

Epidemiology of ASF in wild boar

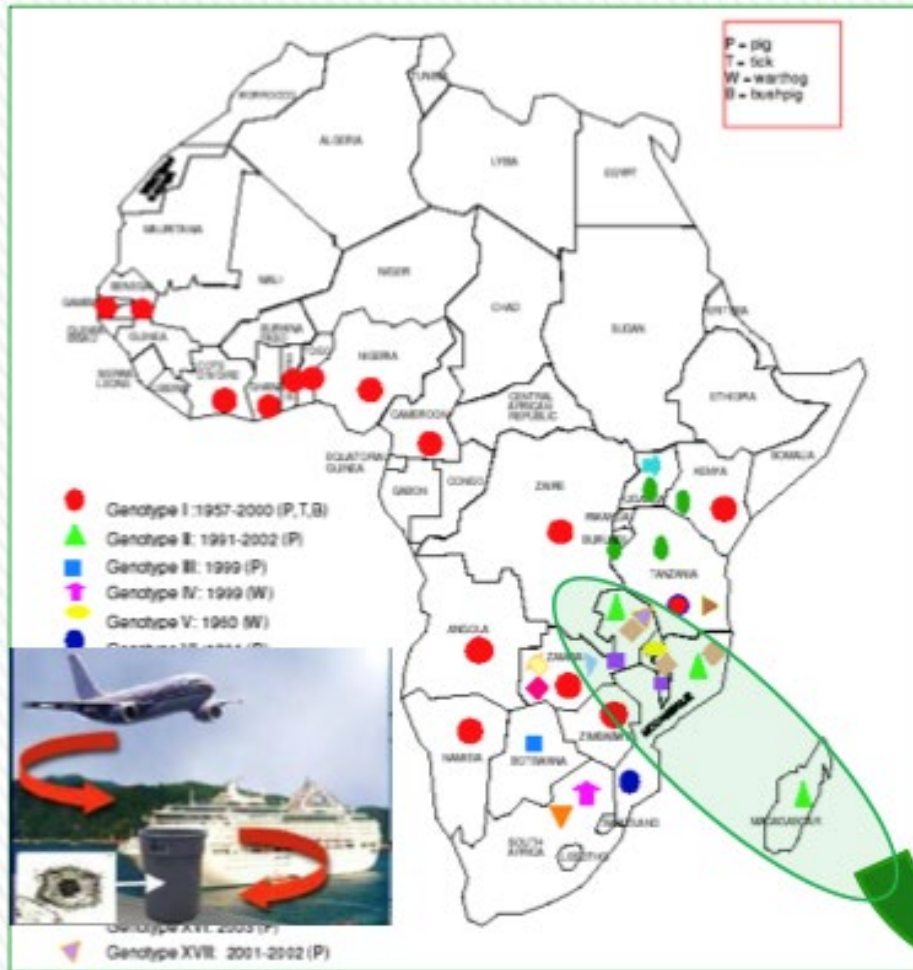


Vittorio Guberti
ISPRA, Italy



European Commission

Tracing the origin



Georgia June 2007





European
Commission

1



2



3



4



N Europe

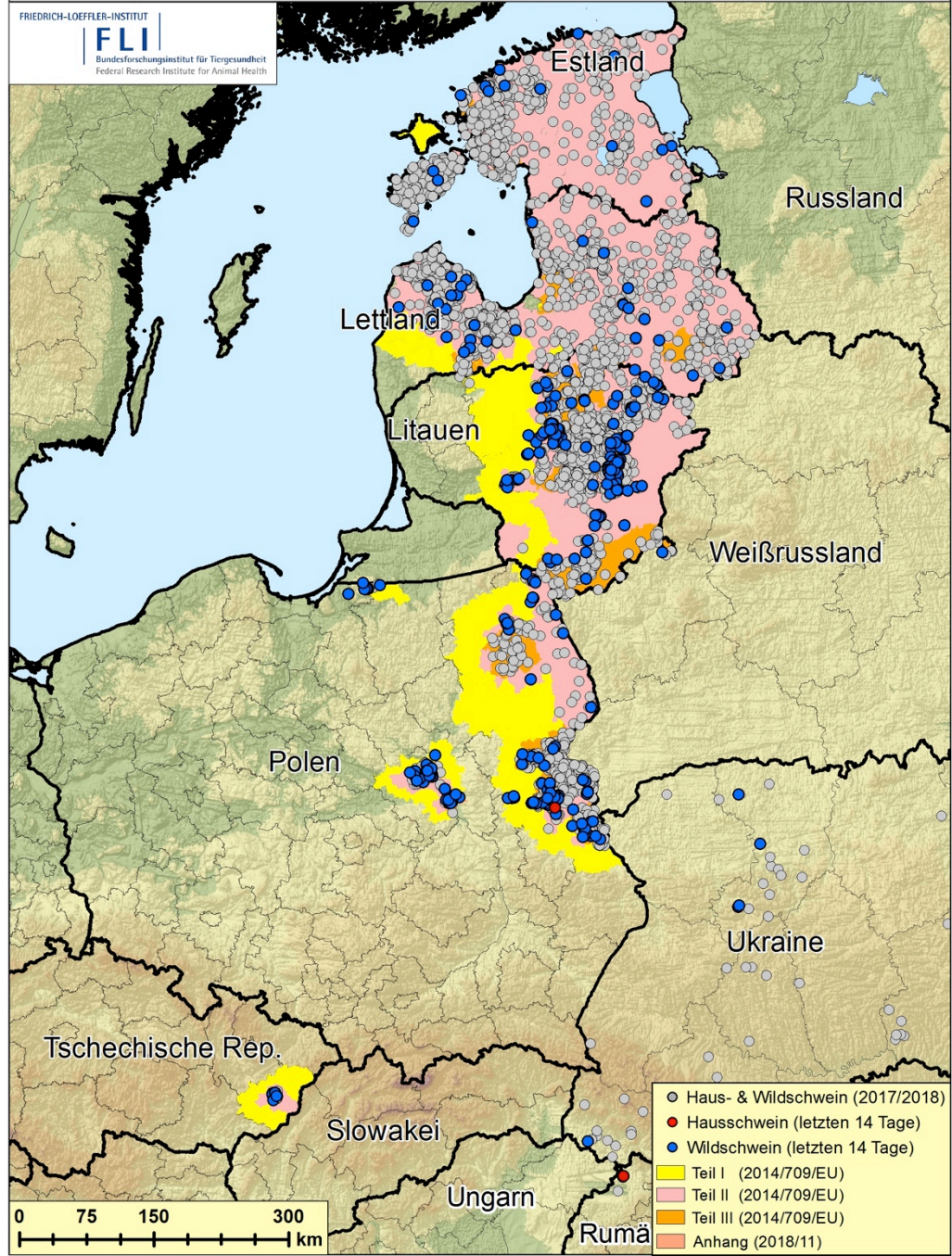
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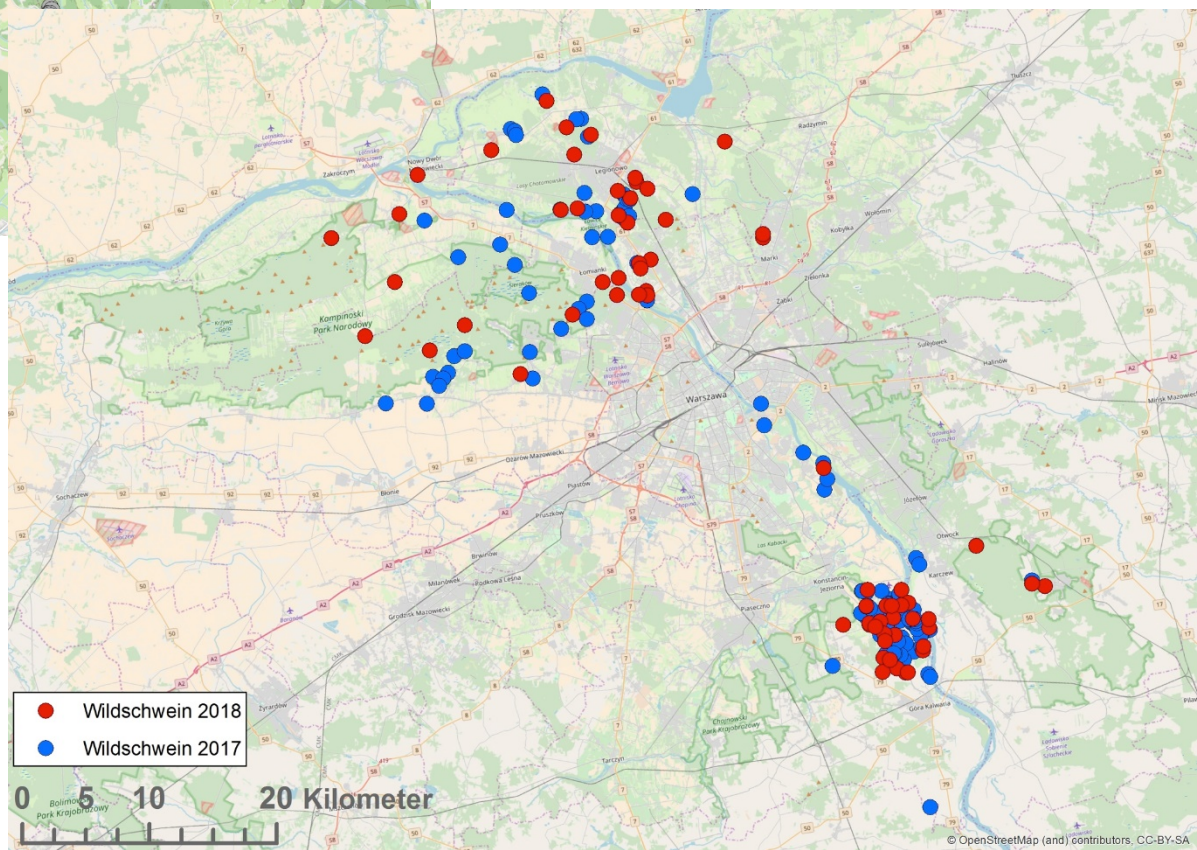
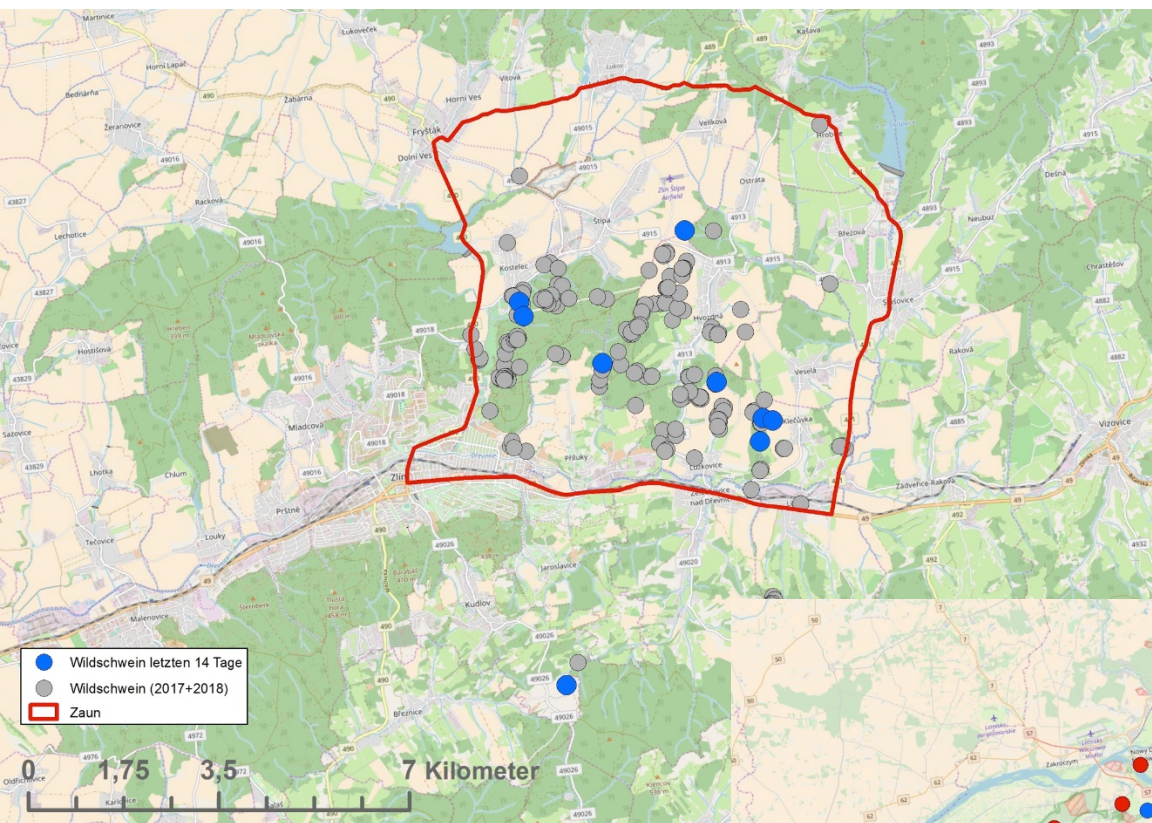
1. LITHUANIA
2. LUXEMBOURG
3. LIECHTENSTEIN
4. CZECH REPUBLIC
5. BOSNIA & HERZEGOVINA
6. SERBIA
7. MONTENEGRO
8. KOSOVO



