Scientific Opinion on African swine fever in wild boar

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Animal and Plant Health Unit

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efsa
European Food Safety Authority

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Scientific Opinion (Art. 29)

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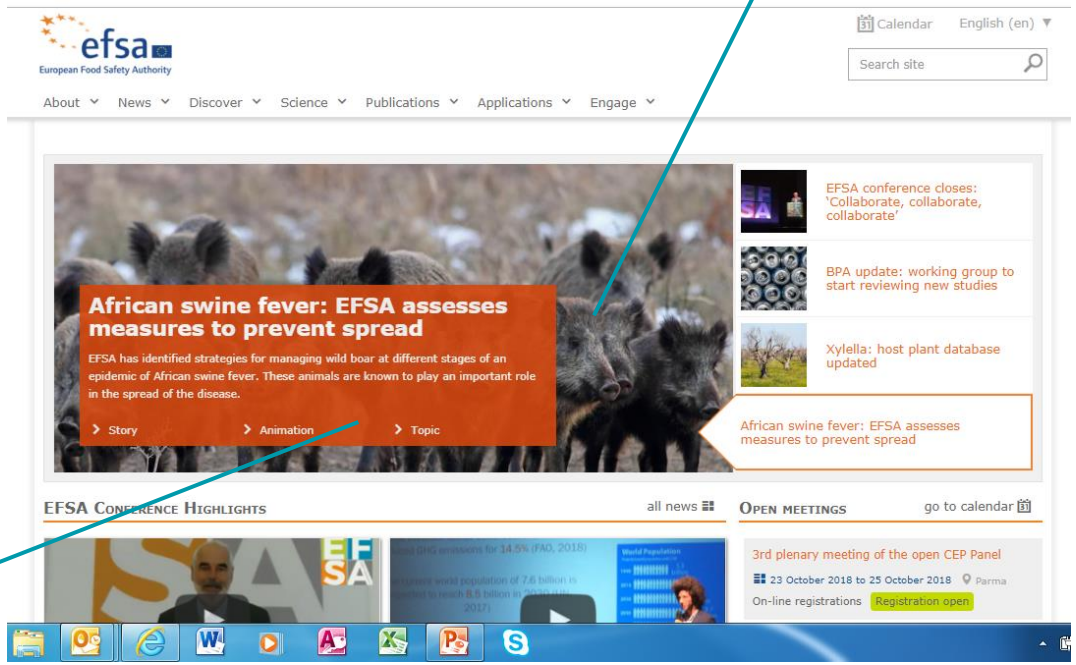
- Published:11/07/2018

Scientific Opinion:
https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2018.5344



Animation:
https://www.youtube.com/watch?v=eyQ4t1wHl2M&feature=youtu.be

Scientific Opinion (Art. 29)-TORS

- 1. Provide an estimate of the **wild boar densities** in the EU and assess the **reliability and comparability** of the data proposing; proposing possible **guidance on a methodology** to reach the best estimate.

- 2. Review the latest epidemiological data to identify **threshold(s)** in wild boar **density which do not allow sustaining the disease**, in different settings.

- 3. Review the wild boar depopulation methods, or **population density reduction methods** intended to achieve a determined threshold, (e.g. poisoning, selective killing and chemical sterilization) and rank them according to their efficacy, practical applicability in the EU, cost-effectiveness and their capacity to minimise the spread of African swine fever.

