European Commission

Epidemiology of ASF in wild boar

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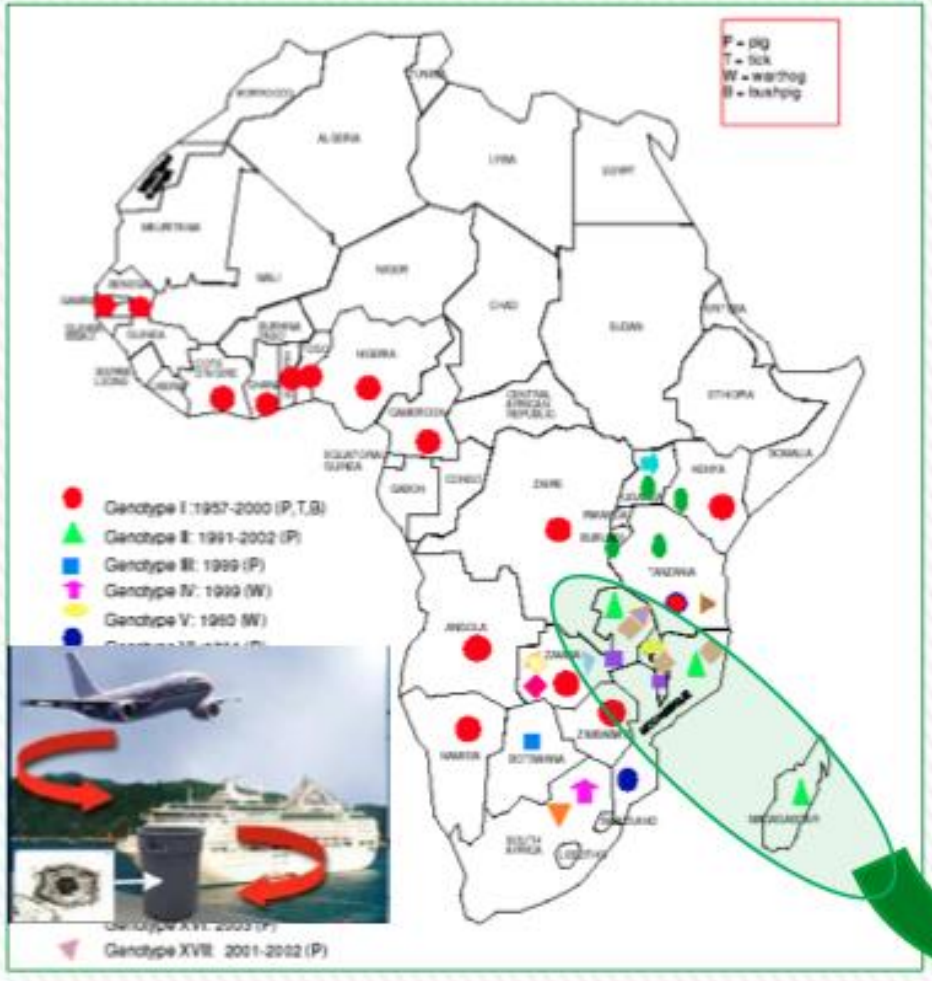
ISPRA, Italy

