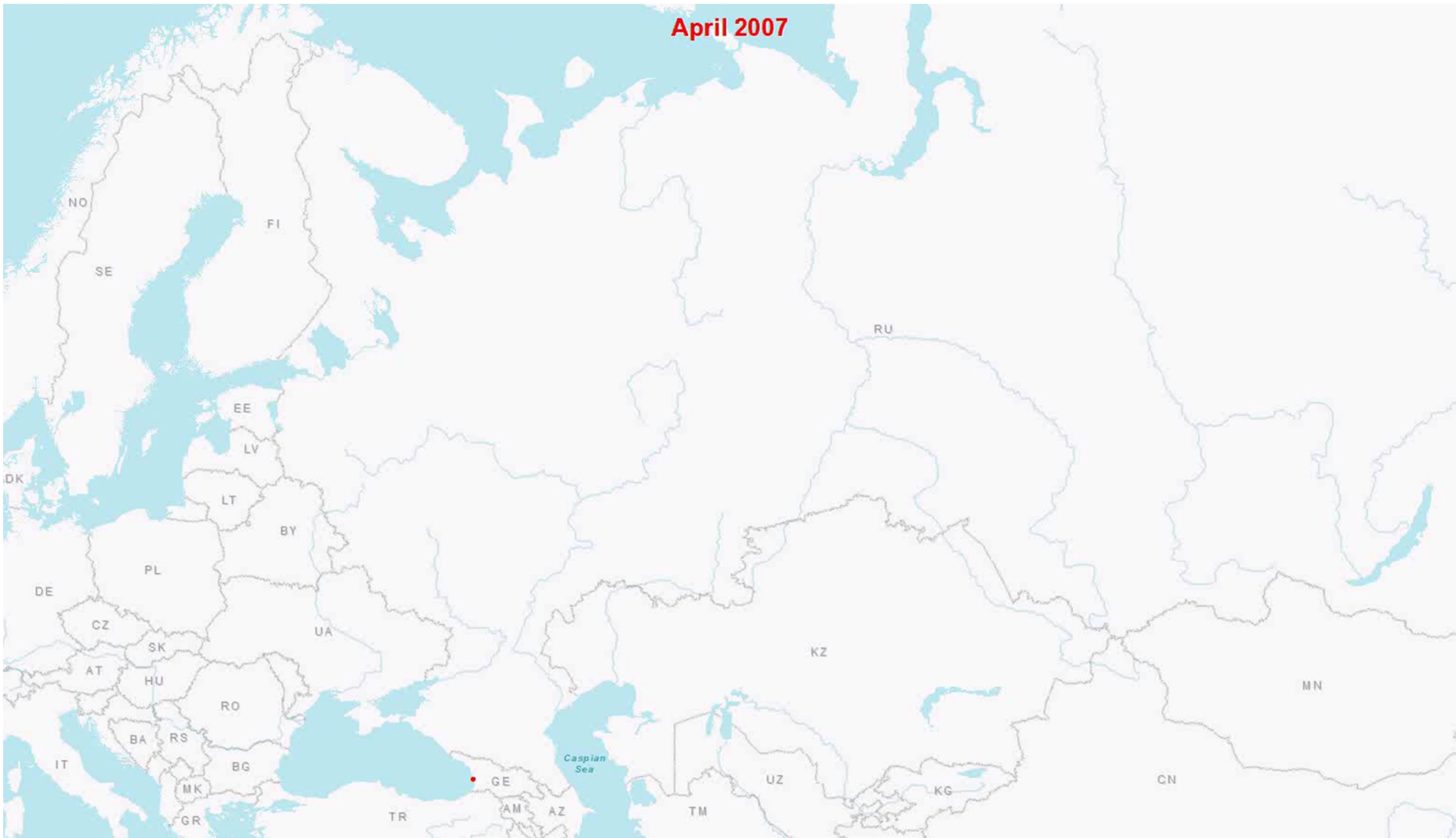
efsa
European Food Safety Authority

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

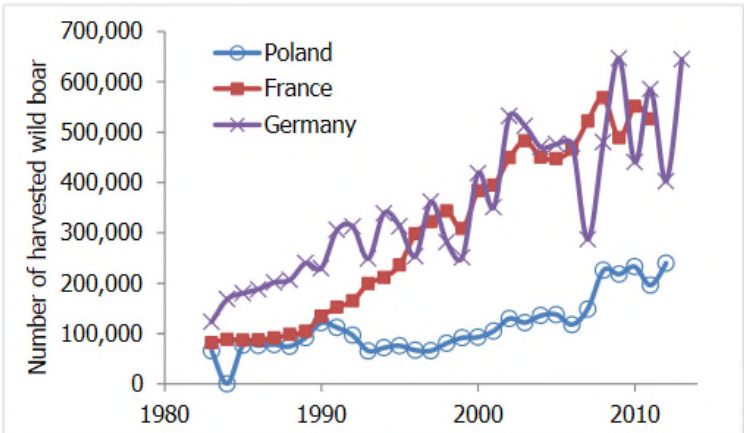
STRUCTURE

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)**

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

1. EXTENSIVE LITERATURE REVIEW: CONCLUSIONS

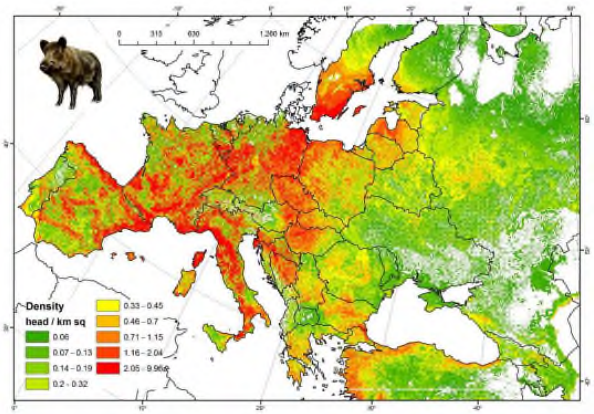
- The **capacity and willingness of hunters,** the social context and regional diversity need to be integrated into policy to manage wild boar populations
- **There is a need for a better understanding of the wildlife population dynamics** and for good baseline data on wildlife population trends