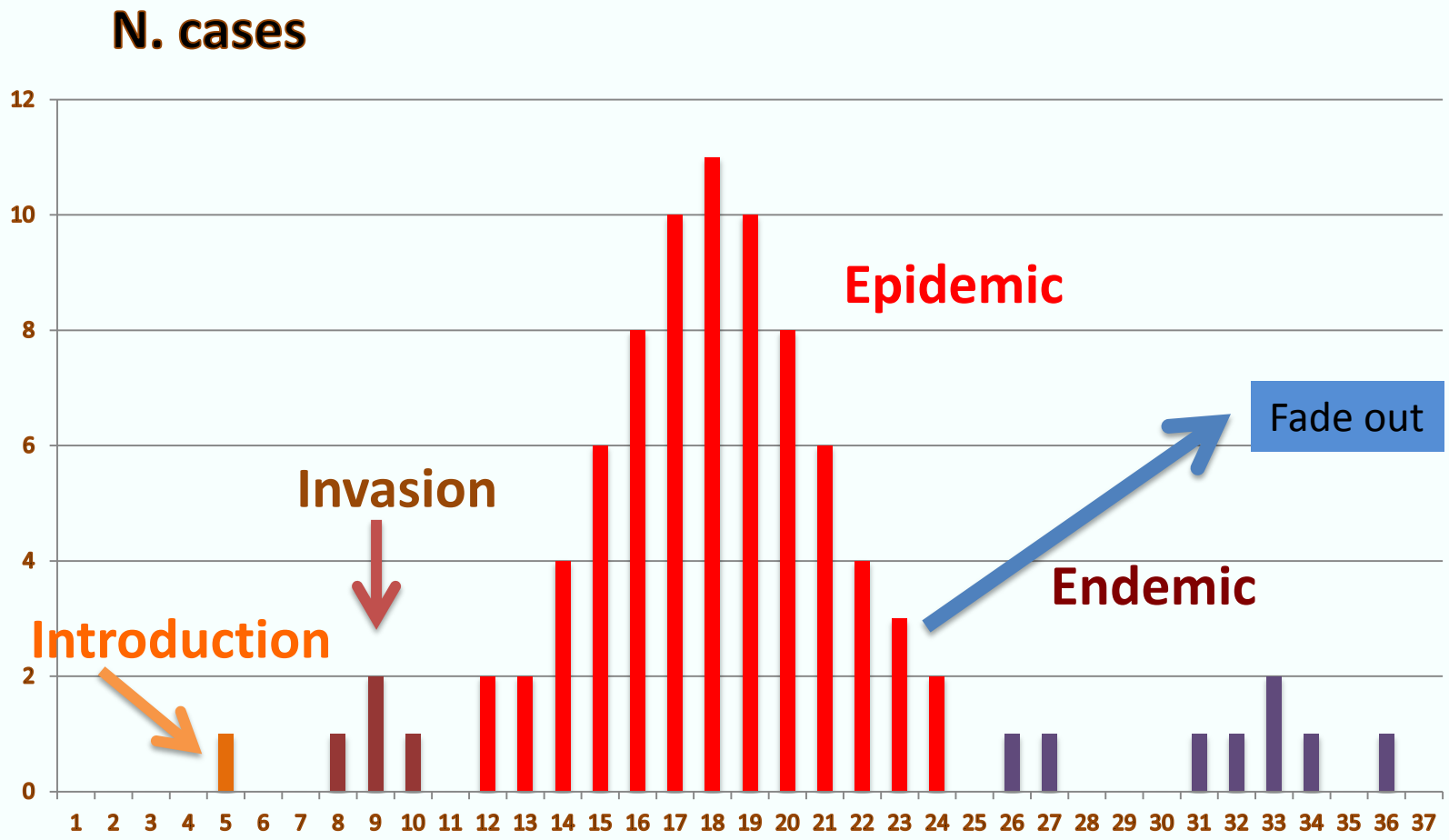
Scientific Opinion (art. 29)-TORS

- 4. Review the fencing methods, or **population separation methods**, available for wild boar (e.g. permanent, electric, odour) in the EU in different scenarios (e.g. forest, farmland, urban area) and for different objectives (e.g. for preventing movement of wild boar) while keeping in mind the wild boar ecology.

- 5. Considering the wild boar densities identified in TOR 1 and the risk of introduction of African swine fever in naïve wild boar population in the EU, propose and assess a **surveillance strategy,** provide sample size, frequency of sampling, and identify possible risk groups. This surveillance needs to prioritise **for early detection** of the introduction of the disease and cost effectiveness.

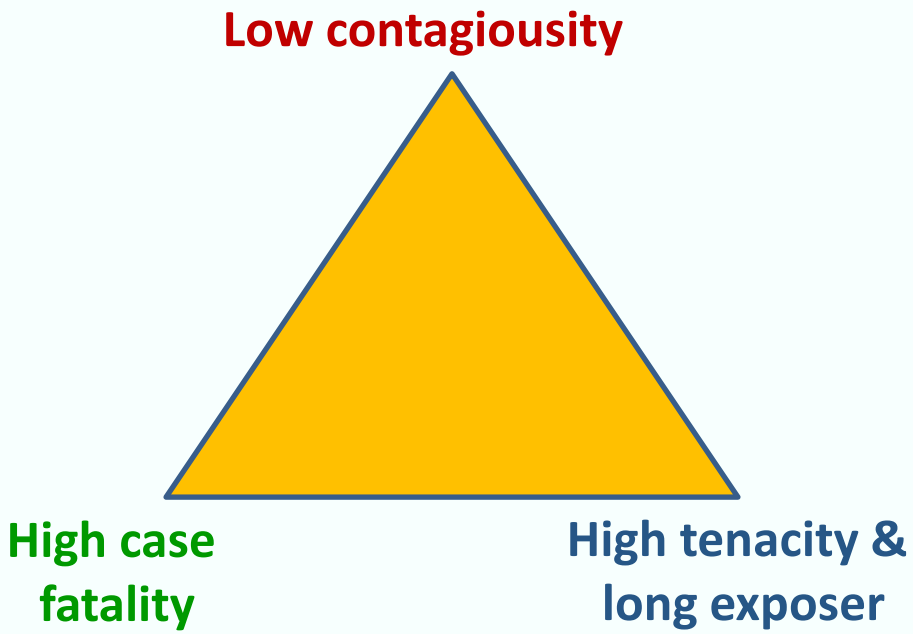
- 6. Review of successful and relevant methodologies used in the past for surveillance programmes in wildlife and **identify successful strategies for ensuring the optimal involvement of the main stakeholders.**