European Commission

Tracing the origin

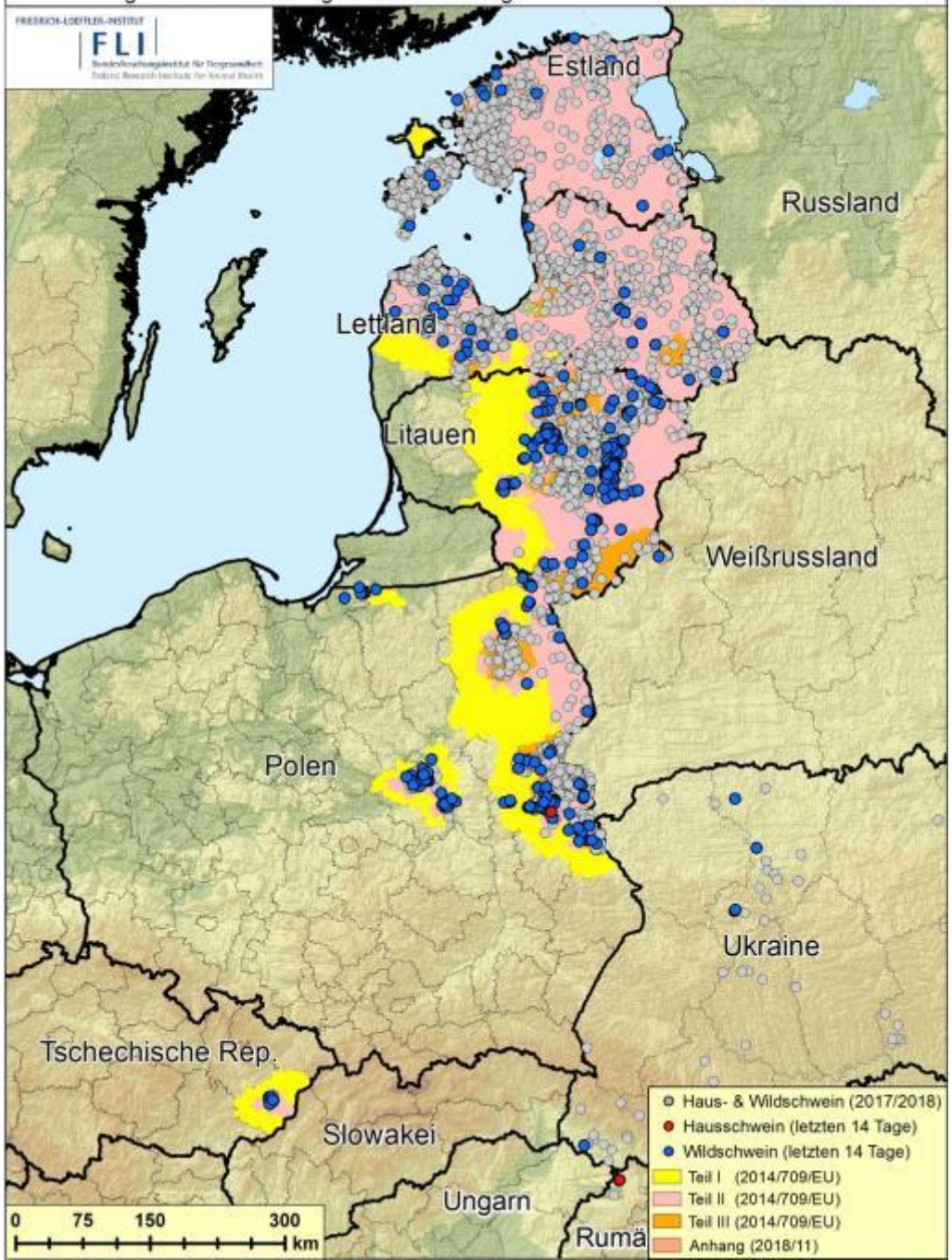


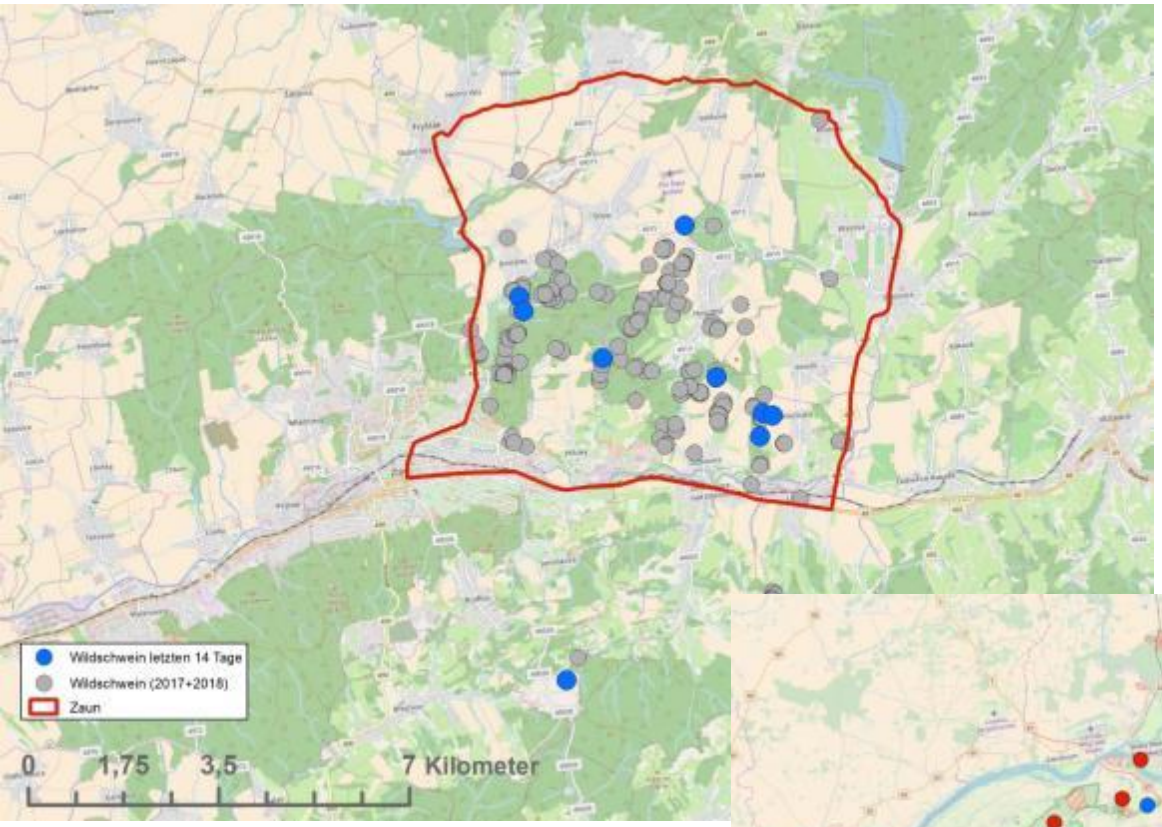
Georgia
June 2007

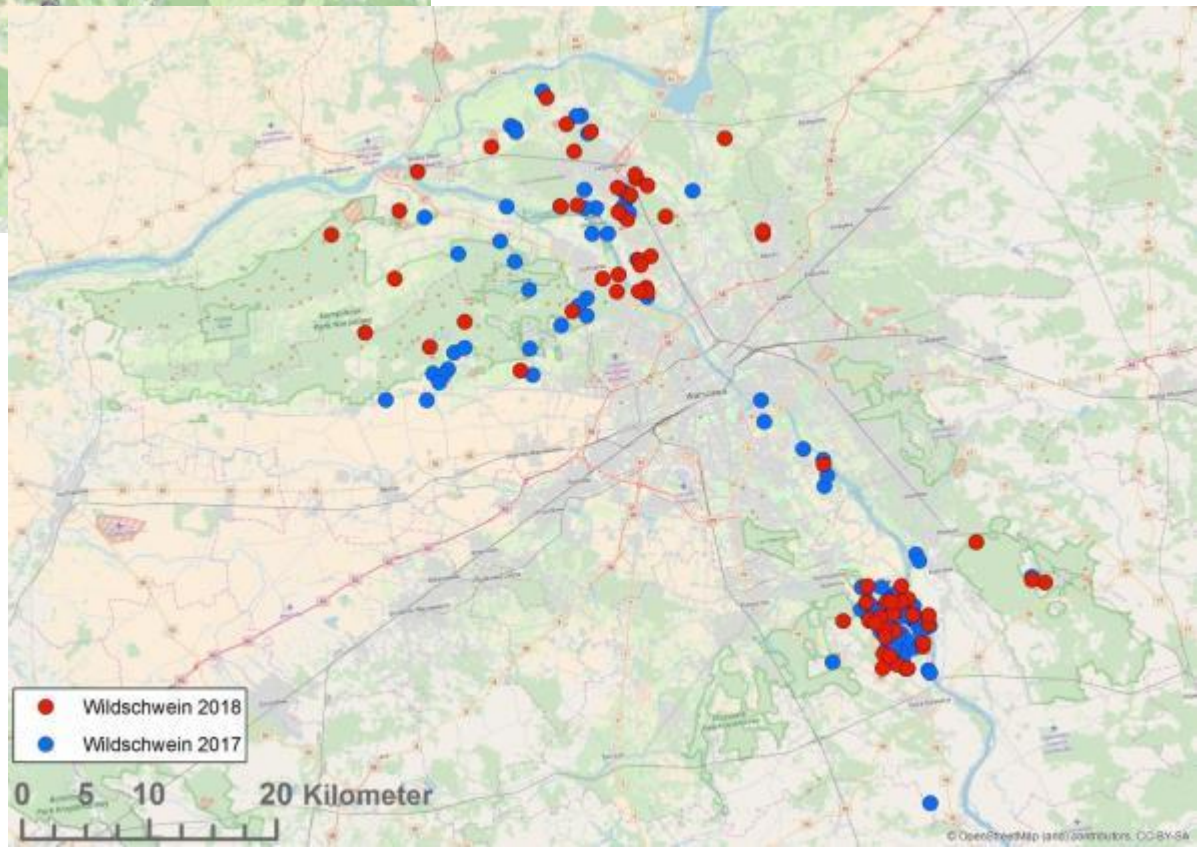

1
2
3
4


Europe
©MAPS.COM
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
SVALBARD
JAN MAYAN
ICELAND
FAROE ISLANDS
Atlantic Ocean
North Sea
Mediterranean Sea
Black Sea
Caspian Sea
NORWAY
SWEDEN
FINLAND
RUSSIA
ESTONIA
LATVIA
BELARUS
UNITED KINGDOM
ISLE OF MAN
IRELAND
DENMARK
NETHERLANDS
GERMANY
POLAND
UKRAINE
BELGIUM
GUERNSEY
JERSEY
SLOVAKIA
MOLDOVA
SWITZERLAND
AUSTRIA
HUNGARY
ROMANIA
SLOVENIA
FRANCE
CROATIA
BULGARIA
ITALY
SAN MARINO
VATICAN CITY
MACEDONIA
GREECE
TURKEY
ALBANIA
MALTA
GIBRALTAR
GEORGIA
ARMENIA
AZERBAIJAN
AZER.
70°
60°
50°
40°
5°
0°
5°
15°
25°
35°
45°

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




Wildschwein letzten 14 Tage
Wildschwein (2017+2018)
Zaun
0
1,75
3,5
7 Kilometer


Wildschwein 2018
Wildschwein 2017
0
5
10
20 Kilometer

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**

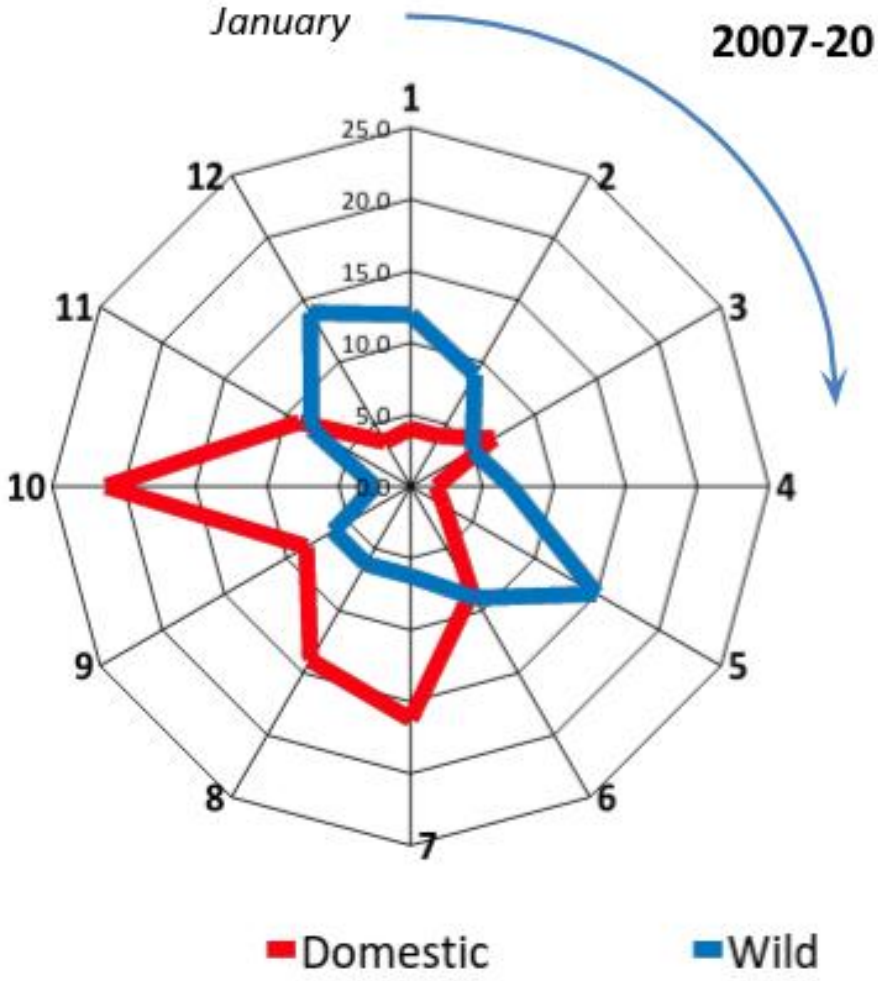
Lethality **90-95%**

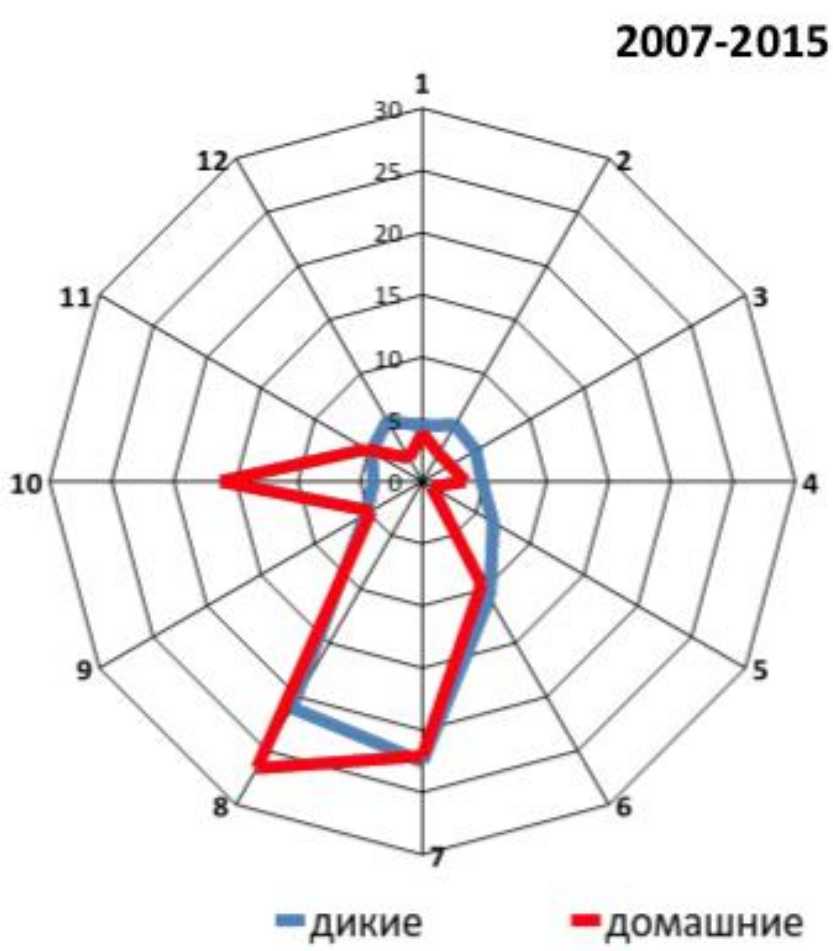
70-80% found dead wild boar are virus positive