ASF: 0-70 km/year since 2007

Afrikanische Schweinepest im Baltikum, Polen, Tschechien, Rumänien und Ukraine
 Datenquelle: ADNS (Stand: 23.01.2018 - 09:15 Uhr) nach Feststellungsdatum
 Restriktionsgebiete nach Anhang der Durchführungsbeschlüsse 2014/709/EU und 2018/11





Few certainties

Wild boar CAN ACT AS the true epidemiological reservoir of the virus;

The virus is maintained by the wild boars independently from the infection in domestic pigs and ticks

Infected Wild boar contaminate the environment making more likely secondary outbreaks in domestic pigs (non commercial and commercial farms)

How the virus spreads

Direct e contacts (nose to nose)

Contaminated environment (infected material)

Feeding infected wild boar carcasses

Virus prevalence in infected wild boar population: **1-4,5%**

Sero-prevalence in hunted WB: **0,5-2%**

Incubation **3-5 days**

Lethality **90-95%**

70-80% found dead wild boar are virus positive

≈ 30-50 km/year is the average speed, but the virus lasts also in old infected areas

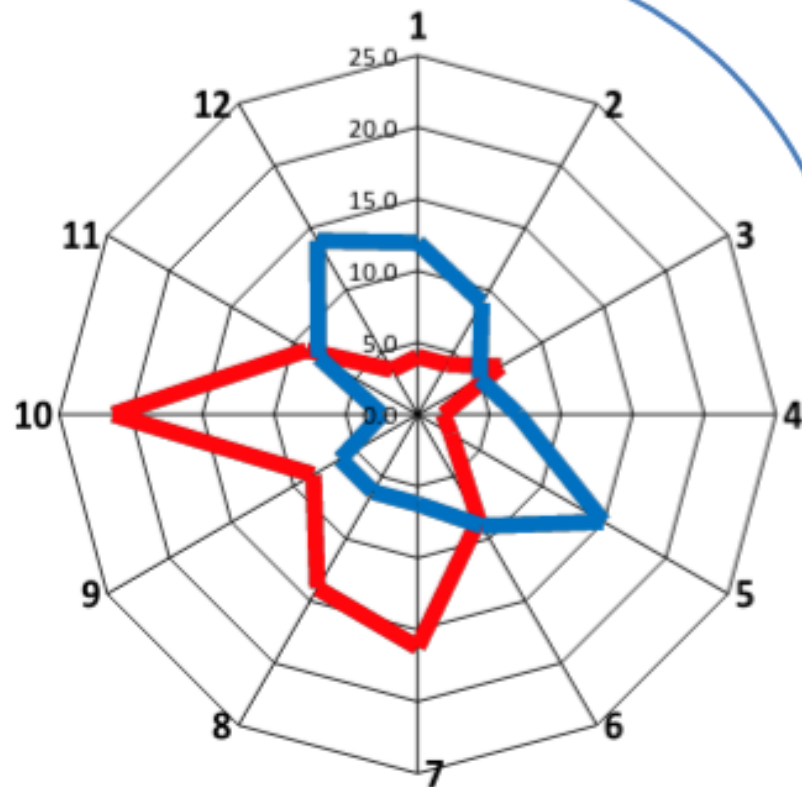
The virus **spreads** through the **geographical continuity of the wild boar population** RATHER THAN of wild boar migration

Monthly incidence of ASF in domestic pigs and wild boar



January

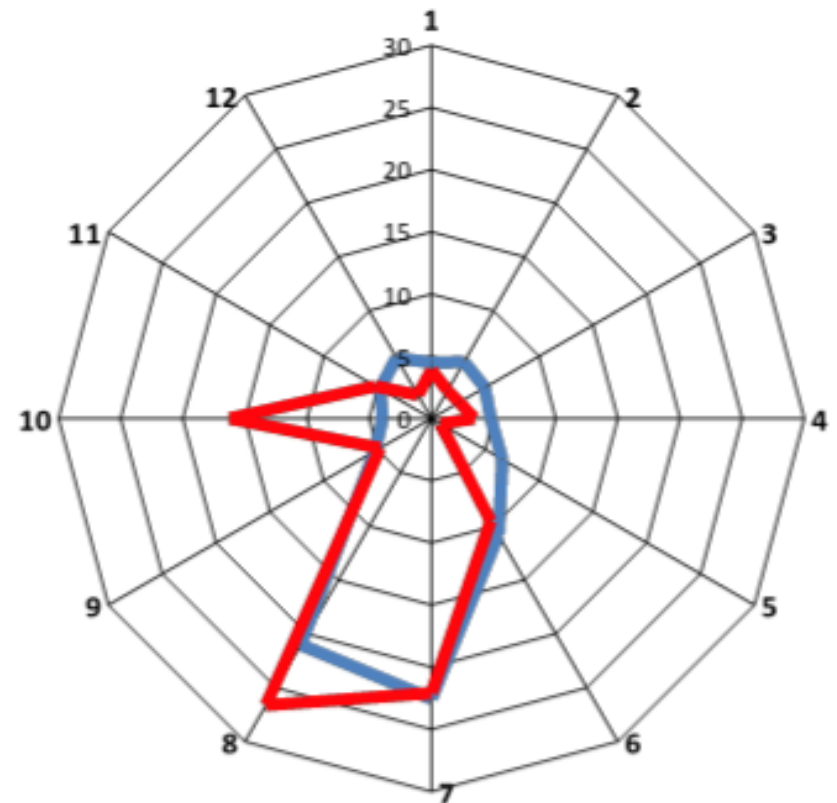
2007-2012



■ Domestic

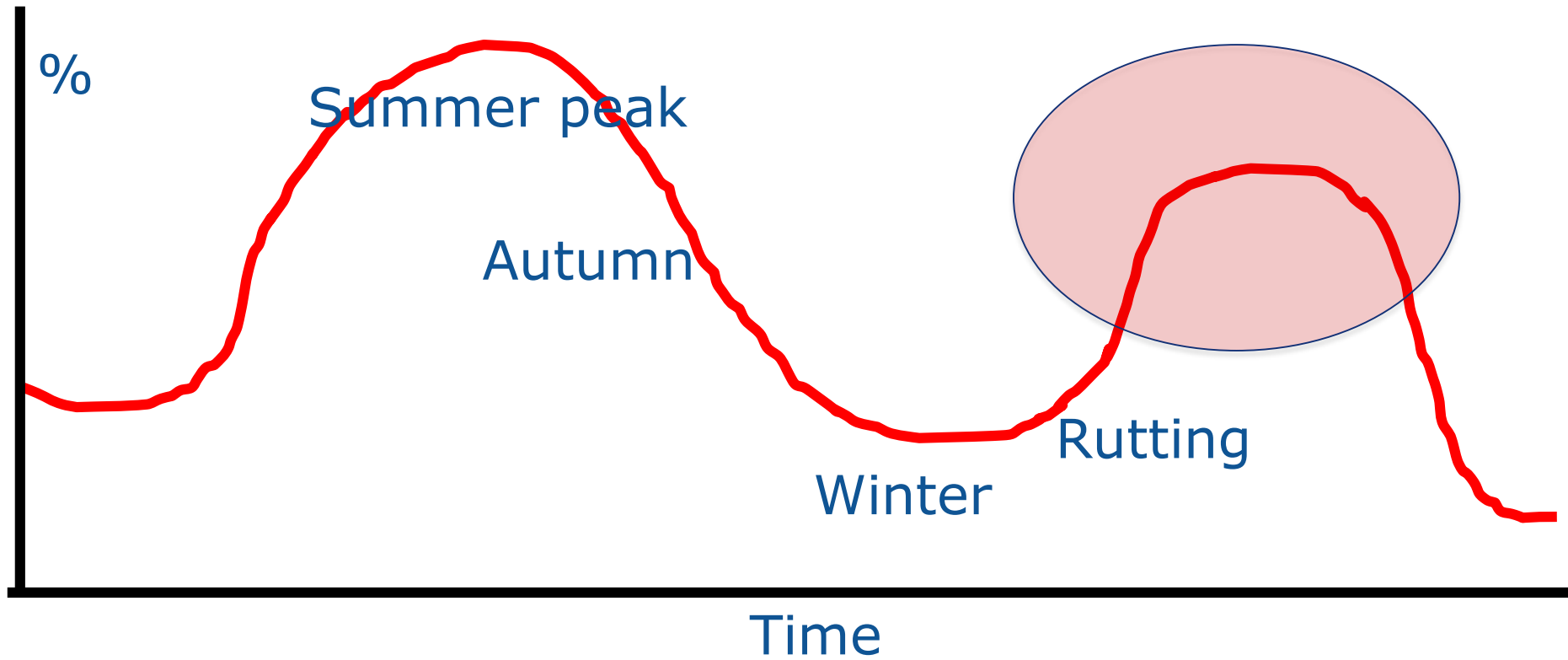
■ Wild

2007-2015



■ дикие

■ домашние



Higher prevalence in summer: new born animals, insectes?