The 4 phases of a transmissible disease



V. Guberti

Persistency triangle (ASF)



Low conatgiousity: only few animals get infected
High case fatality: very few survivors & insufficient immunological protection
High tenacity: long time survival of virus in the environment, long exposer time

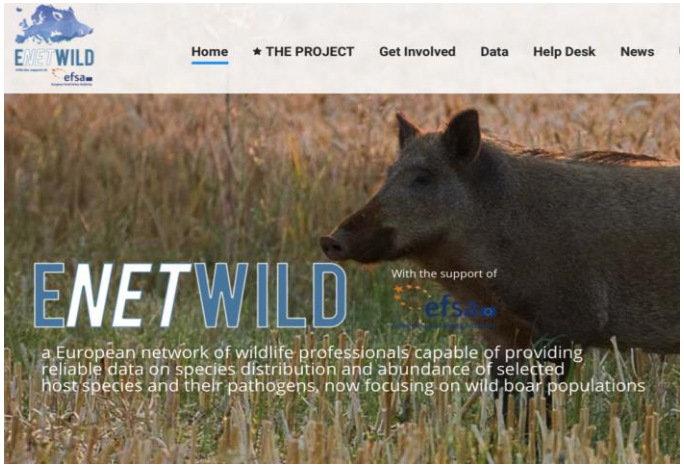
Freedom of disease	Presence of disease
Wild boar management measures	**Disease control measures**
e.g. population reduction to avoid agricultural damage	***not wild boar management measures!!!***
e.g. Intensive hunting	Movement restriction Ban of feeding Prohibition of hunting Intensive hunting

Hunting/Slaughtering ⟷ **Culling**

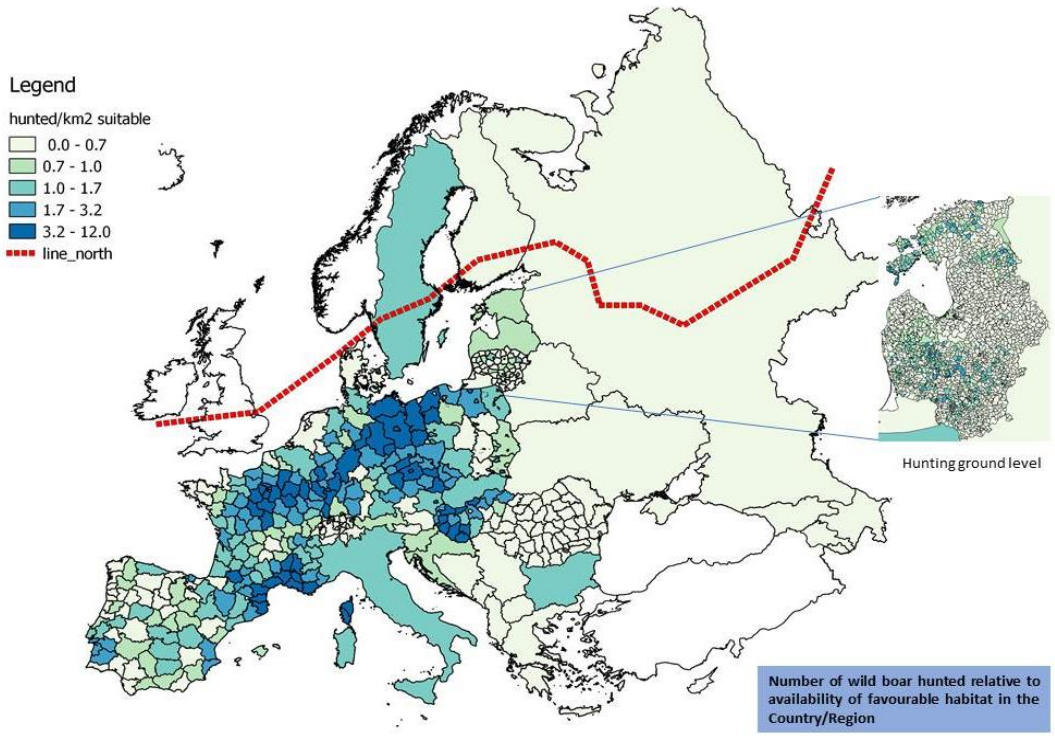
TOR1. Wild boar density

- Reliability and comparability of wild boar density estimation methods
- Guidance for estimating wild boar density

- Assessed by experts from the Enetwild consortium in External Scientific Report



TOR1. Wild boar density



- Accurate density data can only be collected at local level (e.g. using camera trapping).
- Hunting bag data are currently the only EU-wide available index of relative wild boar abundance.