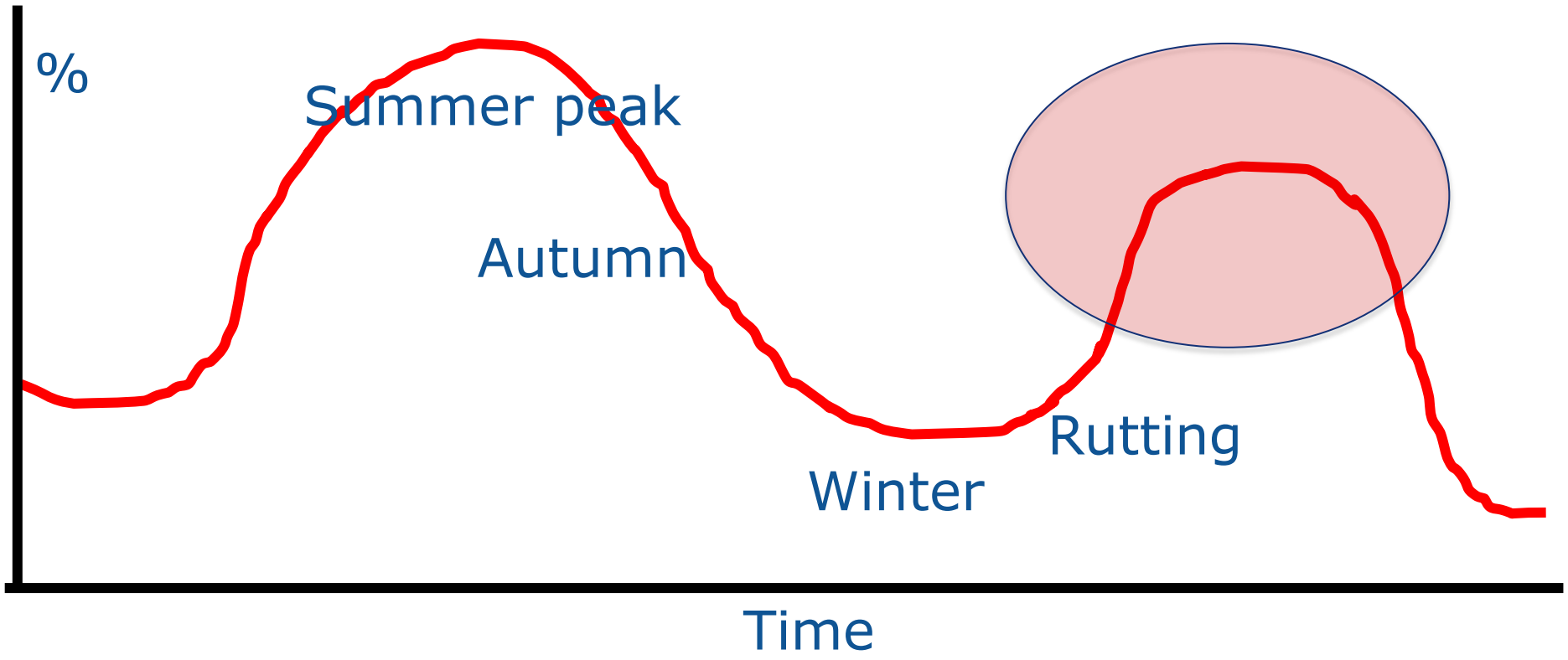
≈ 30-50 km/year is the average speed, but the virus lasts also in old infected areas

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







Higher prevalence in summer: new born animals, insectes?
Lower prevalence in winter: virus survives in carcasses
Increasing prevalence: rutting period ?

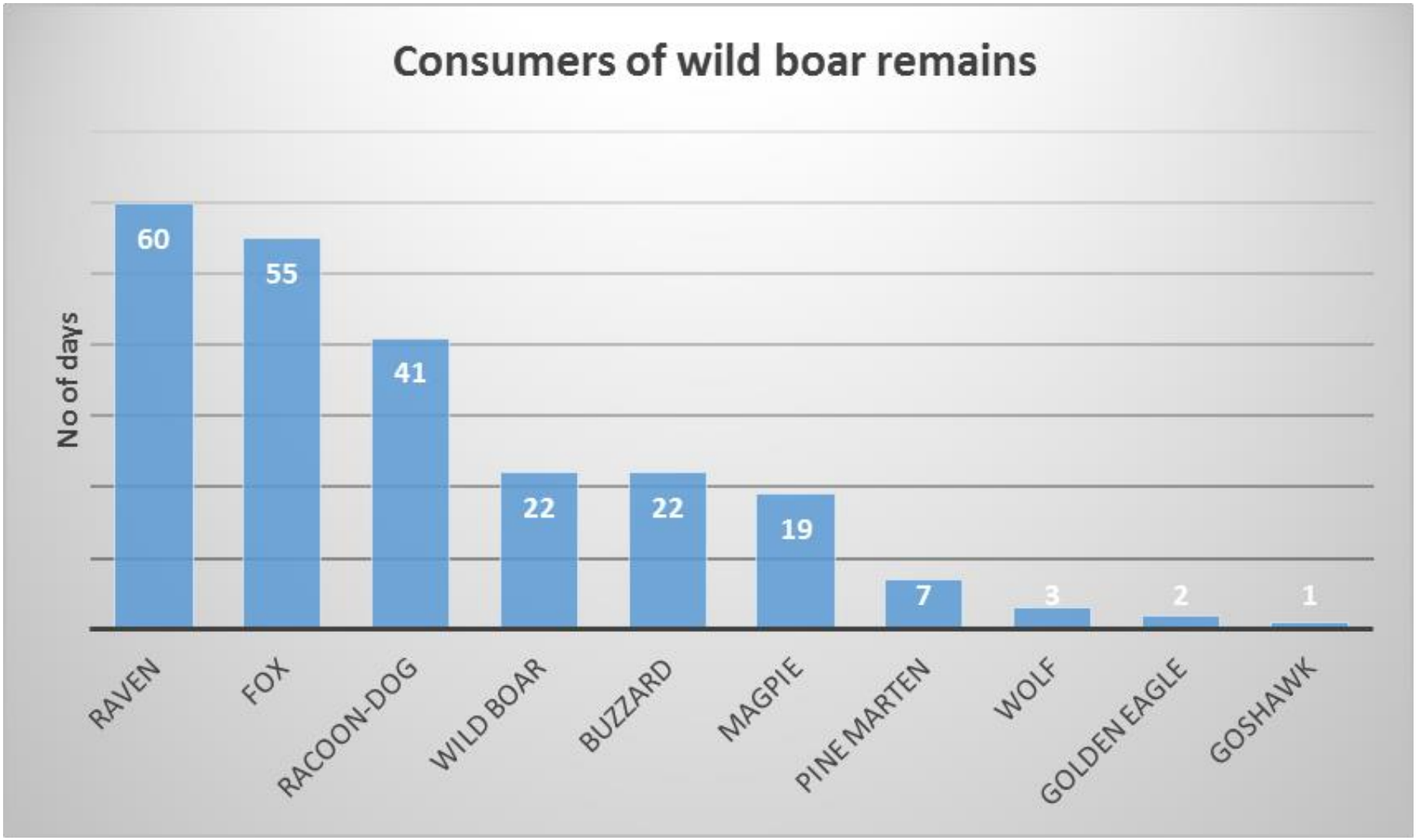
Epidemiological Role played by infected carcasses and insects (no ticks)

Maggots could increase contacts between wild boar and infected carcasses ut 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