Lower prevalence in winter: virus survives in carcasses

Increasing prevalence: rutting period ?

Epidemiological Role played by infected carcasses and insects (no ticks)

Maggots could increase contacts between wild boar and infected carcasses as they have been never positive to the virus (only DNA presence but no virus): enhanced summer transmission

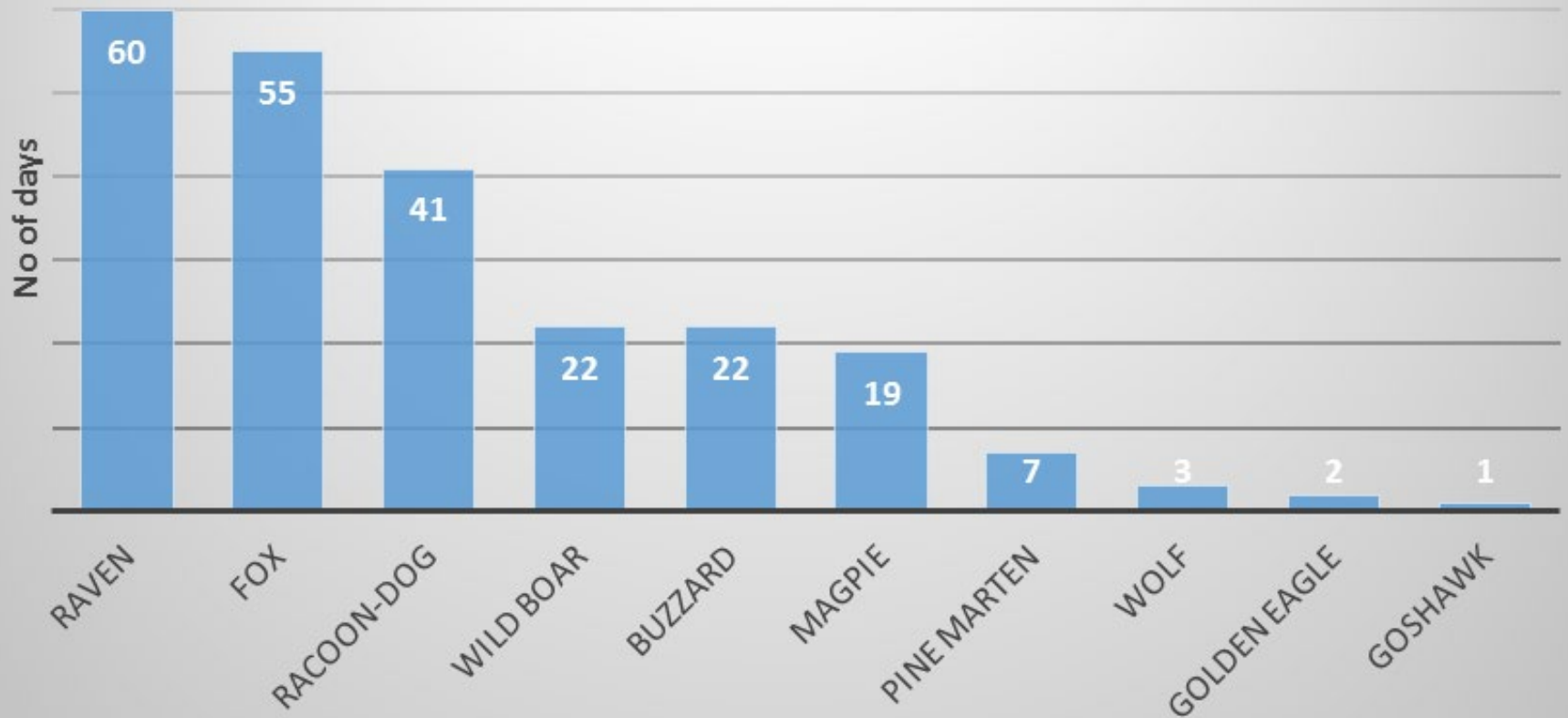
Scavenging insects: long attraction for wild boar, increased probability of direct contact with infected carcasses

Carcasses: virus maintenance in the environment; direct transmission to the susceptible animals





Consumers of wild boar remains



+ 19 wild boar approaches without contact

ASF epidemiology: the general picture

- 1) The virus is introduced by neighbouring infected wild boar;
- 2) The virus spread into the local wild boar population;
- 3) Infected carcasses play the role of virus maintenance in the environment even at a very low wild boar density;
- 4) The virus spread geographically: 30-50 km/year;
- 5) Due to human mistakes the virus is likely to be transported to domestic pigs or and to distant areas where the local cycle starts again in the local wild boar populations;

This pattern could even be without end!!!!