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

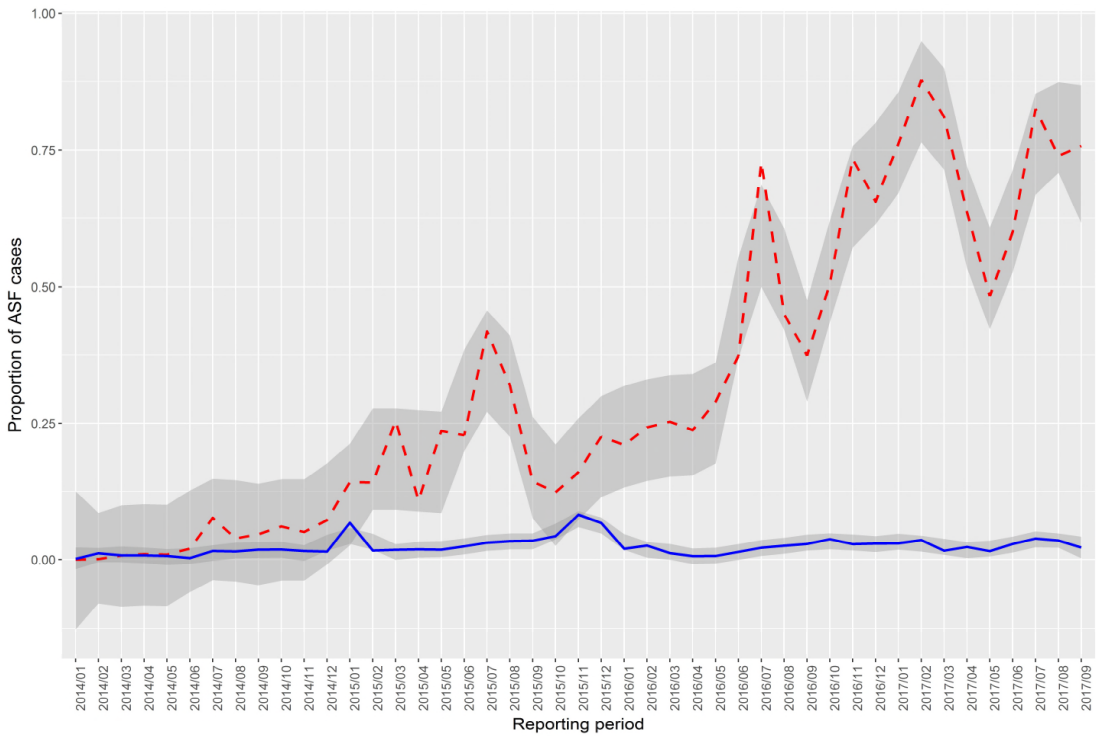
2. DESCRIPTIVE EPIDEMIOLOGY

- **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

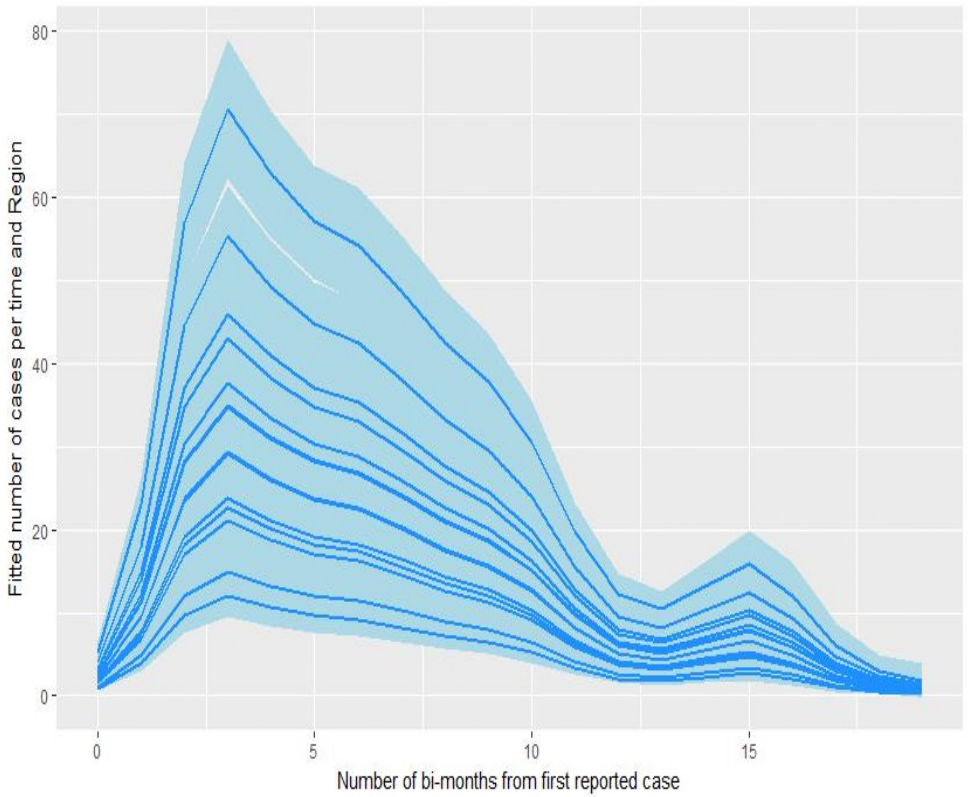
Both the **proportions of PCR and antibody positive samples** from the hunted wild boar of Estonia, Latvia and Lithuania **remained low** since the first detection of ASF.