UOVISION
2016/02/27 20:10:51
20 001°C 034°F
6



+ 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

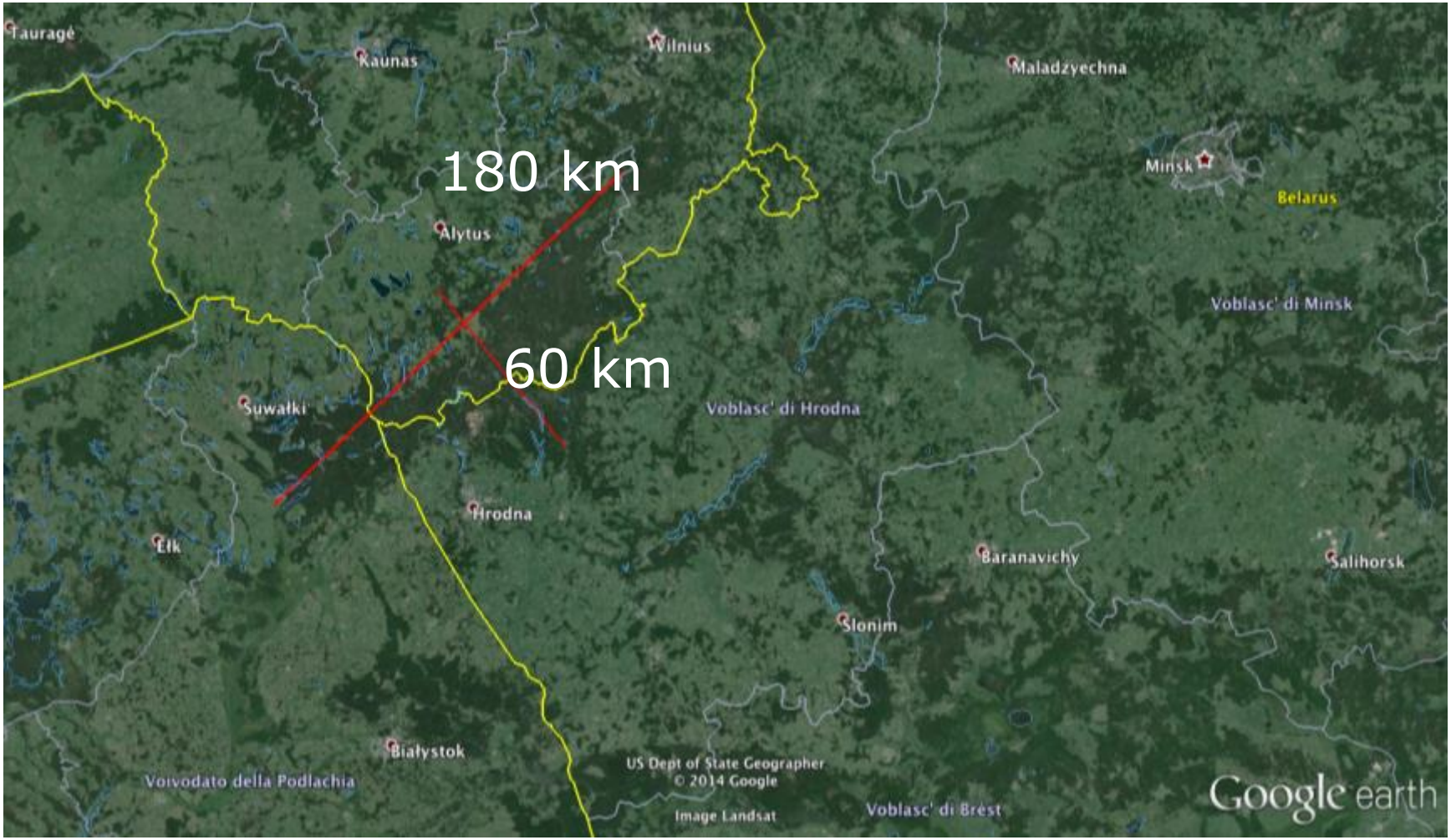
Inappropriate hunting methodologies

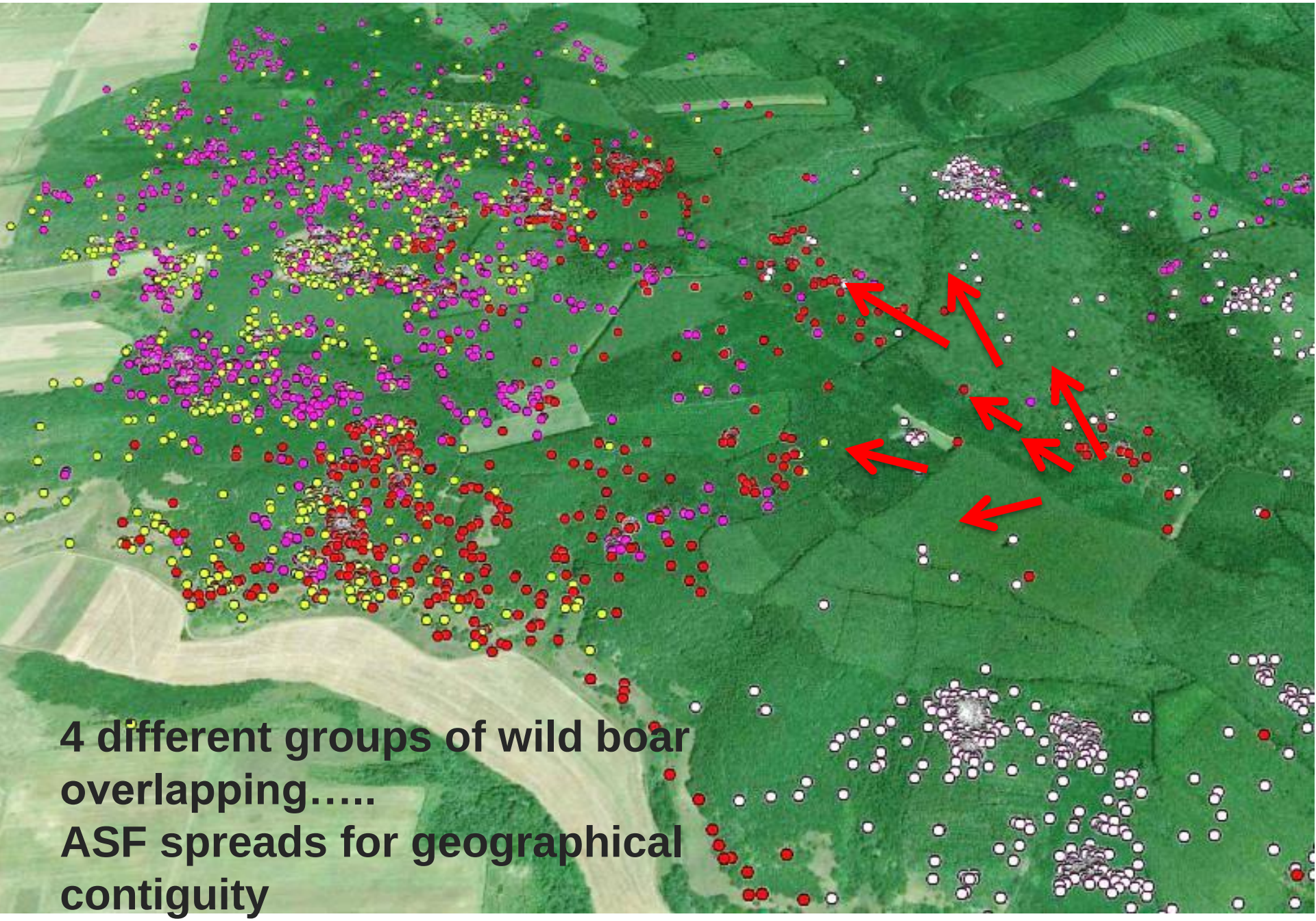
Lack of biosecurity measures applied during hunting

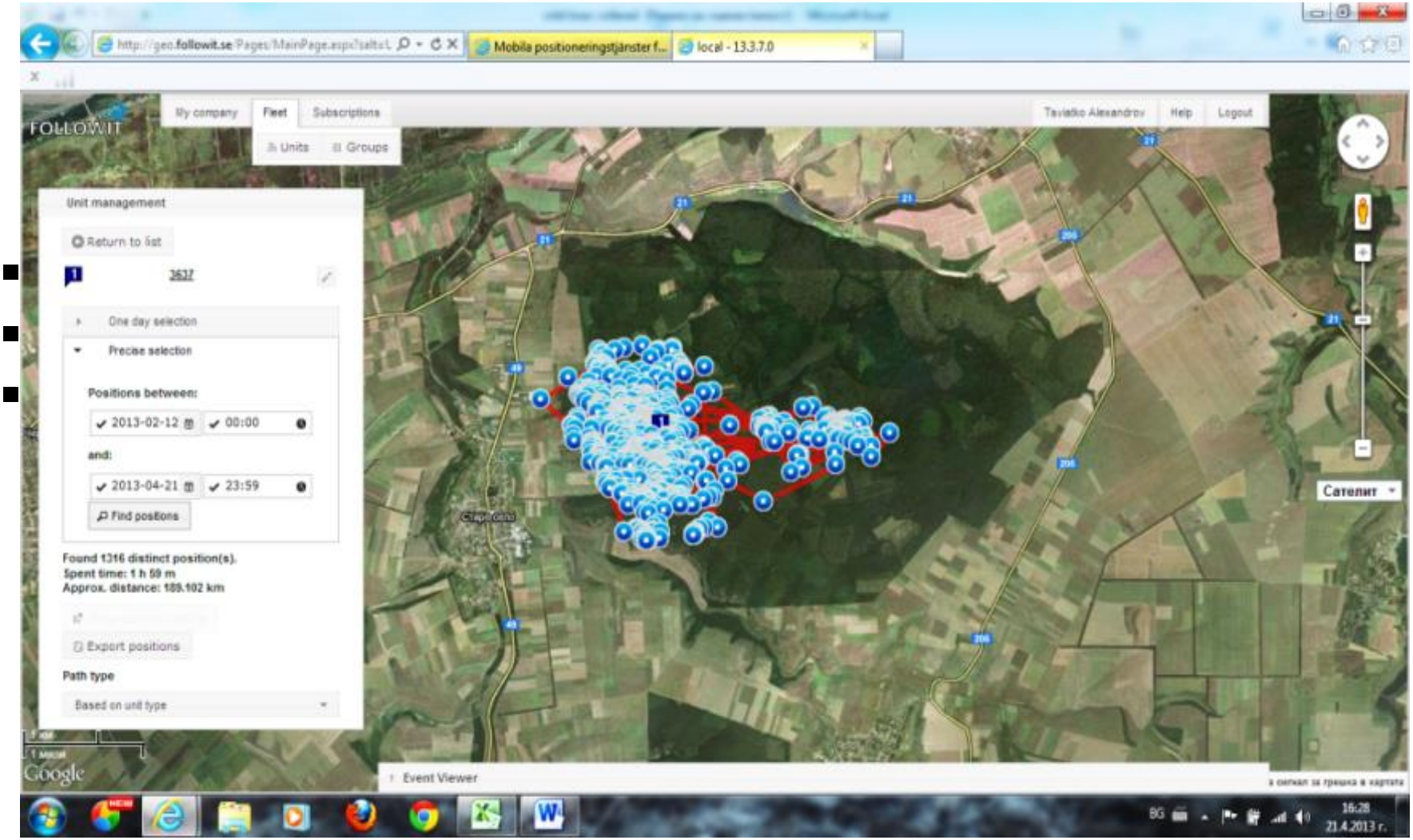
Infected wild boar carcasses available for healthy wild boars