Numbers of wild boar harvested in the hunting grounds in the EU Member States in 2017

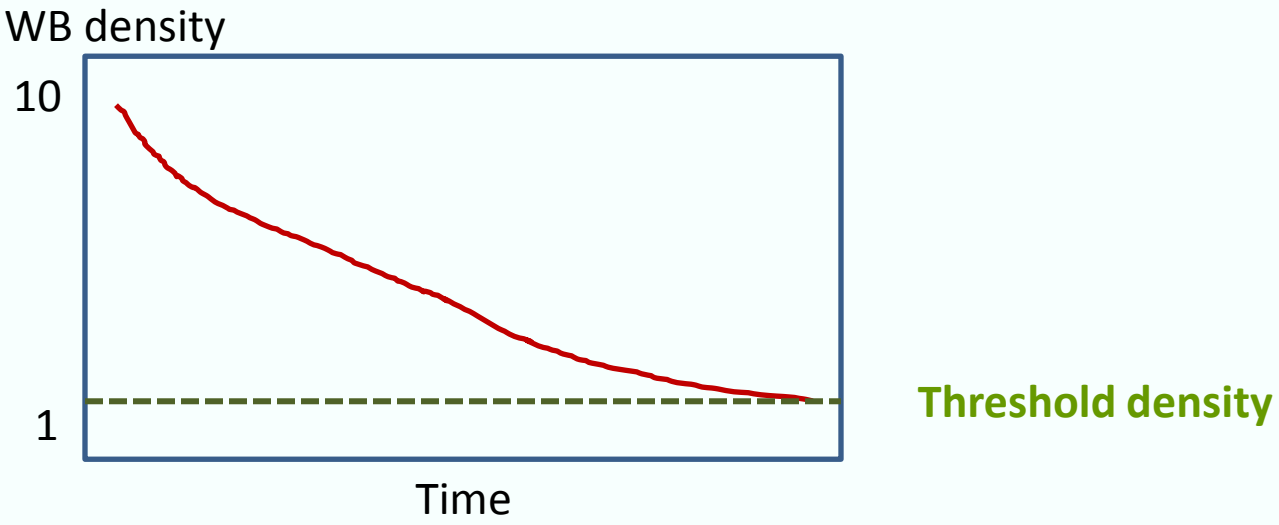
- Hunting bag data collected by Enetwild consortium in DCF:
  - surface covered
  - number of hunting days and of hunters per day
  - hunting modality
    - **improve comparison of data between areas/countries**

Can we define the threshold density?

The critical density at which an infection stops (an infectious wild boar does not encounter any susceptible wild boar in due time to spread the infection)

If the number of susceptible individuals is decreased till a certain density, the infection fades out through a density dependent mechanism

NO WILD BOAR = NO DISEASE



V. Guberti

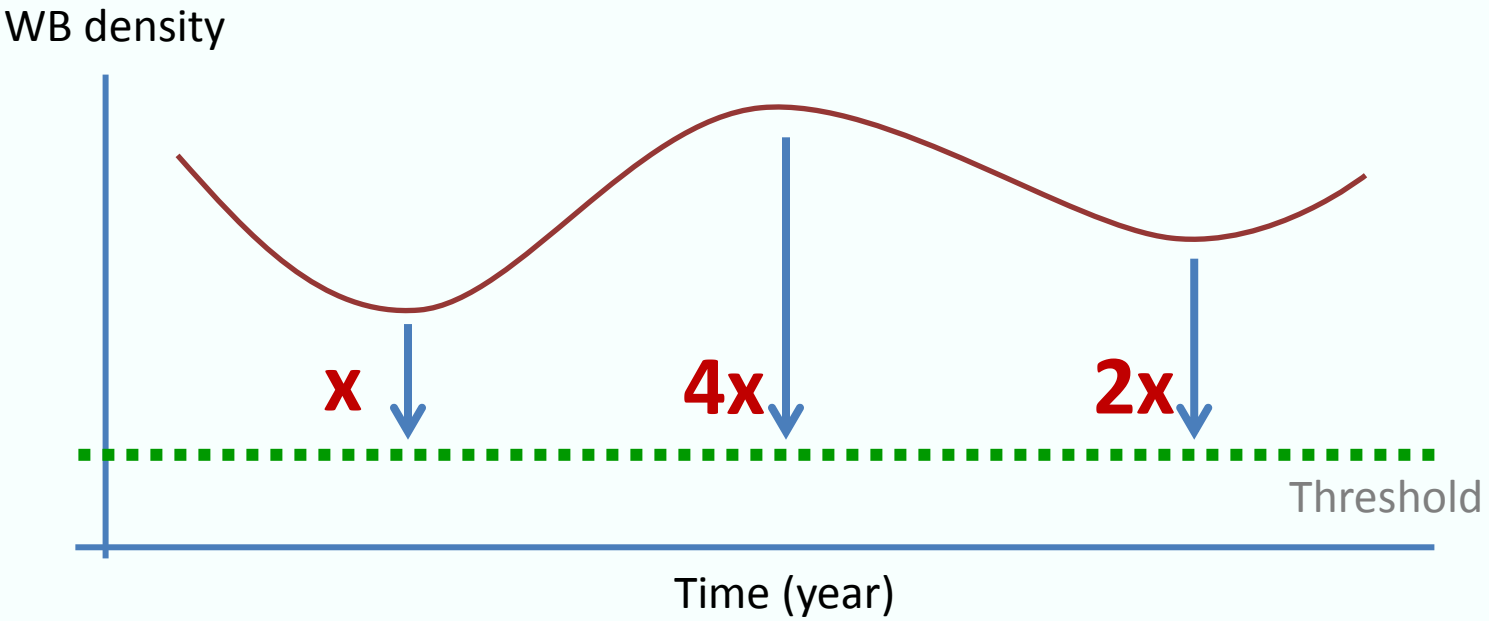
TOR2. Wild boar density threshold for ASF