Risk of spread after introduction of the virus

Delayed diagnosis

Wild boar population size and density

Forest connectivity

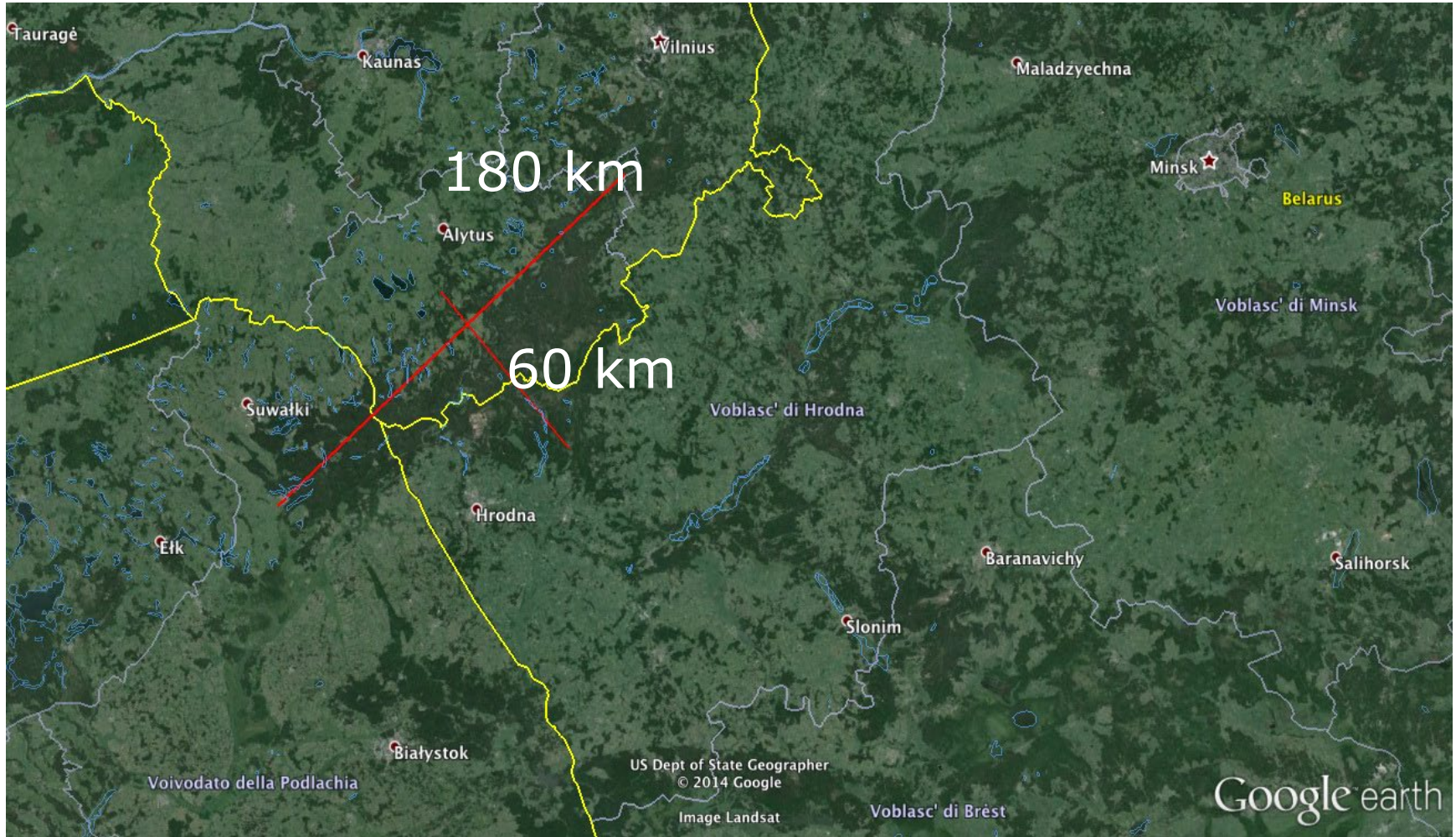
Inappropriate hunting methodologies

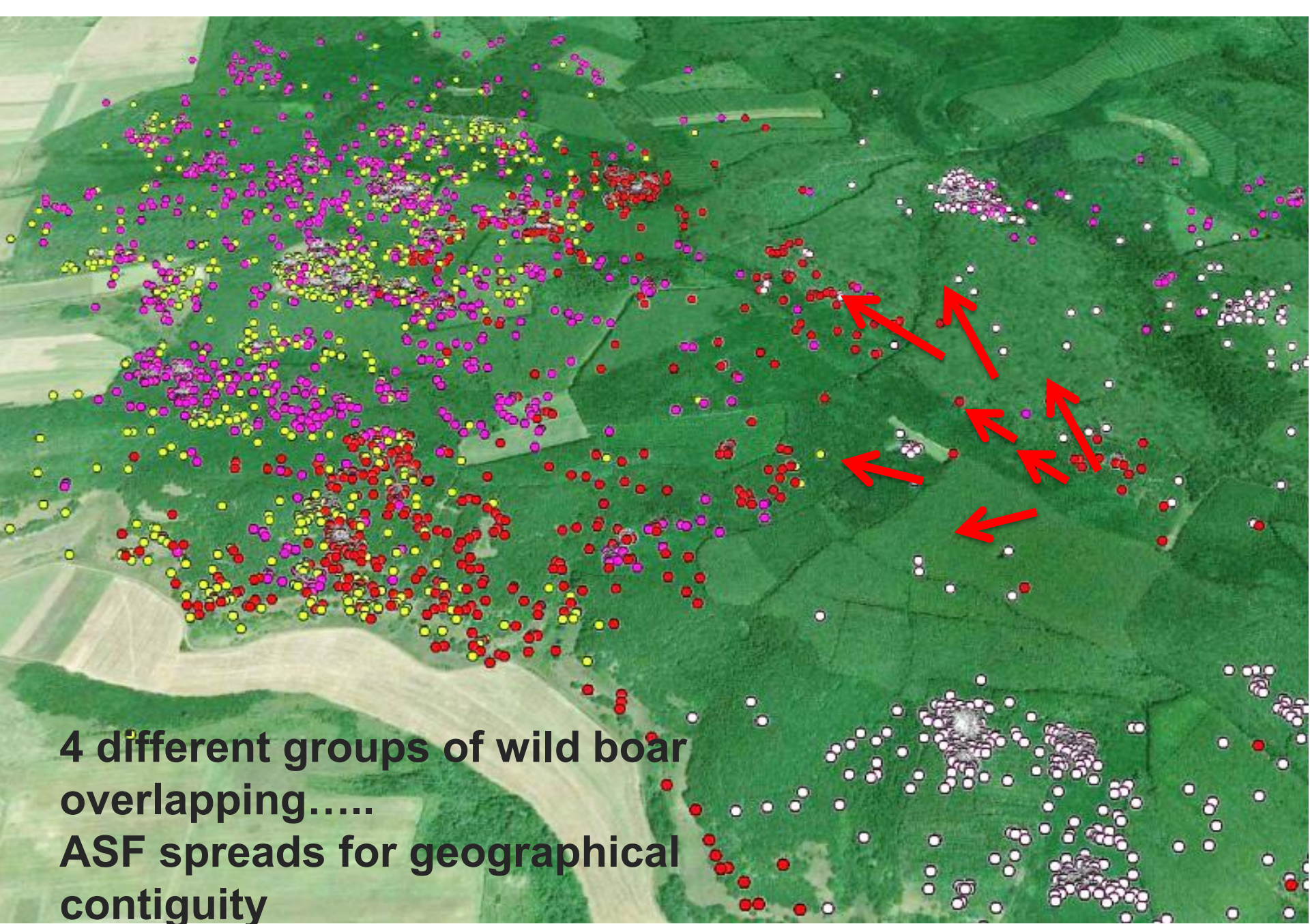
Lack of biosecurity measures applied during hunting

Infected wild boar carcasses available for healthy wild boars

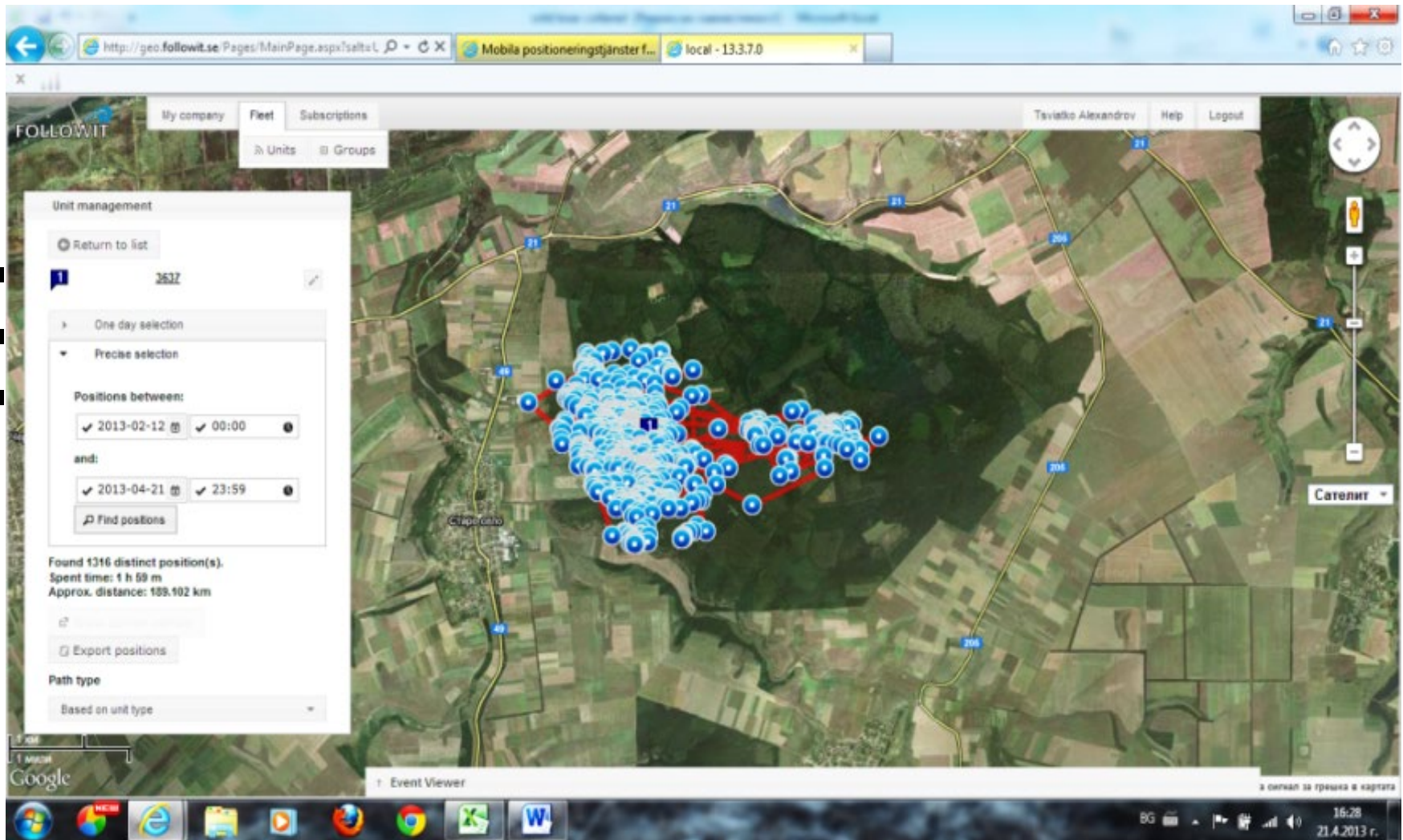
Poaching

Geographical continuity





**4 different groups of wild boar
overlapping.....
ASF spreads for geographical
contiguity**

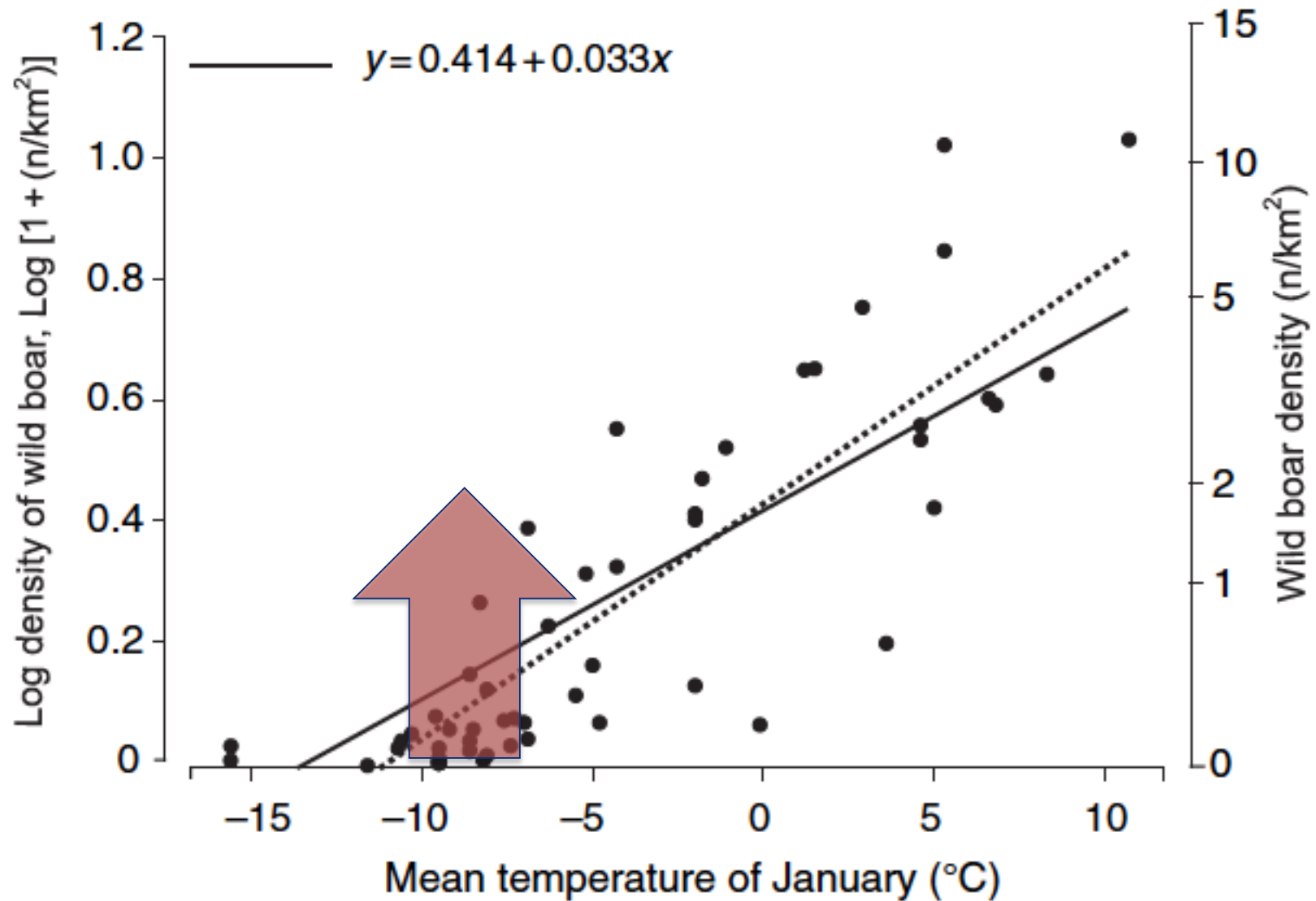


Wild boar movements: Home range: 7 km²

Hunting management



Winter feeding increases densities



Hunting and wild boar movement

Drive hunting with dogs: increase of range size during the hunting season

Season	100% MCP				95% kernel				50% kernel			
	Median	Q ₃ -Q ₁	Mean	SE	Median	Q ₃ -Q ₁	Mean	SE	Median	Q ₃ -Q ₁	Mean	SE
Pre-hunting	80	104	88	25	66	156	98	39	4	14	10	3
Hunting	428	1360	825	358	221	696	457	192	23	68	45	16
Post-hunting	195	544	358	151	189	488	284	99	20	88	45	20