Poaching

Geographical continuity



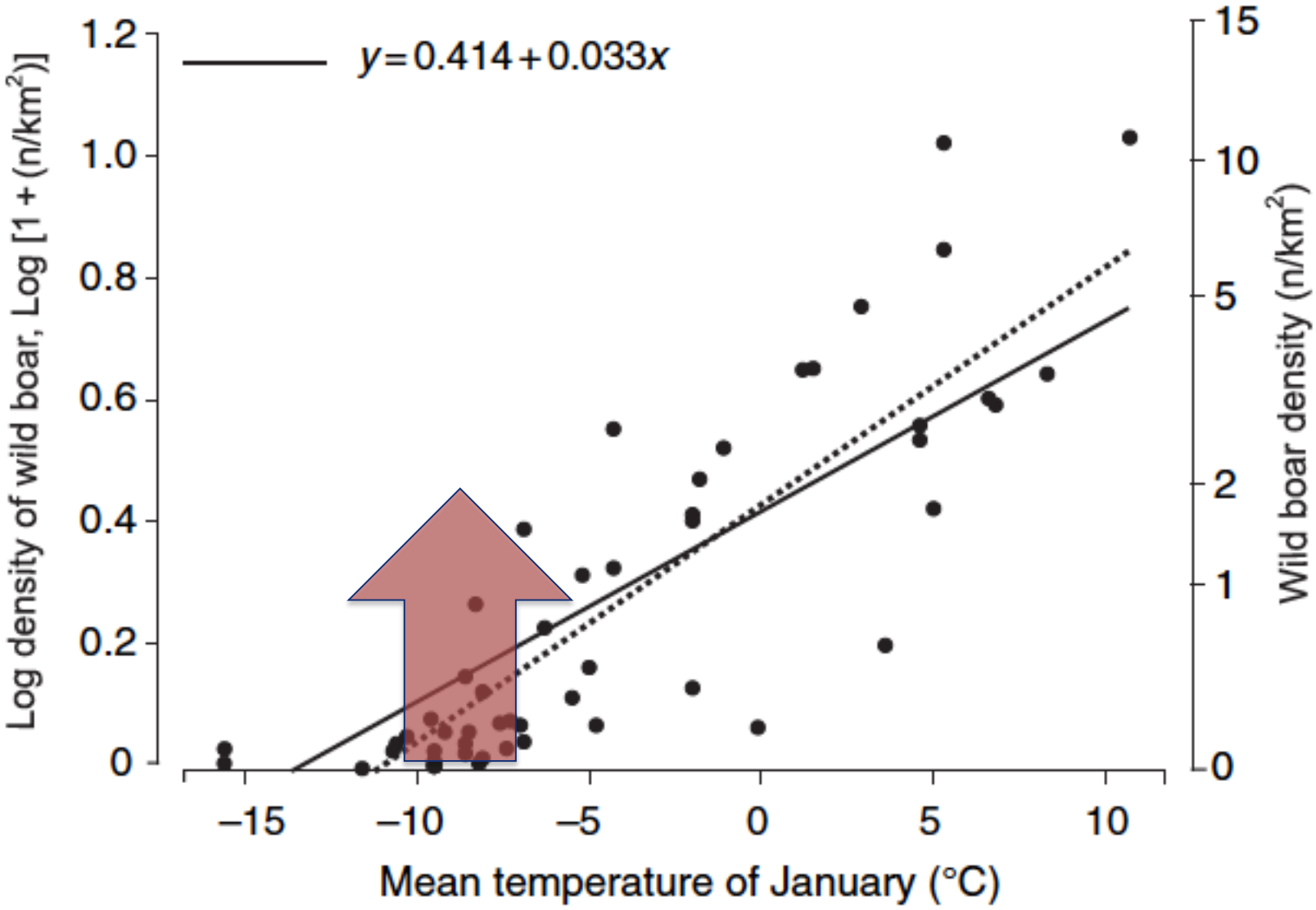

4 different groups of wild boar overlapping…..
ASF spreads for geographical contiguity



Wild boar movements: Home range: 7 km^2

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

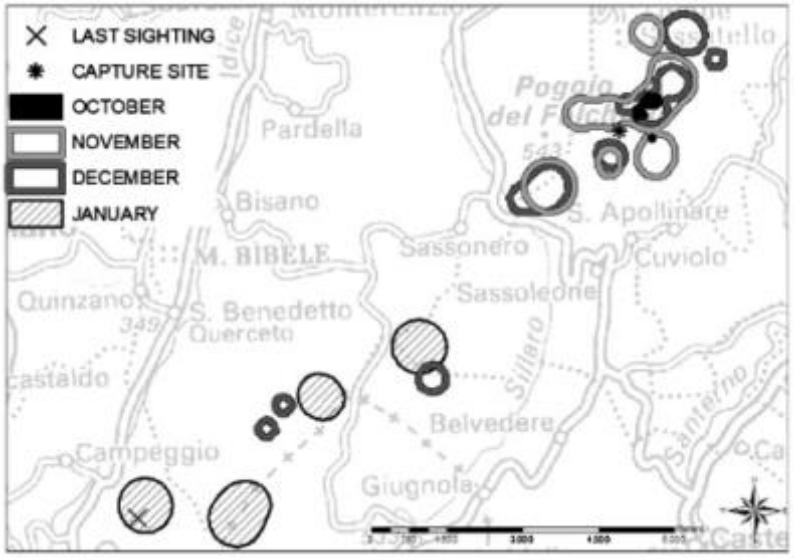
Home range displacements during the hunting season