2. DESCRIPTIVE EPIDEMIOLOGY

Temporal distribution

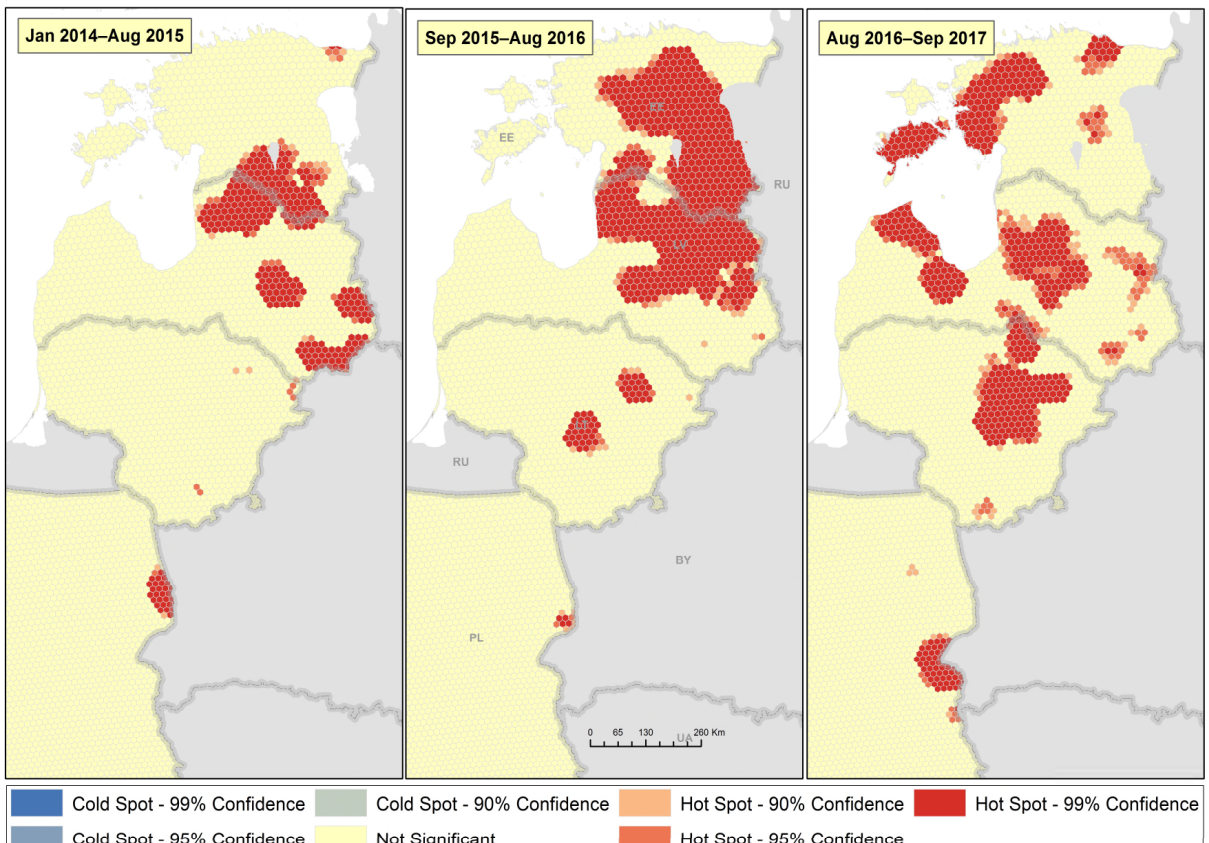
The modelled time trends indicated a **peak in the number of ASF cases around 6 months** after the first case was reported. At the end of the follow-up period of 38 months, a **significant reduction** of the number of cases was predicted, but at the same time there the possibility for ASF to **circulate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