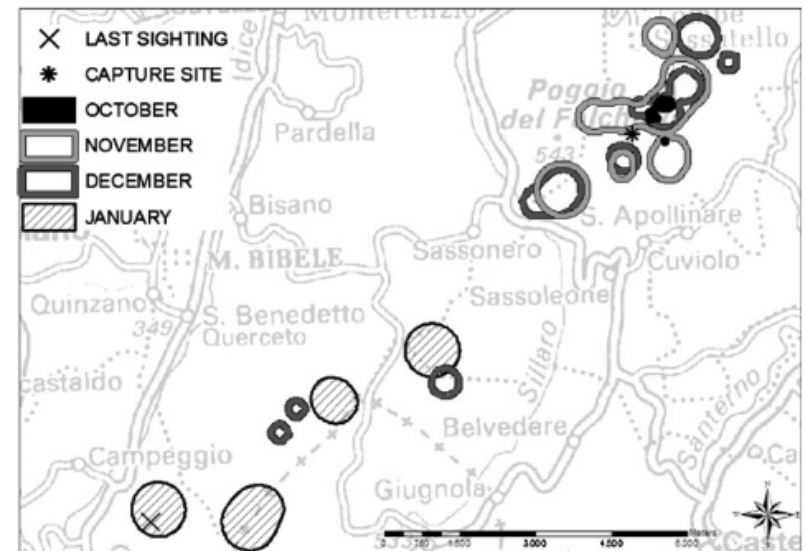
Home range displacements during the hunting season

Eur J Wildl Res (2010) 56:307–318
DOI 10.1007/s10344-009-0314-z

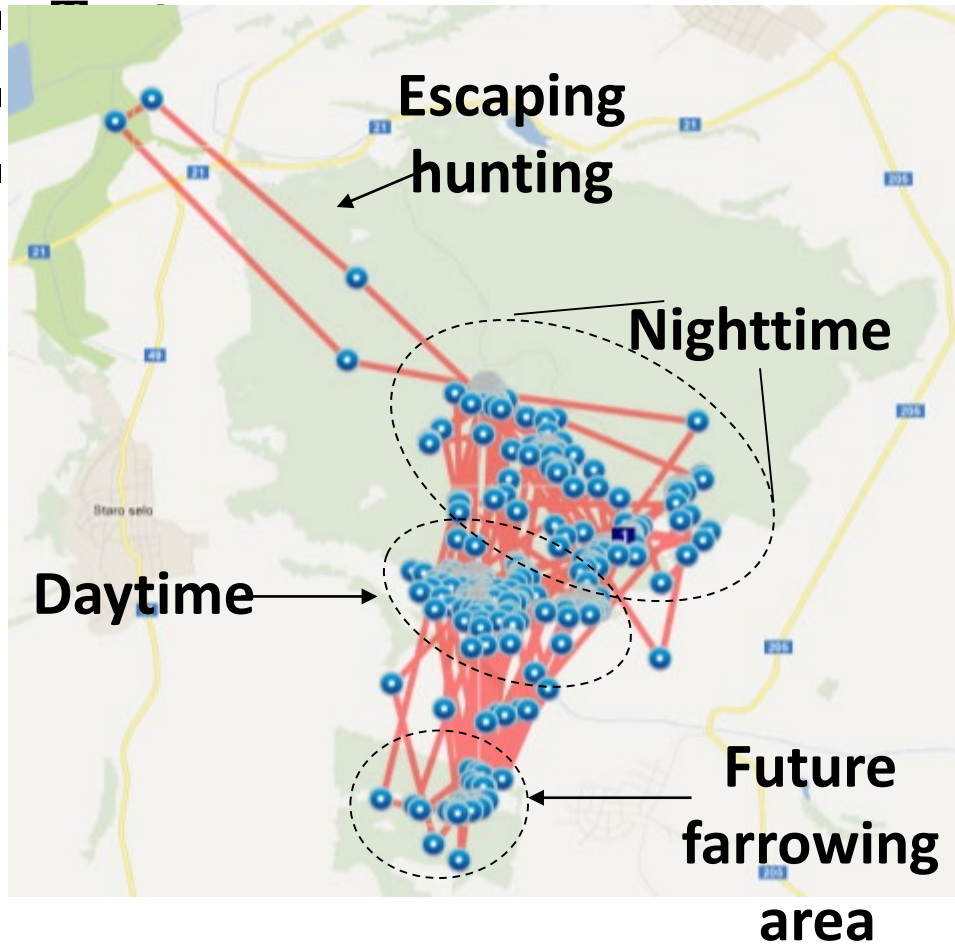
ORIGINAL PAPER

Do intensive drive hunts affect wild boar (*Sus scrofa*) spatial behaviour in Italy? Some evidences and management implications

Laura Scillitani • Andrea Monaco • Silvano Toso



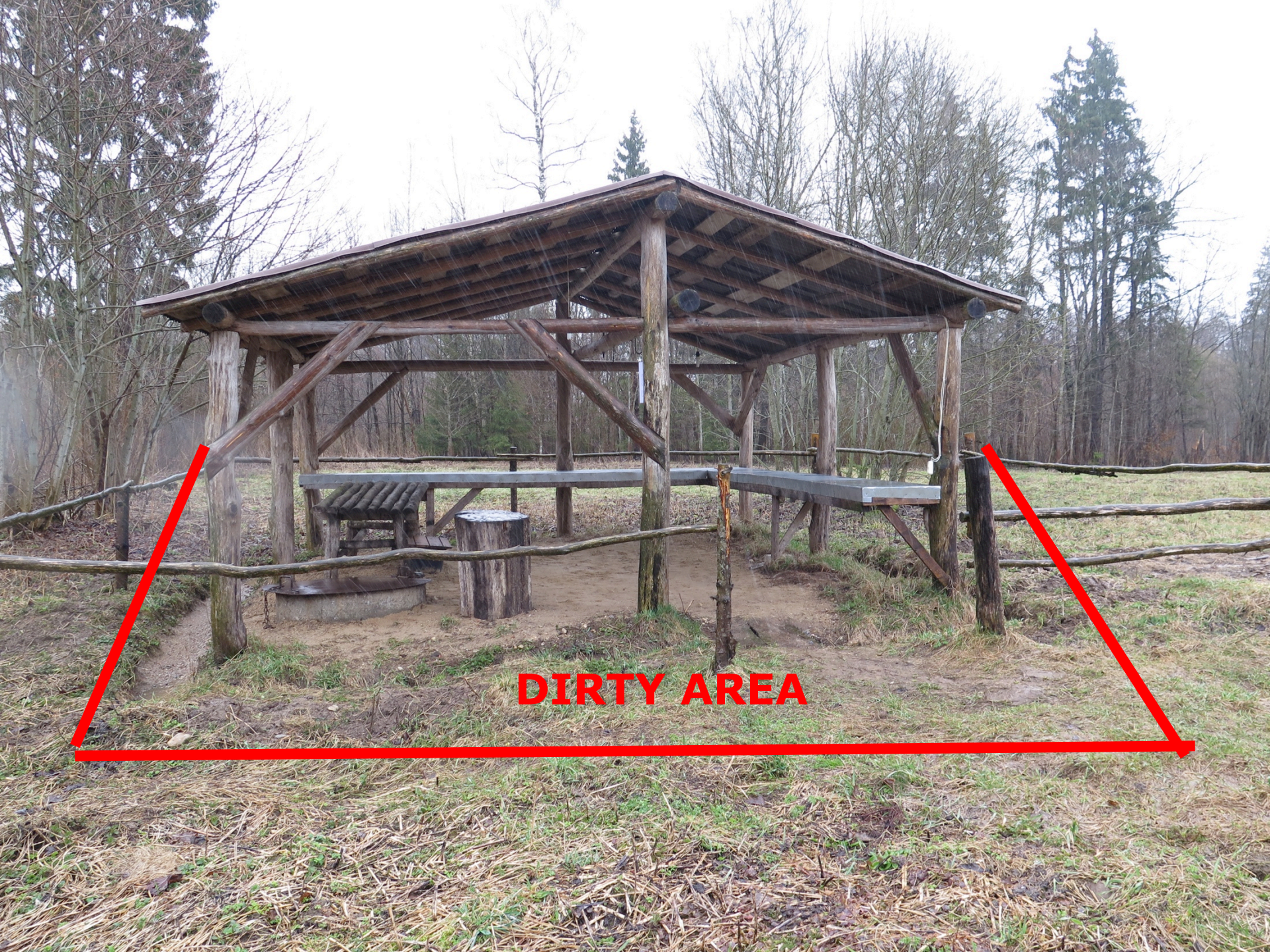
Wild boar long distance movements



**FAO data on
FMD in wild boars
Bulgaria**



LACK OF BIOSECURITY DURING HUNTING



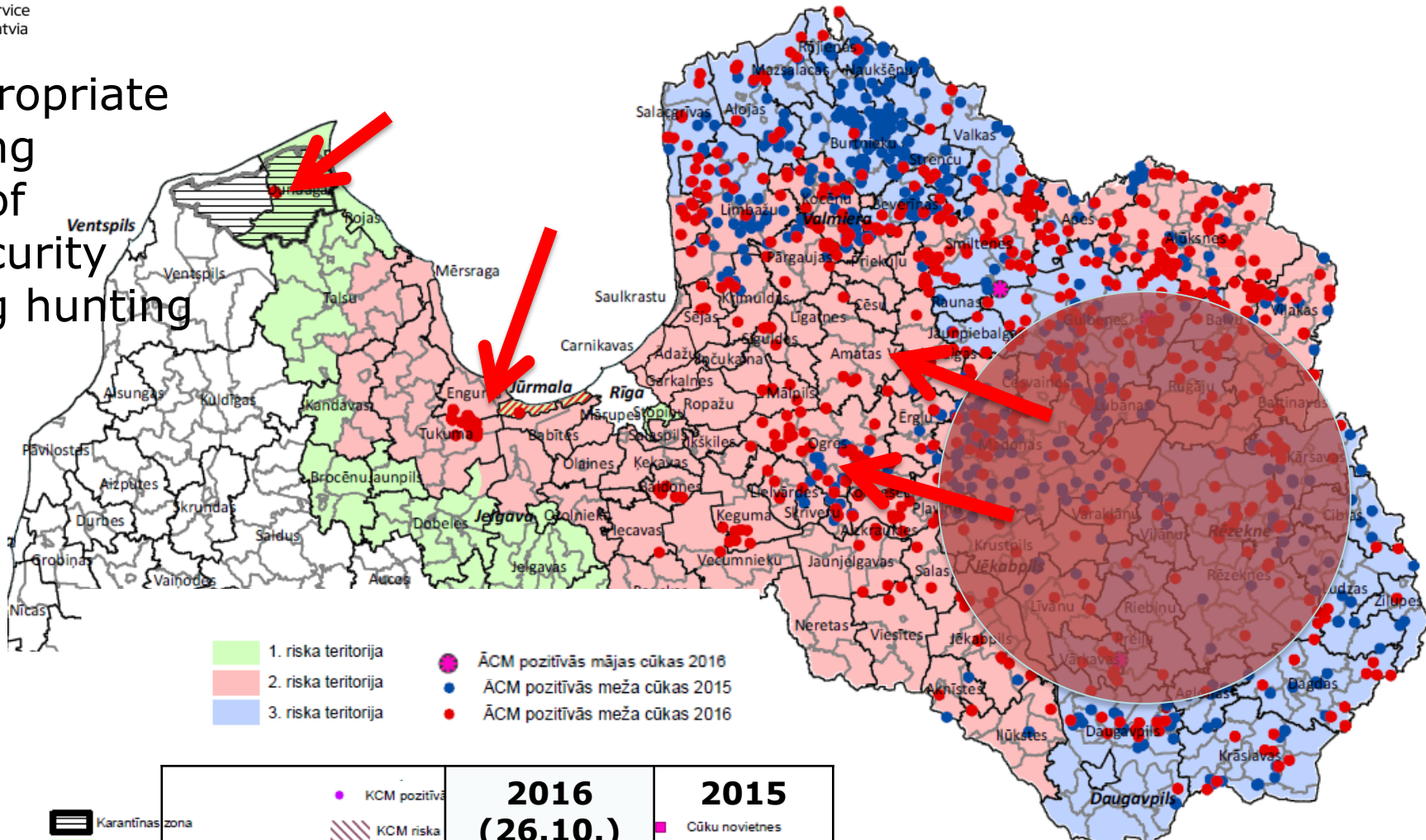
DIRTY AREA



Food and
Veterinary Service
Republic of Latvia

ASF in wild boar (26.10.2016.)