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

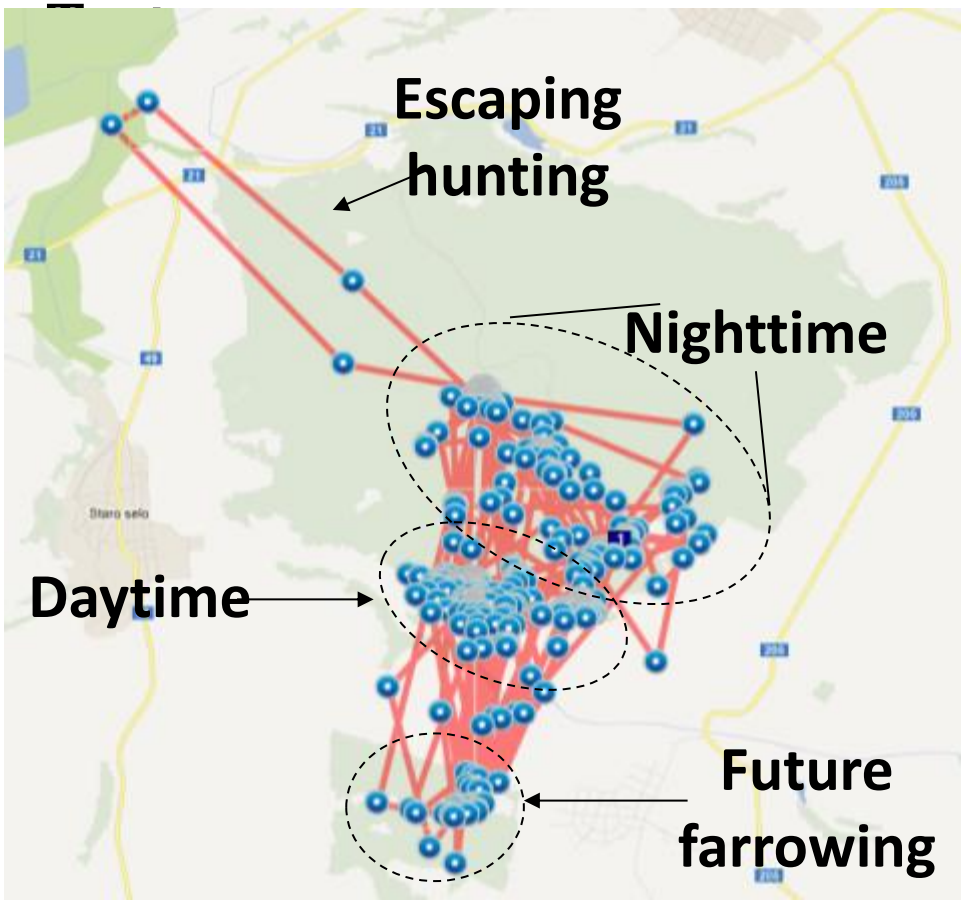
ORIGINAL PAPER

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

Laura Scillitani · Andrea Monaco · Silvano Toso

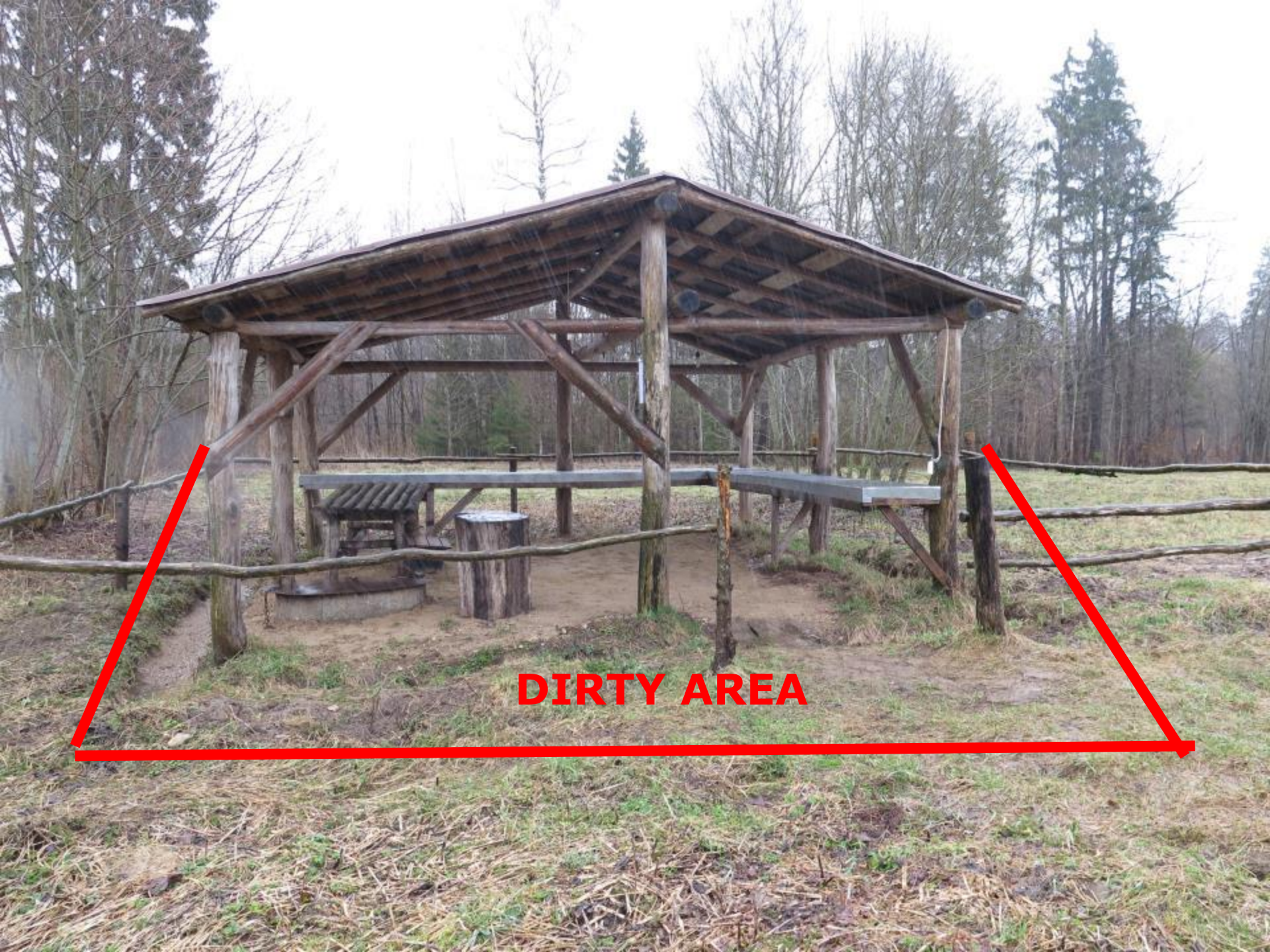


Wild boar long distance movements



FAO data on FMD in wild boars Bulgaria

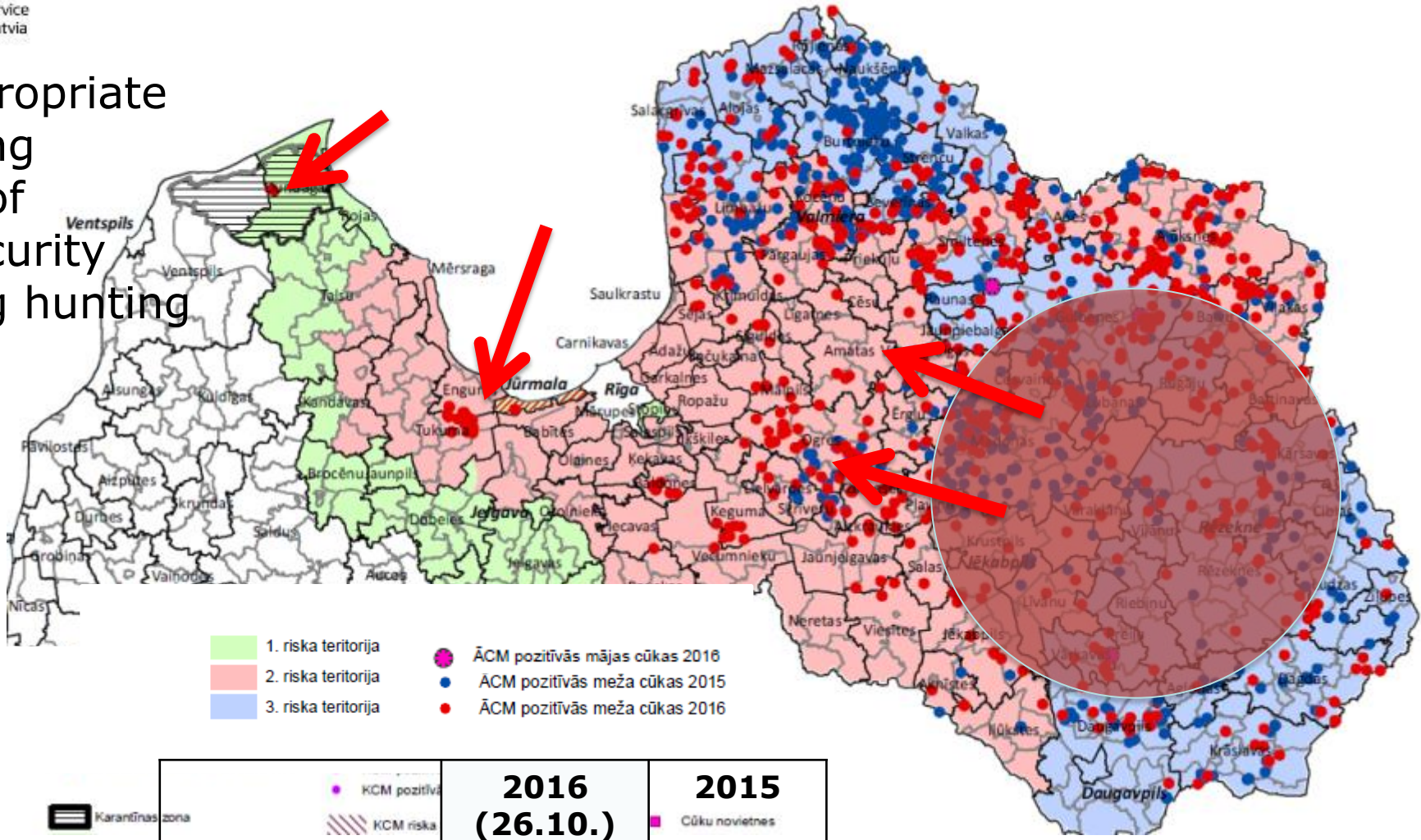
LACK OF BIOSECURITY DURING HUNTING


DIRTY AREA

Food and Veterinary Service Republic of Latvia

ASF in wild boar (26.10.2016.)

Inappropriate hunting
Lack of biosecurity during hunting



Karantīnas zona / ĀCM pozitīvā / ĀCM riska	2016 (26.10.)	2015 Cūku novietnes
Cases	**893**	**1048**
Hunted	**447**	**422**
Found dead	**446**	**626**

Carcasses removal and wild boar density

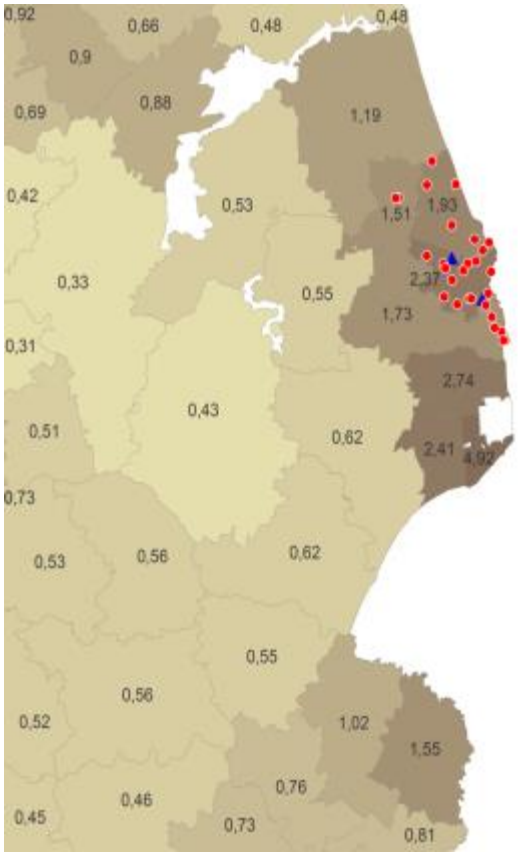

How many
wild boars?