2. DESCRIPTIVE EPIDEMIOLOGY

3. Spatial distribution

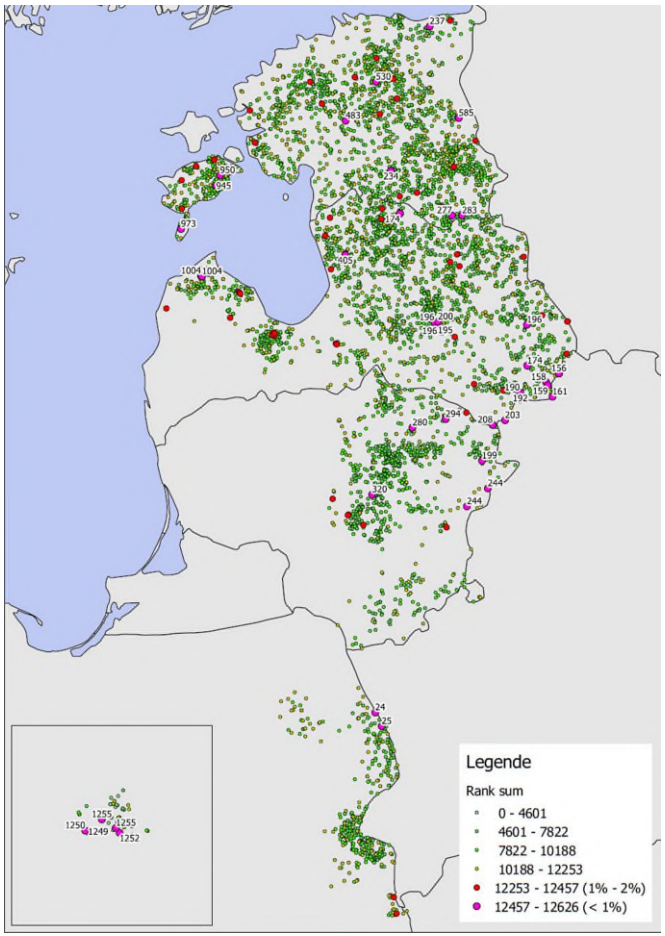
Identification of hot-spots: behaviour hot spots difficult to predict



2. DESCRIPTIVE EPIDEMIOLOGY

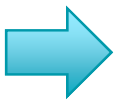
3. Spatial distribution

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:

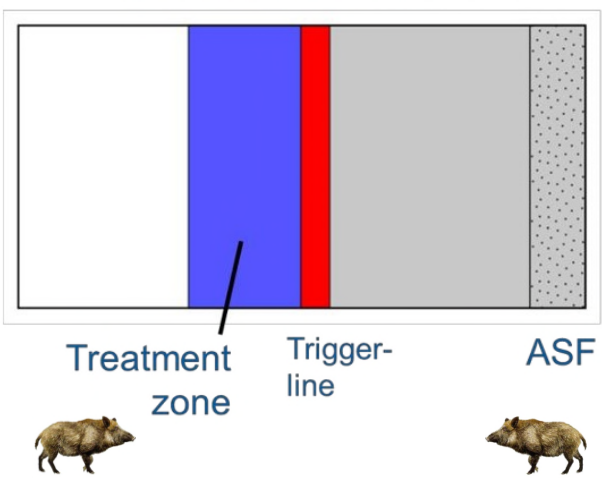
- **Width of the treatment zone**
- **Efficiency of proposed measures** in terms of percentage achievement
  - **Depopulation**: 30%, 50%,…, 90%)
  - **Targeted Hunting**: Percent effective (30%, 50%,…, 90%)
  - **Carcass removal**: 0%, 30%, 50%,…, 90%)

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.

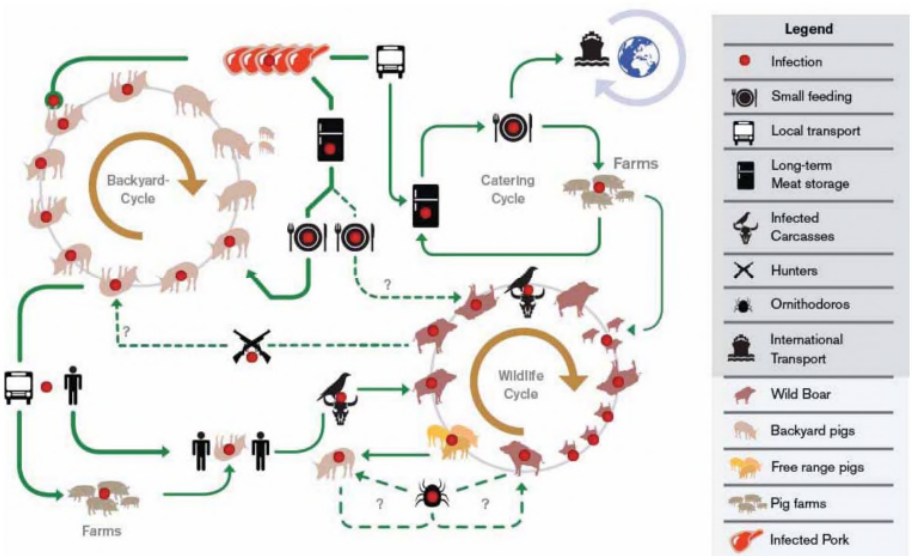
- Detailed analysis using simulations on **true landscapes** with multiple habitat predictors would improve the understanding of the performance of the measures.