Inappropriate
hunting
Lack of
biosecurity
during hunting



	2016 (26.10.)	2015
Cases Hunted	893	1048
Found dead	447	422
	446	626

Carcasses removal
and wild boar density



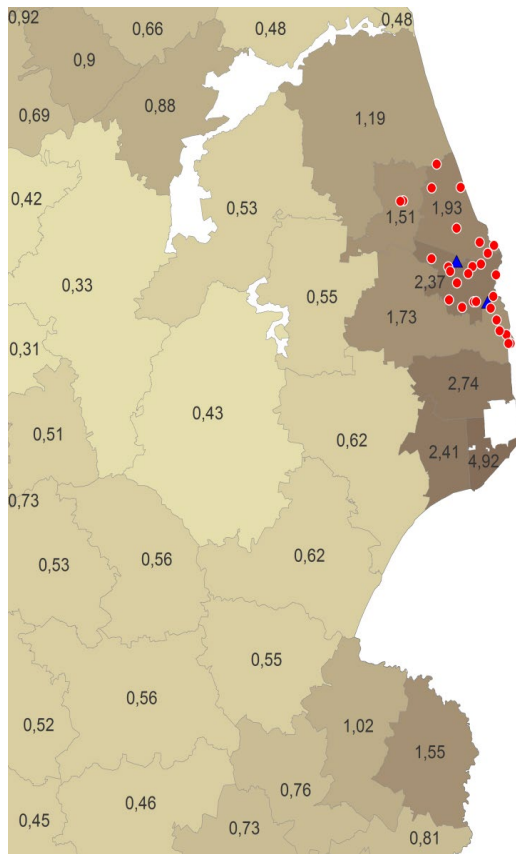
How many
wild boars?

Density dependent spread

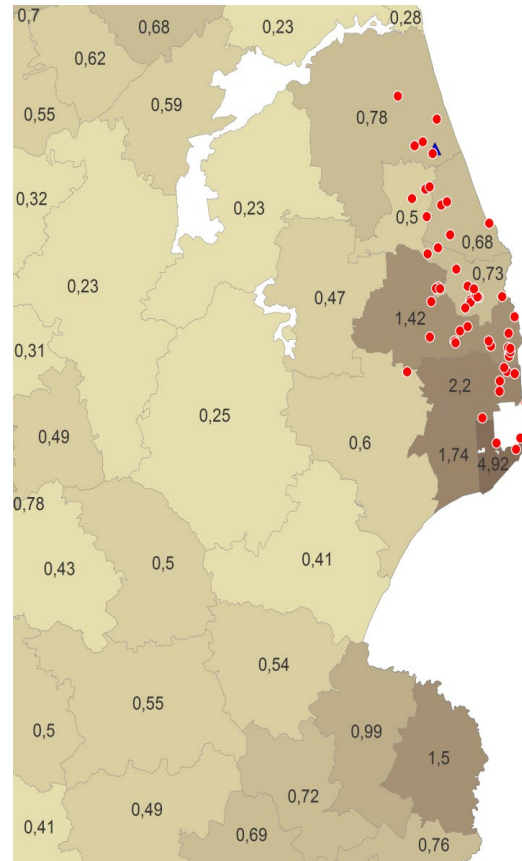
The number of NEW INFECTED wild boar is proportional to the wild boar population size

The duration of the epidemic is proportional to the wild boar population size

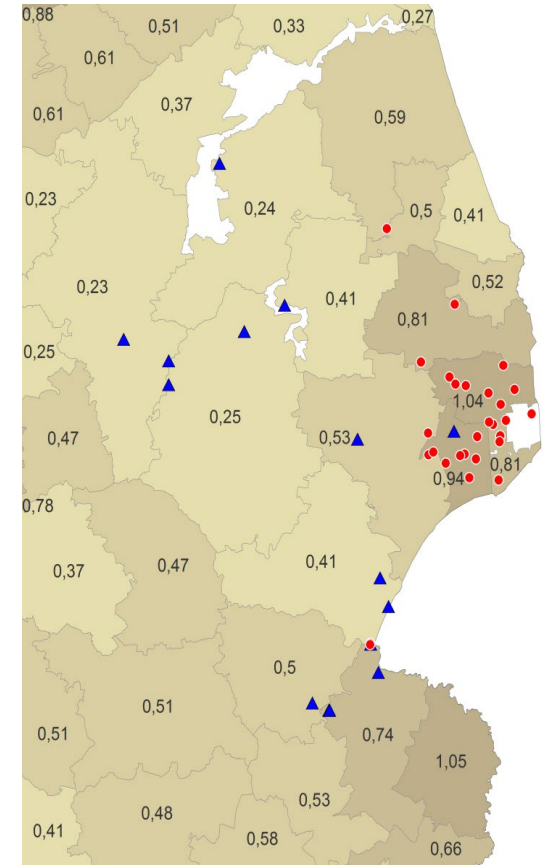
Poland: tendency to spread within areas with wild boar density > 1 individual/km²



2014 – 30 cases

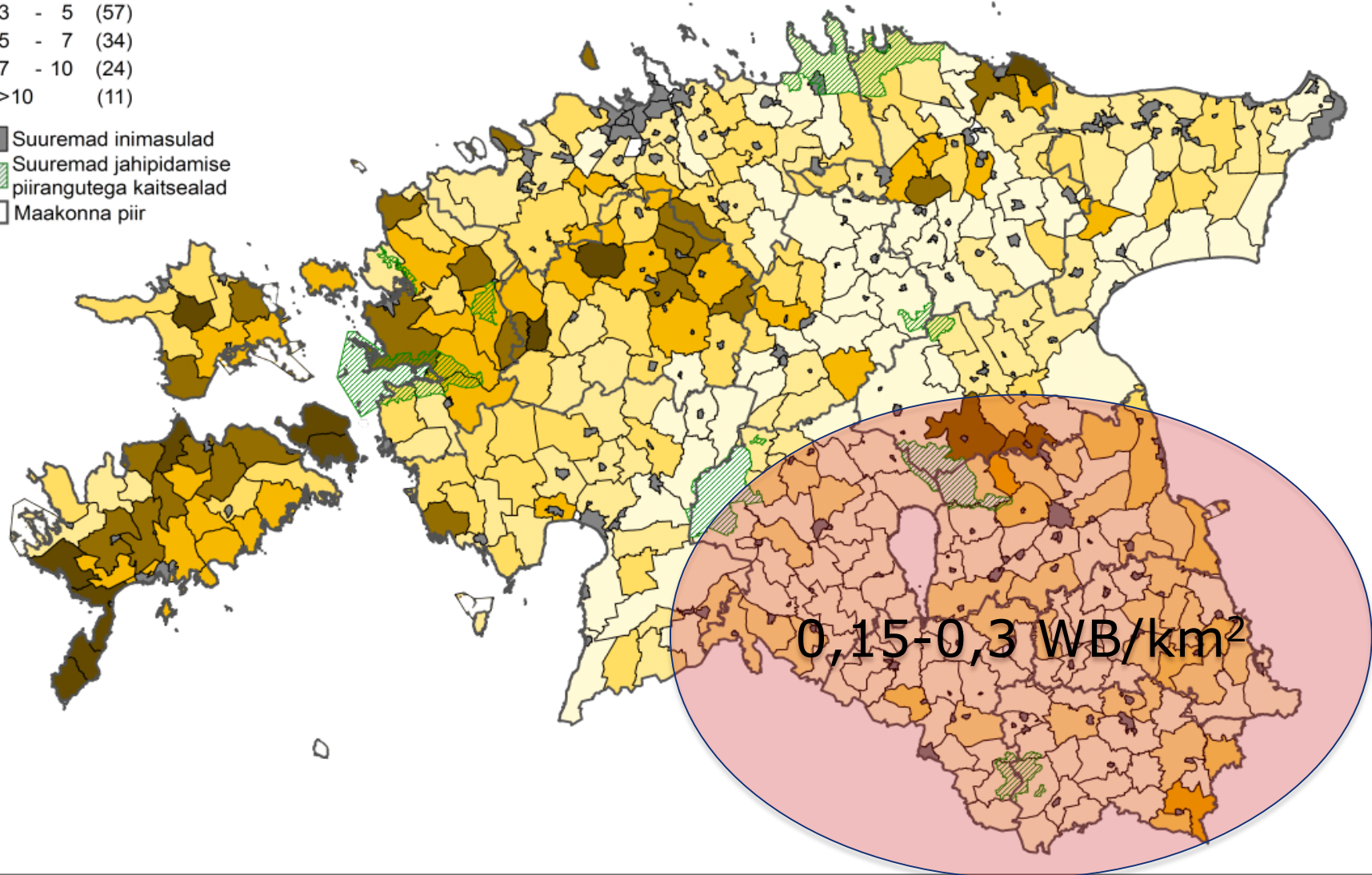
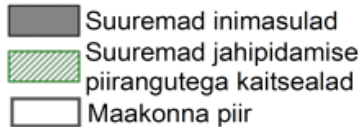
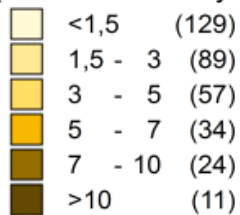


2015 – 53 cases



2016 – 28 cases

Metssea asustustihedus jahipiirkonniti
(isendit 1000 ha jahimaa kohta)