Density dependent spread

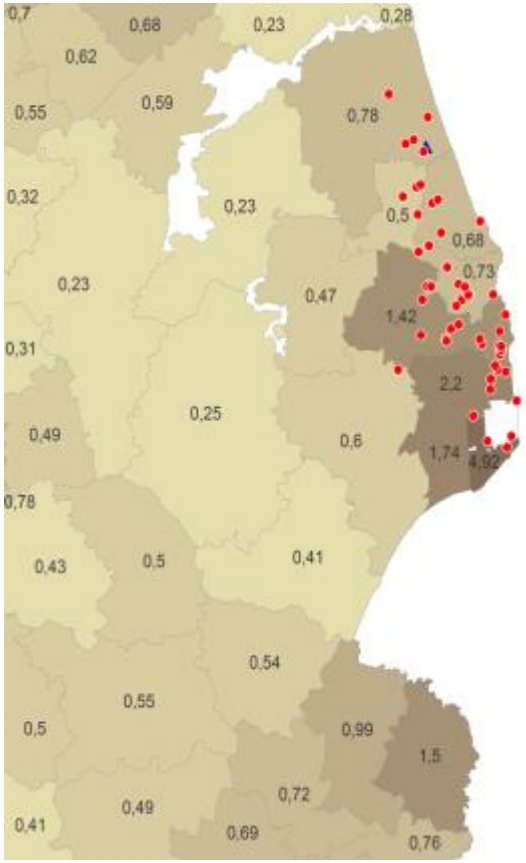
The number of NEW INFECTED wild boar is proportional to the wild boar population size

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

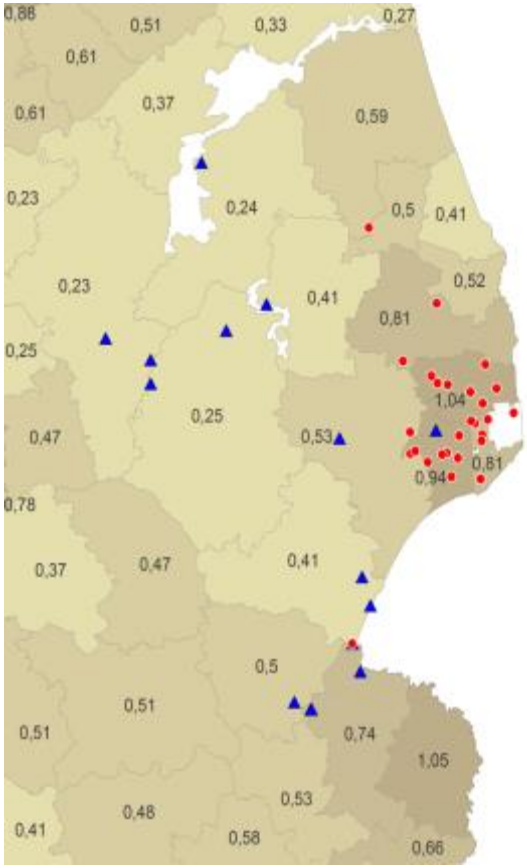
Poland: tendency to spread within areas with wild boar density > 1 individual/km^2