- **Density threshold**= critical density at which ASF perpetuation within an affected wild boar population stops

➢ **Not possible to be defined at this moment**

- ASF spread has occurred in areas of varying, including very low, reported wild boar density. As yet, there is no evidence that the disease has disappeared from these low-density areas.
- Theoretical approaches for density threshold rely on key assumptions, including homogenous and random mixing of wild boar, which cannot be met for ASF.
- Any derived density threshold would be difficult to translate into practical measures due to difficulty in estimating wild boar density a priori.
- Due to the complex ecology of ASF, other drivers apart from density may determine whether this disease can be sustained or not in a particular ecological setting. These could include indirect transmission from infected carcasses and the small-scale social structure of the host population.

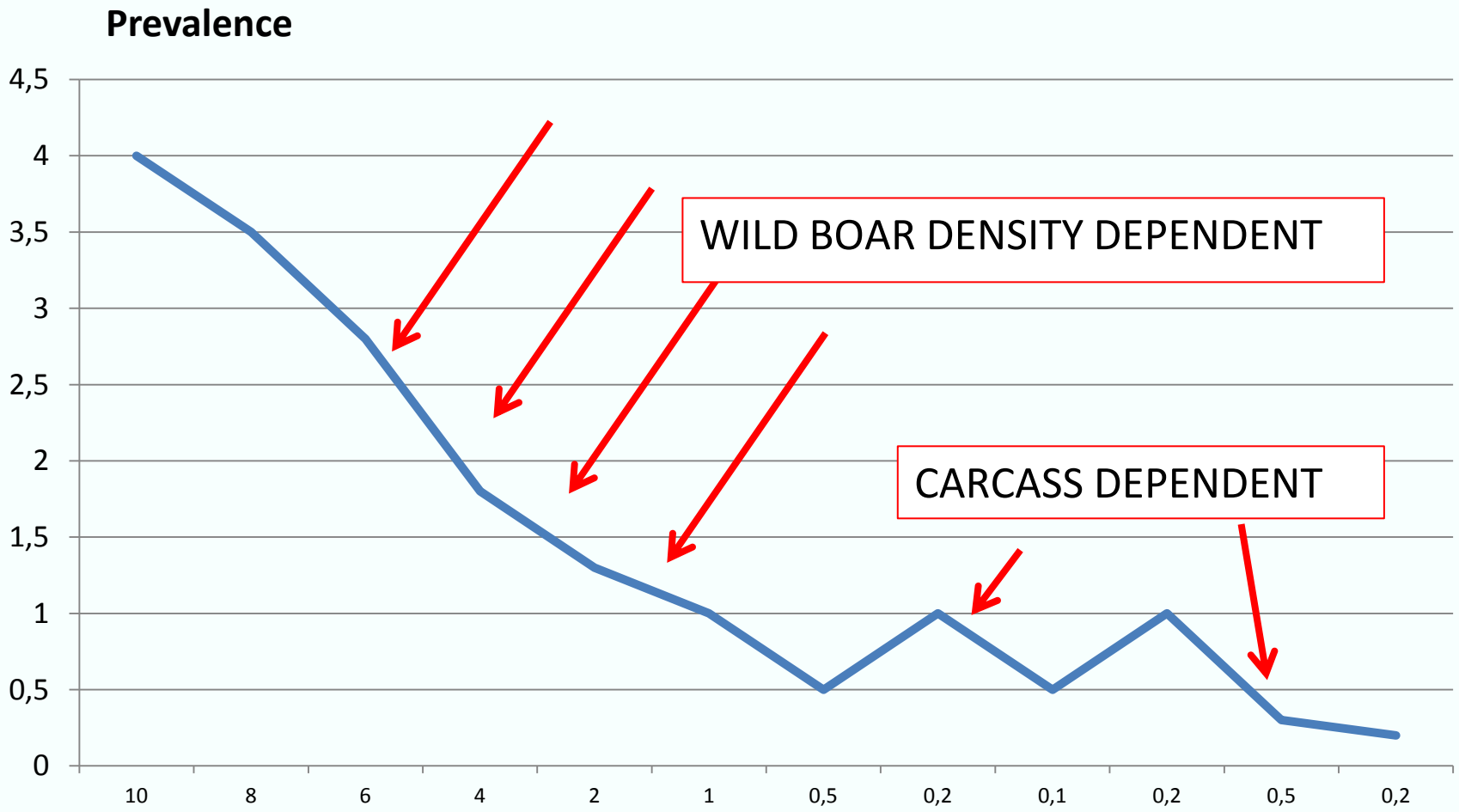
Threshold elasticity



- **Estimating the threshold:** ***easy to come up with a theoretical figure***
- **Reaching the desired threshold:** ***difficult (impossible???)***