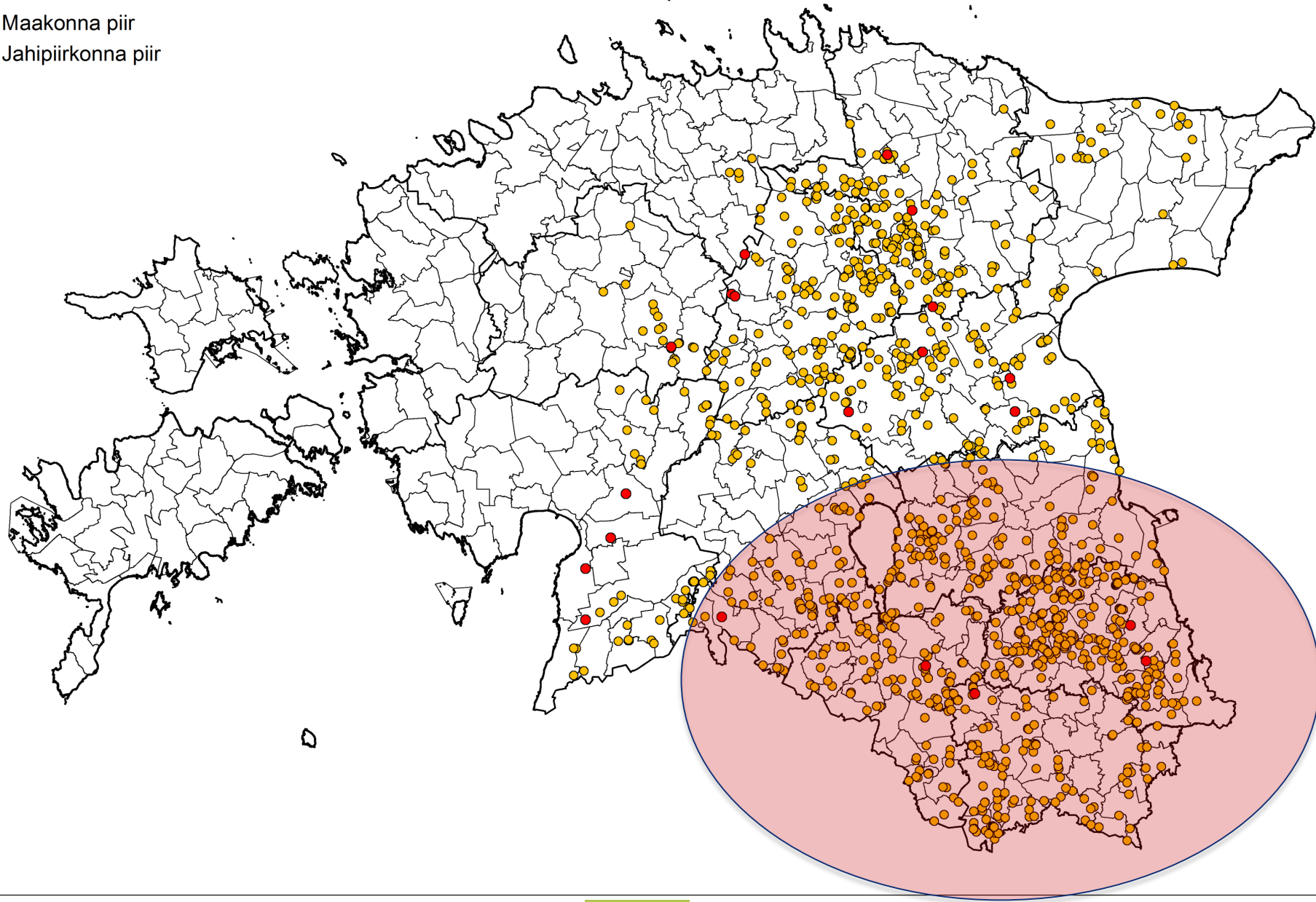


Density of wild boars (individuals per 10 km² of hunting ground) in hunting districts by hunters estimations (census) in spring 2016.

SAK leiud metssigadel

- 11. - 17. juuni 2016
- Varasemad

- ▭ Maakonna piir
- ▭ Jahipiirkonna piir



Can we define the threshold density?

The threshold density (n_t) is that wild boar density at which an infectious wild boar does not encounter any susceptible wild boar in due time to spread the infection

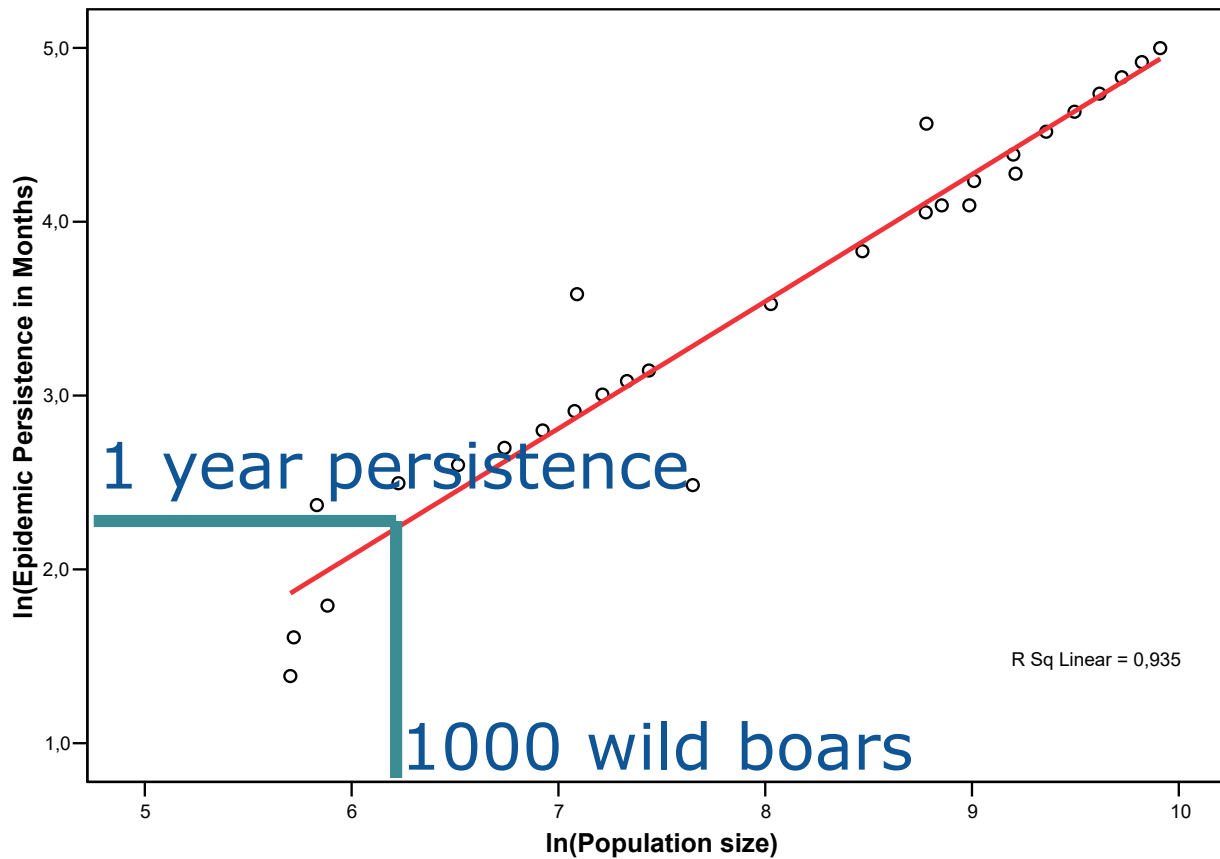
Duration of infectiousness

Density/availability of susceptible hosts

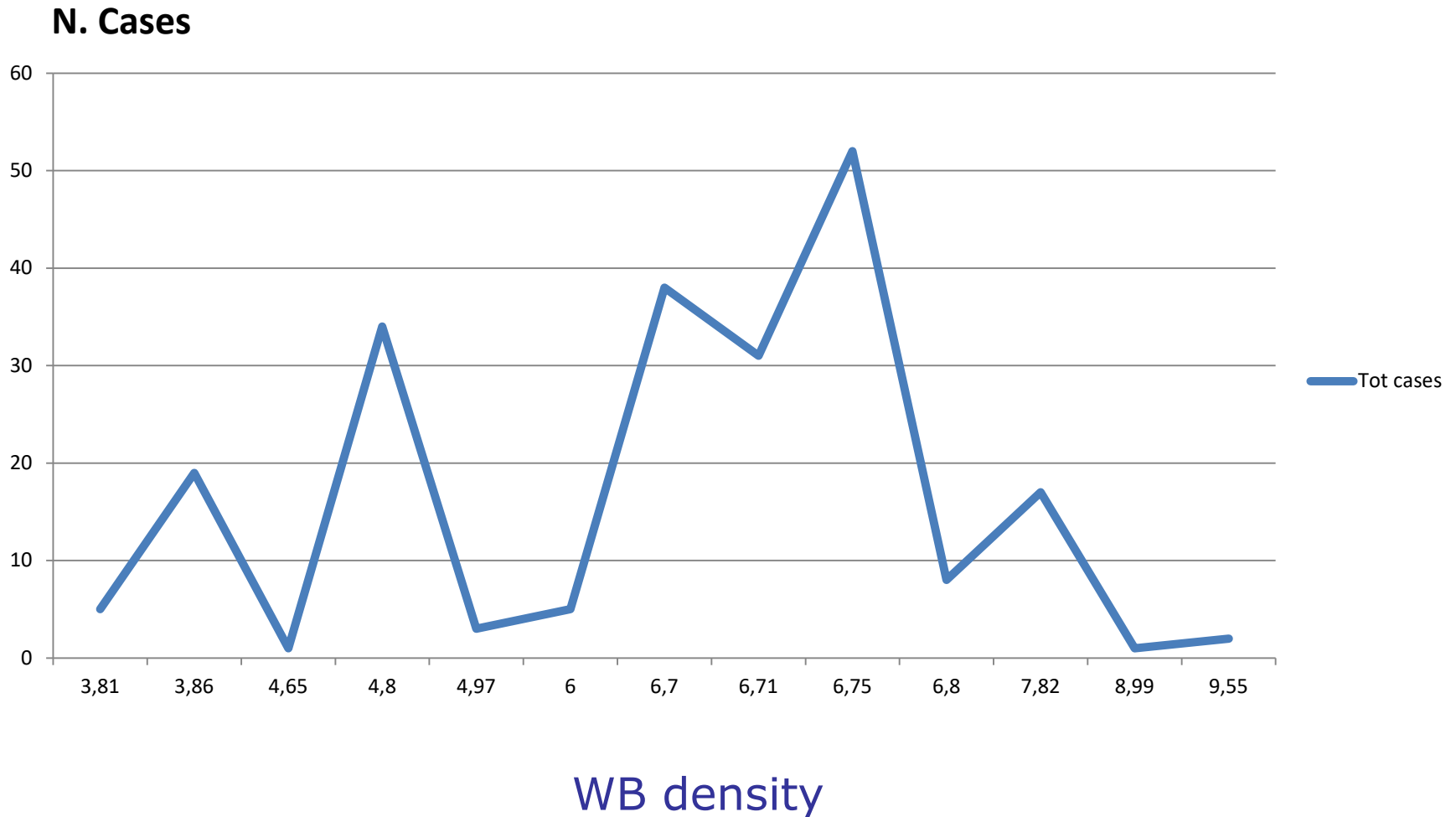
If the wild boar population size is decreased till a certain density, the infection fade out through a density dependent mechanism

NO WILD BOARS = NO DISEASE

CLASSICAL SWINE FEVER in WILD BOAR



Apparently: not a density dependent spread



ASF in wild boar

A density dependent transmission during summer-autumn (new born and adult animals)....insects?