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

RECOMMENDATIONS

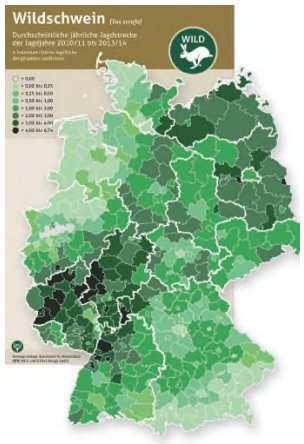
- **Human-mediated spread** needs to be urgently addressed by intensified awareness building of all persons that might be potentially in contact with infected wild boar or pigs

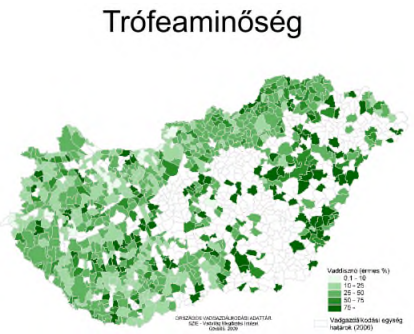
- The existing approaches to local emergency measures using drastic depopulation and/or fencing should be evaluated with existing empirical an epidemiological data.

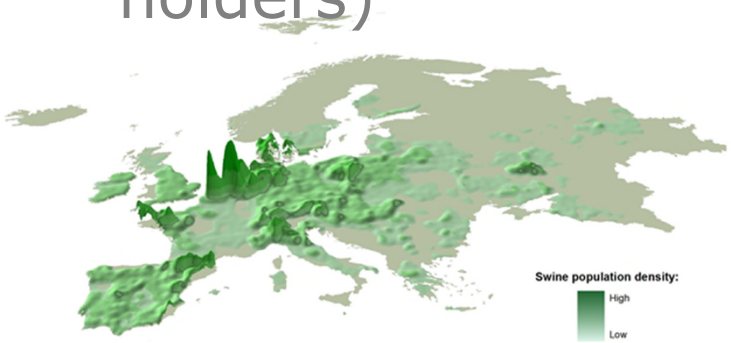


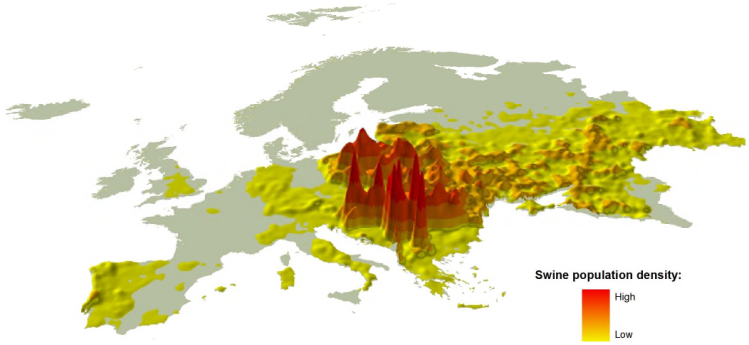
REPORT III

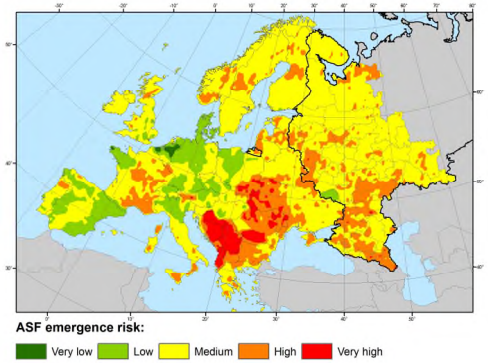
- Countries at risk
- Domestic pigs distribution (location, type, population)
- Wild boar population data
- Contact points – national services and authorities (data holders)











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