- ***The total number of wild boar is unknown and all estimates are wrong***
- ***Best is, do not disturb the animals and remove carcasses as effectively as possible...***

ASF in not a simple density dependent infection.
The ultimate persistence of the virus is guaranteed by carcasses
The virus itself kills most of the animals



TOR 3. WB-density reduction/depopulation

Extensive literature review: studies aiming at wild boar density or wild boar harvest reduction:

- Urgent interventions for disease control ≠ long-term management in free areas at larger scale aiming at sustainable population management.
- Disease control: depopulation of wild boar has been achieved in small, fenced estates, but in larger areas, not more than 50 % of population reduction was reported.
- In areas of high habitat quality, maintaining an intense wild boar population control through intervention is expensive and possibly not sustainable in the long-term.
- **Poisoning:** forbidden in the EU under the legislation of biodiversity conservation. Although highly efficient in reducing local feral swine populations, the potential undesirable effects on welfare and residues have to be investigated
- The use of **traps** has resulted in a harvest of wild boar up to 79% of the population and can be especially interesting in areas where hunting is not recommended.

TOR 3. WB density reduction/depopulation

Field experience:

- The combination of measures applied in the Czech Republic is the only one where spread only over a short distance was reported (up to time of assessment)

➢ **Different actions** in terms of wild boar management **at different stages of the epidemic**

  - Preventive: reduce wild boar density to reduce the probability of establishment of local population to ASFV and efforts needed for potential emergency actions (i.e. less carcass removal) following introduction

TOR 3. WB density reduction/depopulation

- Following focal introduction:
  - drastic reduction in the wild boar population ahead of the ASF front (in the free population),
  - management of the infected population to keep it undisturbed and avoid aggregation of individuals and avoid any spread

  (e.g. short-term hunting ban of wild boar and other species or leaving crops unharvested within the affected area).

- Following the decline in the epidemic, as demonstrated through surveillance activities, active population management could be reconsidered.

TOR 4. WB separation/restriction

Extensive literature review:

- Electrical fences:
  - Small scale: can temporarily protect crops to a certain extent
  - No 100% boar-proof electrical fence on a large-scale for prolonged period of time
  - More efficient when wild boar not disturbed (e.g. drive-hunts)
- Odour repellents: several studies with divergent results
- Light repellent: no significant result (2 studies)
- Sound repellent: 67 % crop damage reduction (1 study)

TOR 4. WB separation/restriction

Field experience:

- Fences over large distances: no evidence of successful containment of wild boat up to present.
- Large-scale fences under construction/recently constructed: their effectiveness to separate wild boar populations will need to be evaluated in the future.
- Natural barriers: can be used for demarcation for restricted areas as they have shown to reduce, but not completely impede, the movements of wild boar.

TOR5. WB surveillance for early detection

- Passive surveillance is the most effective and efficient method of surveillance for early detection of ASF in wild boar.

- For early detection through passive surveillance the aim is to test as many 'found dead' animals as possible.

- In uninfected populations, there is a need for estimates of wild boar density and mortality rate combined with the probability of detecting 'found dead' animals given their presence to calculate the basic submission rate:

Submission rate > Density free population* mortality rate *probability of detection*

- Based on current knowledge and experiences, for an intervention to be successful, there is a need to detect an ASF incursion while it is still spatially contained.

Early detection of ASF in wild boar

Passive surveillance vs. active surveillance

	tested	positive	% positive
Passive (found dead)	245	177	***72.24***
Active (hunted)	2765	40	***1.45***
		217	

Passive / Active: 72.24 / 1.45 = 49,82

*The probability to detect an ASF positive case is **50** times higher in dead animals than in hunted animals*

***81 out of 100** positive cases are likely to be detected in **dead** wild boar*

(177 / 217 x 100 = 81)

Scientific Report (Art. 31)

- Request received: 1/12/2017
- Deadline publication:30/11/2018 = **REPORT 3**
- Deadline publication:30/11/2019 = REPORT 4

REPORT OUTLINE

1. Epidemiological analysis ASF:

- Temporal and spatial patterns of transmission
- Speed of propagation
- Seasonality
- Sources of introduction of the virus in different types of domestic pig holdings.