Virus survival during winter with few (or many) **infected carcasses** according to the local ecological situation

A mixed transmission: density dependent and frequency dependent => **NO THRESHOLD**

ASF in wild boar

A density dependent transmission during summer-autumn (new born and adult animals)....insects?

Virus survival during winter with few (or many) **infected carcasses** according to the local ecological situation

A mixed transmission: density dependent and frequency dependent => **NO THRESHOLD**

ASF in wild boar

The question is:

Which is the wild boar density that prevent the contact between a susceptible wild boar with an infected carcass?

An ASF virus will overwinter in a infected carcass.....3-4 months...and the virus will appear again during the late spring in alive susceptible individuals

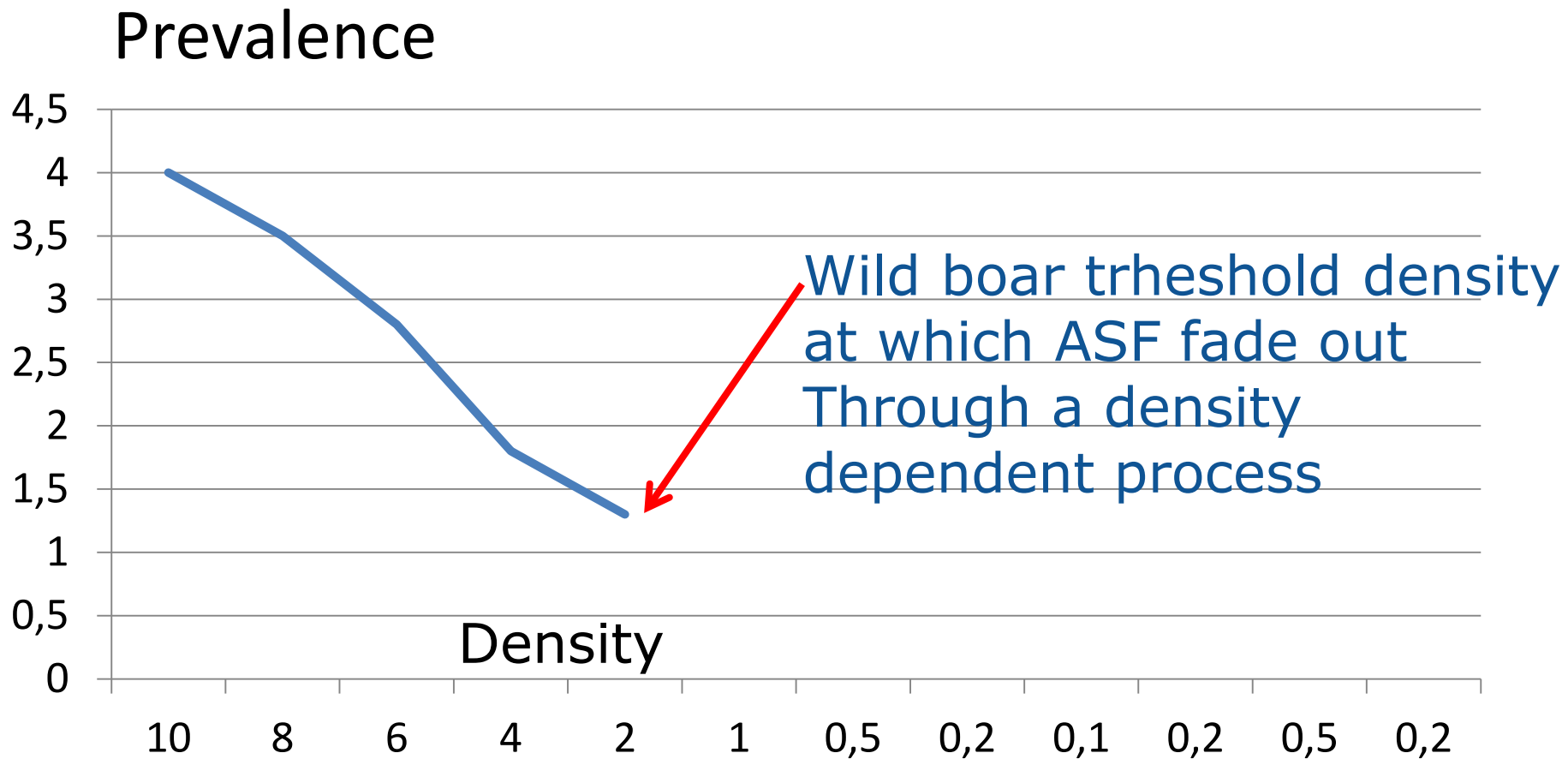
ASF in wild boar

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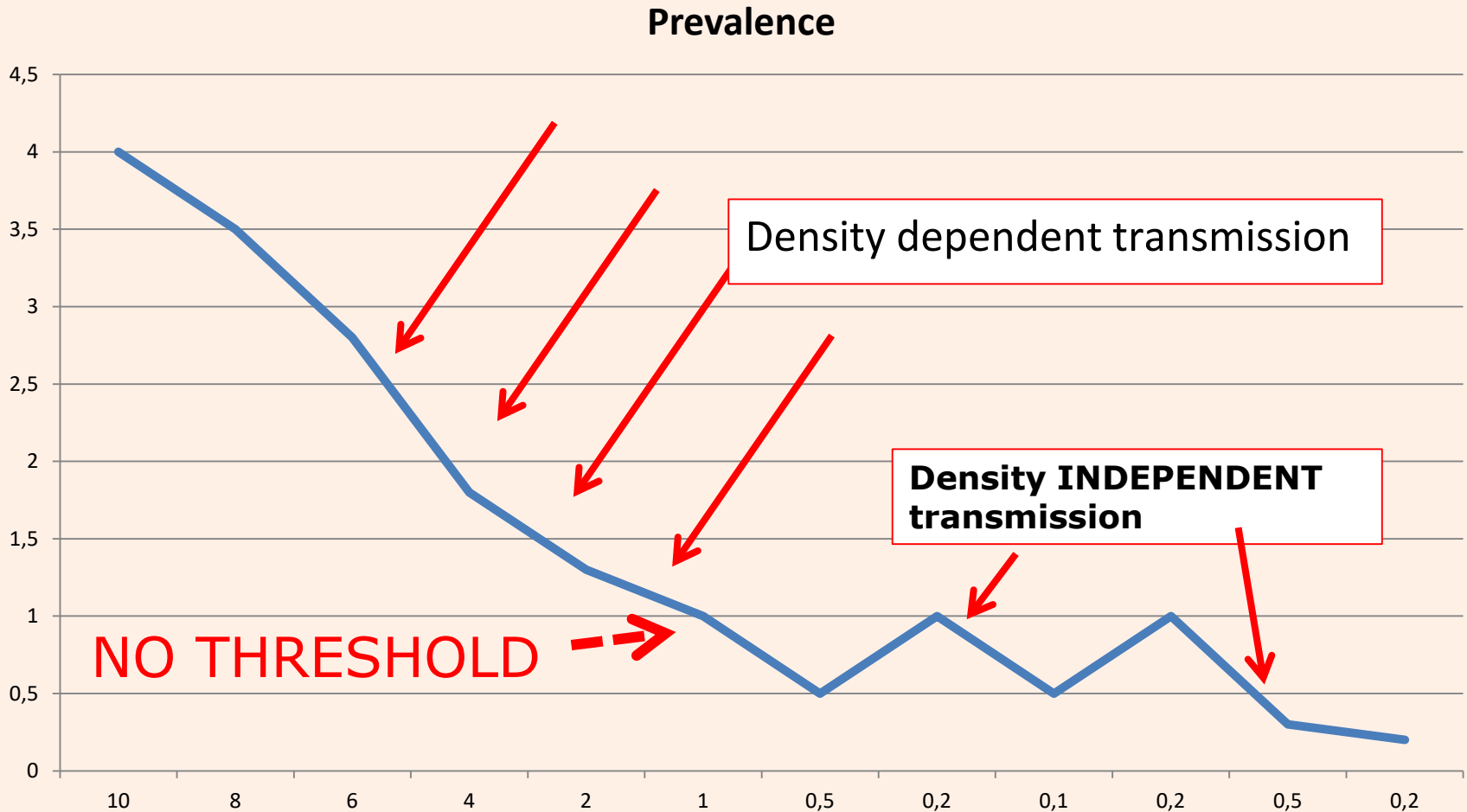
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CSF: a density dependent disease



ASF is not a truly density dependent infection. The final tail of the infection is determined by carcasses



Practically

ASF in wild boar eradication is PROBABILISTIC EVENT (stochastic) NOT a DETERMINISTIC one;

Eradication probability increases when: **wild boar population** size is **reduced** (as much as possible); **carcasses** are safely **disposed** (as much as possible); **hunting** is carried out under **bio-security**

ASF: the virus and the environment

Since the infection is not entirely transmitted through density dependent mechanism we have to shift to

The reduction of the environmental contamination of the virus

The problem then is not purely addressed in the mechanistic reduction of the wild boar density but in reducing the viral load of the environment

Standing Group of Experts on African swine fever in the Baltic and Eastern Europe region under the GF- TADs umbrella

SGE ASF3: Moscow, Russia, 15-16 March 2016

Wild boar population reduction should be considered, in combination with other control measures, within the framework of a wild boar management strategy **aimed at reducing ASF virus contamination of the environment.**

EU strategy

(see EFSA, 2015)

- ◆ Reduce the wild boar population size through targeted hunting of adult females
- ◆ Detection of – at least - 50% infected carcasses and their safe disposal
- ◆ Ban of winter/sustaining artificial feeding

Strategy applied - for at least - 100 km in front of the detected case

It is a medium term strategy that accepts the presence of the virus for a certain number of years

TAKE AT HOME MESSAGE

1. In ASF epidemiology, infected carcasses maintains the virus in the environment for a very long time;
2. Due to the presence of infected carcasses, there is no a minimum number of wild boar at which the virus fade out;
3. A very low number of wild boars together with infected carcasses can maintain the virus in the forest
4. Improper hunting techniques together lack of biosecurity during hunting are the most relevant factors enabling the long distance spread (jumps) of ASF virus in wild boars.

Thanks for the attention

Questions, comments?

BTSEF



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