2. Review the previously identified risk factors

- Occurrenceof the ASF virus
- Wild boar population and in the domestic/wildlife interface

3. Review the control measures of ASF in wild boar

- Effectiveness: review scientific literature addressing these measures.
- Epidemiological model

REPORT OUTLINE

4. Review and assess the robustness and effectiveness of the different types of **geographical artificial or natural boundaries** used for the determination/demarcation of the restricted areas.

- Effectiveness: review scientific literature addressing these measures.
- Epidemiological model

5. Recommend measures for managing the wild boar populations in four separate geographical areas:

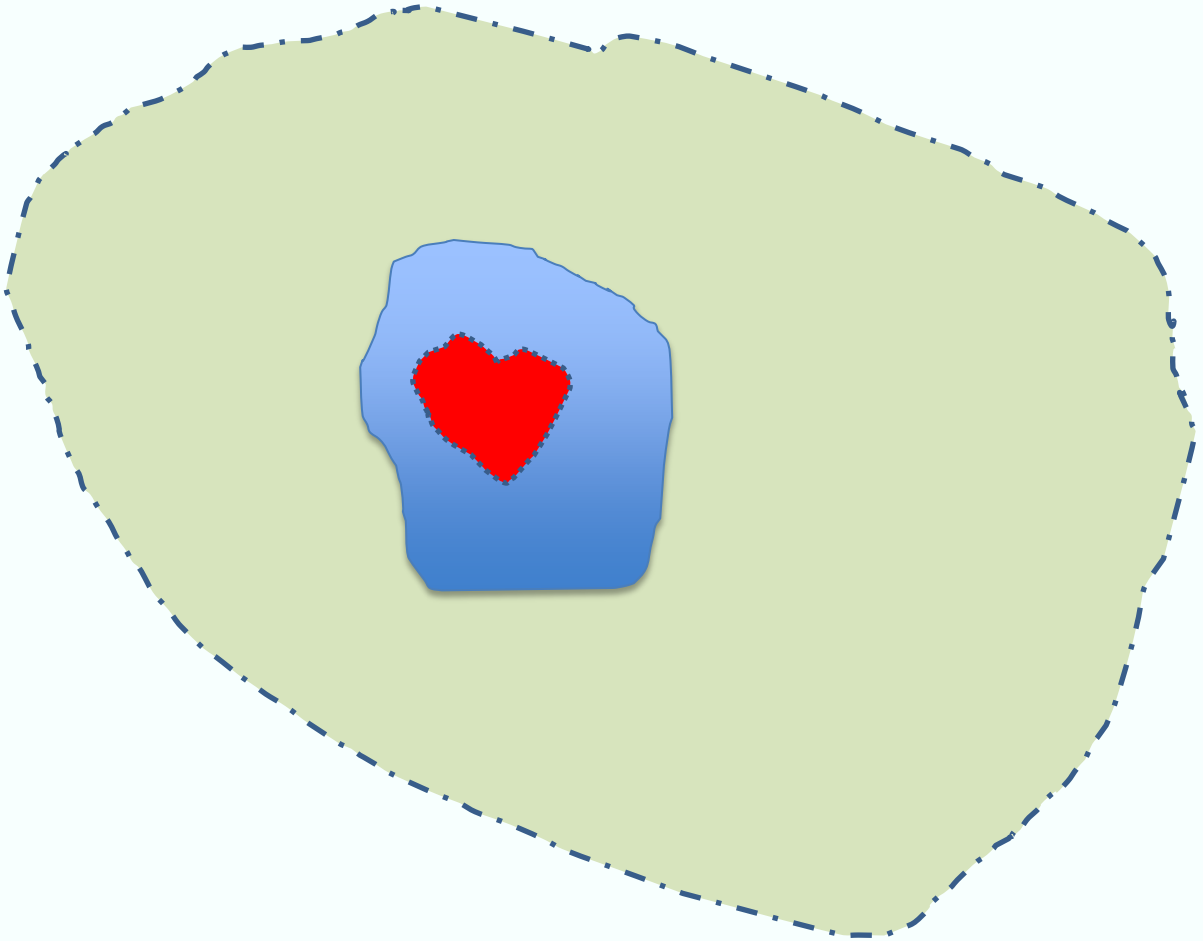
- Disease **free** areas, **far away** from any ASF occurrence
- Disease **free** areas **neighbouring** infected or restricted areas at higher risk of getting the infection mainly via natural spread of the disease through wild boar;
- Areas where the disease was **recently introduced** in wild boar;
- Areas where the disease has been **present** in the wild boar population for quite some time (**more than one year**).

PRELIMINARY RECOMMENDATIONS EPI 3 REPORT:

Free wild boar population far away from epidemic:

- Preparedness and contingency plans (e.g.: detailed protocols describing responsibilities and actions, prepare means to organise landscape demarcation, carcass storage and material for public awareness.
- Training of field staff (e.g. in finding and destroying carcasses)
- Collaboration between Environmental and Veterinary Services (hunters need to know why they are so relevant, why it is so important to stop wild boar population growth- not only for ASF)
- Take action on habitat carrying capacity (i.e. ban feeding, consider improved crop protection)
- Assess current means of hunting and current hunting efforts, to seek for means of improving hunting efficiency (e.g. tailor-made advice to increase harvest rate up to 60%)

Measures based on ASF biology



CA: defind by carcasses found within 1-2 months

BA: defind by home range, ~ 6 km

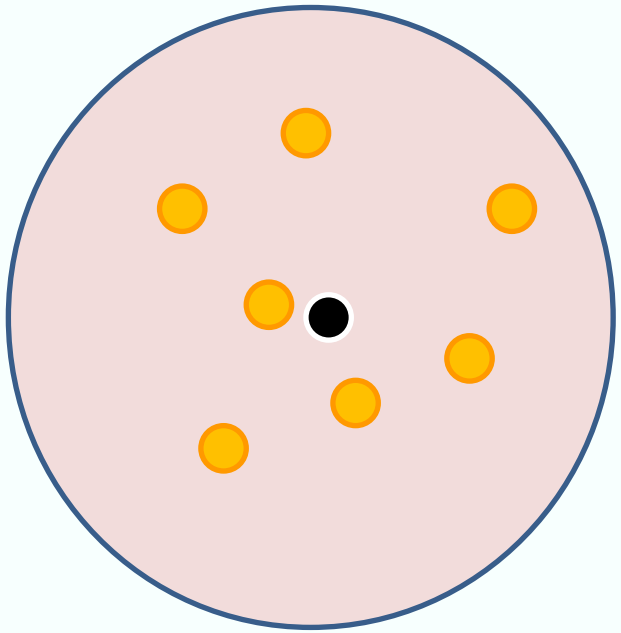
IA: “legal area” >200km^2 400 - 1000 WB

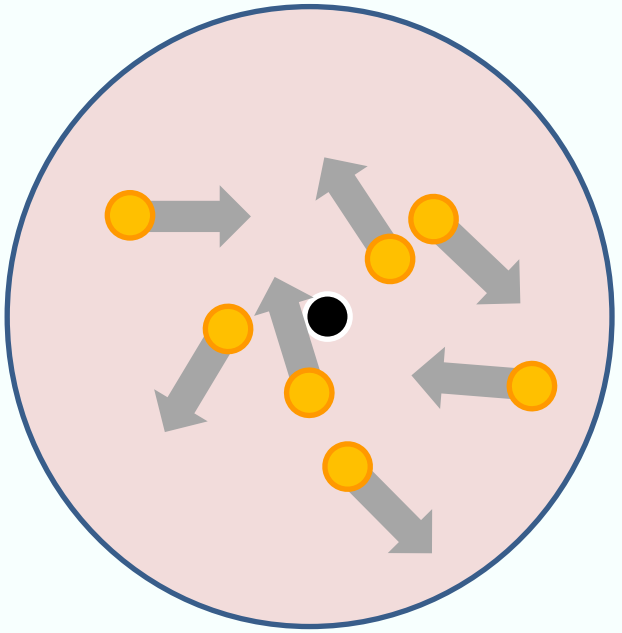
Slow disease => be very patient in CA + BA!!!

Avoid any activity which disturb WB

Exposure opportunity

Marbles in motion





Contact rate **+**

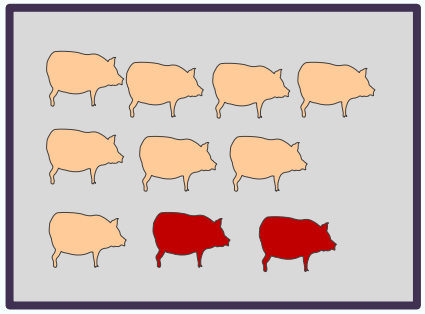
Contact rate **+++**

ASF control and eradication

Key characteristics of ASF:

- low contagiousity, slow spread, few secondary infections
- no transmission by wind or insects,
- **site fidelity** (stable disease / habitat disease),

DP: stable disease

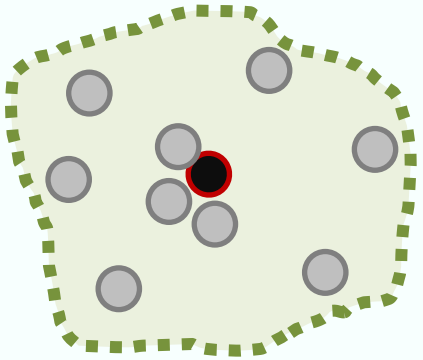


Measures:

1. Standstill
2. Culling
3. C&D

Successful approach!!

WB: habitat disease



Measures:

1. Standstill (no disturbance of WB, no hunting, electrical fence, (feeding)
2. (Trapping)
3. Disposal of carcasses

"Virtual stable" in forest

- **Thank you very much for your attention!**