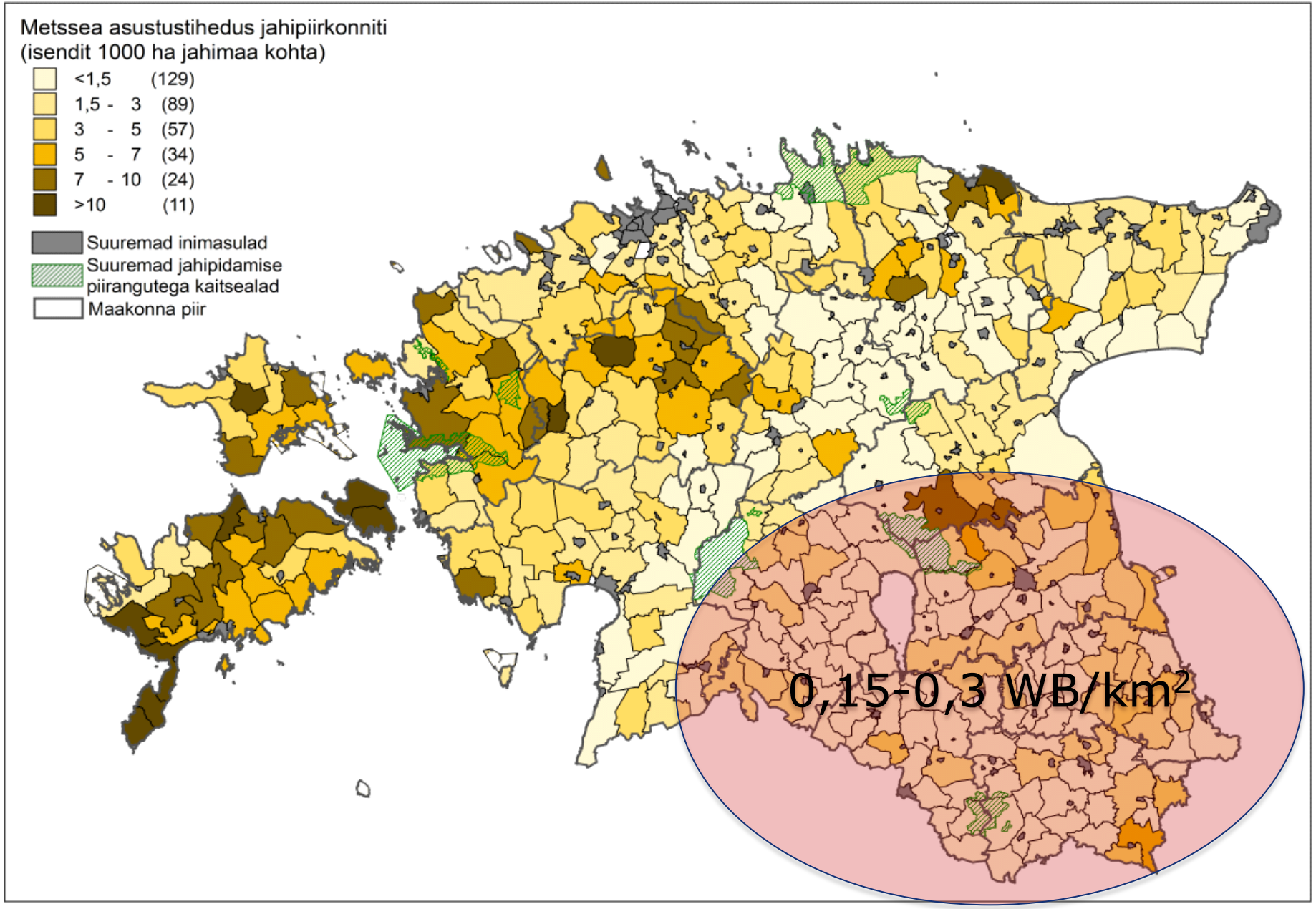
2014 – 30 cases



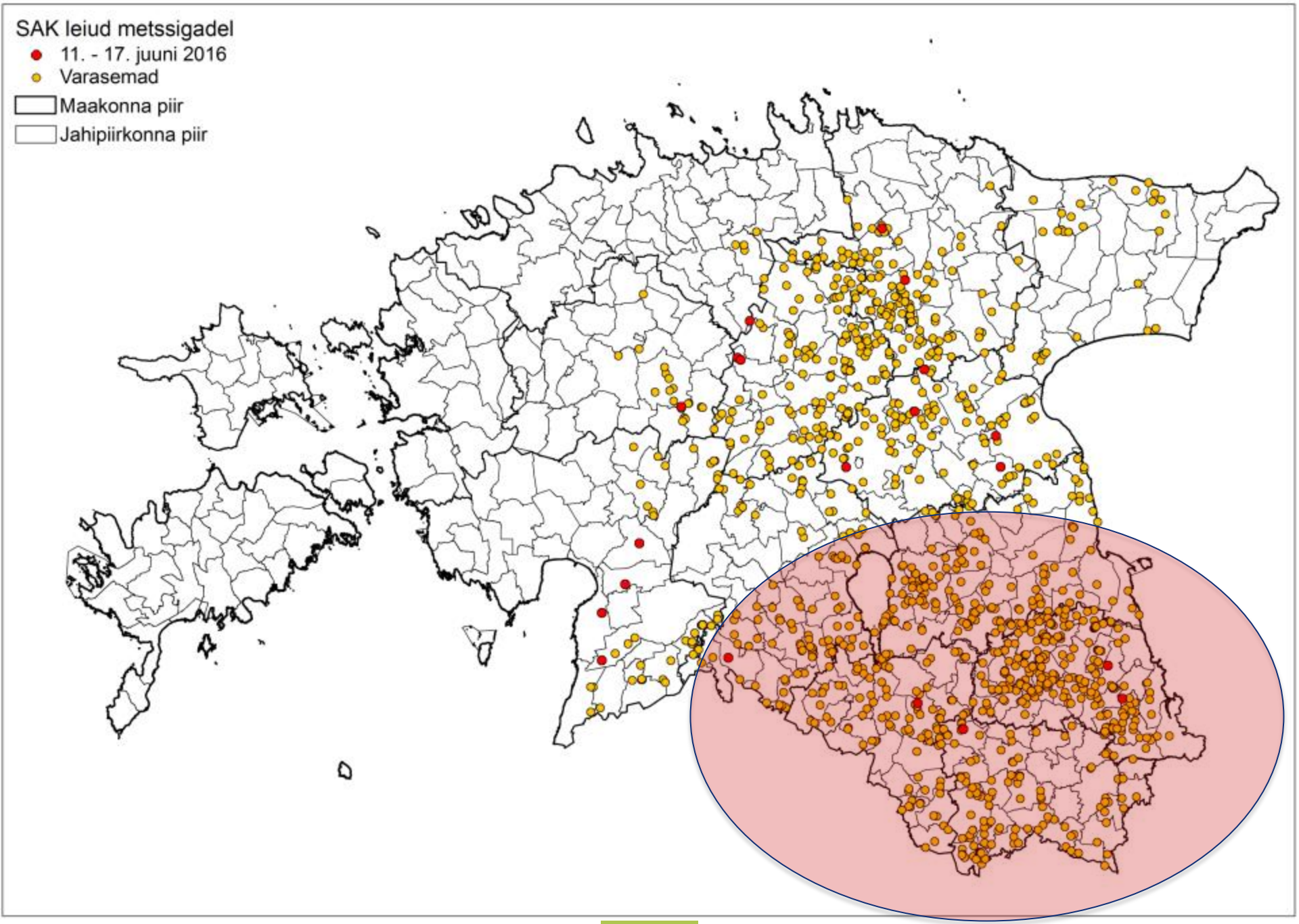
2015 – 53 cases



2016 – 28 cases



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 (nt) 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

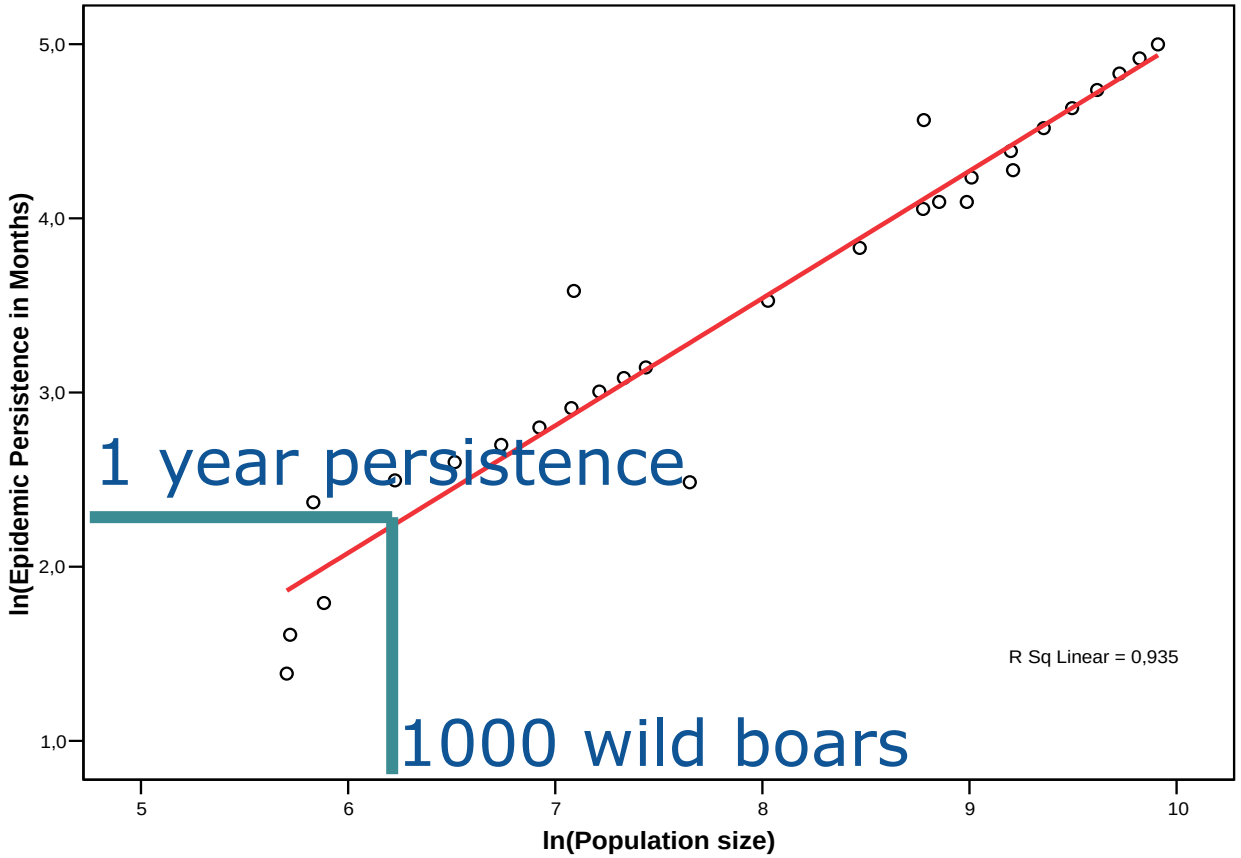
Duration of infectiousness

Density/availability of susceptible hosts

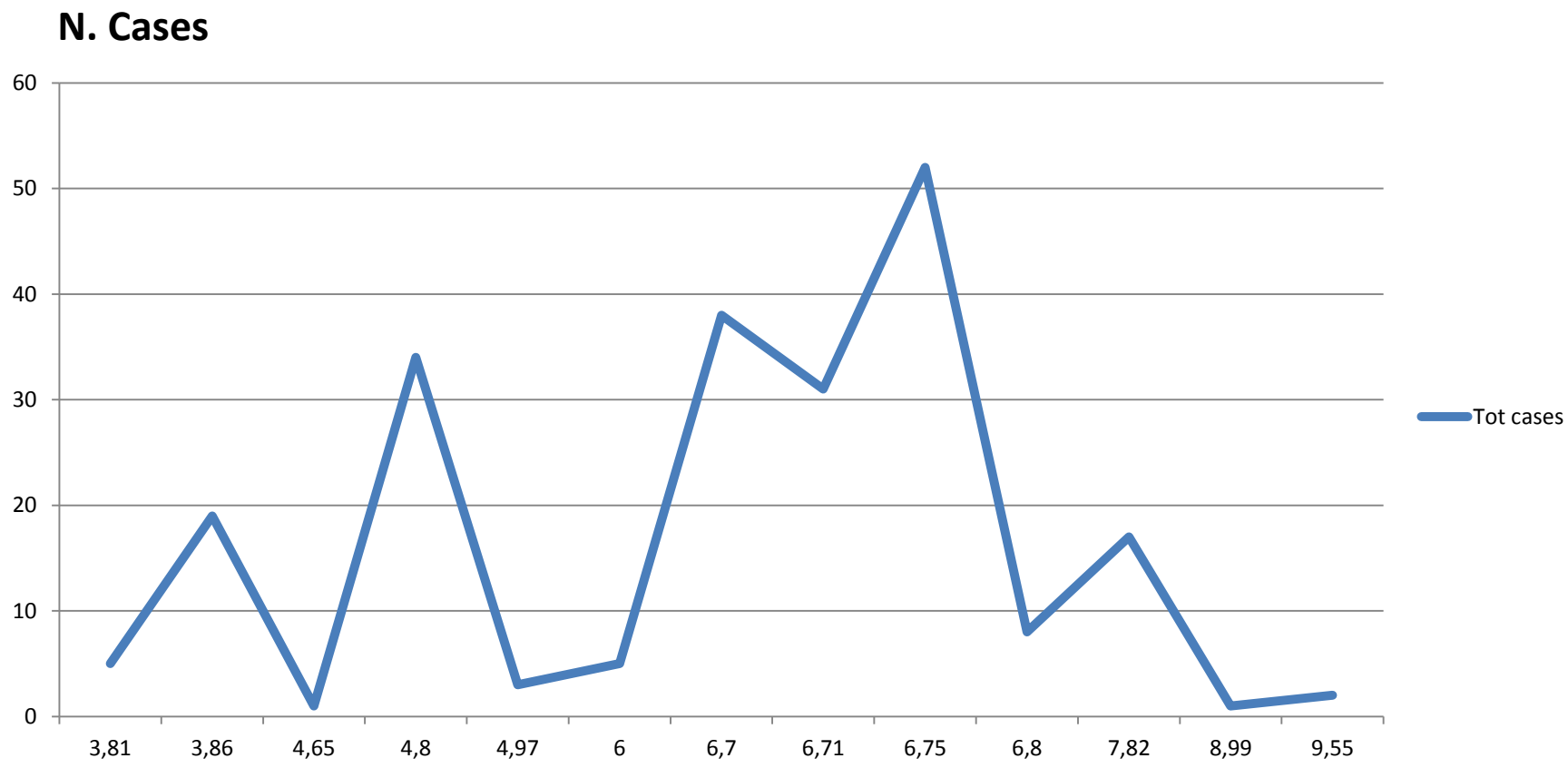
If the wild boar population size is decreased till a certain density, the infection fade out through a density dependent mechanism

NO WILD BOARS = NO DISEASE

CLASSICAL SWINE FEVER in WILD BOAR



Apparently: not a density dependent spread



WB density

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

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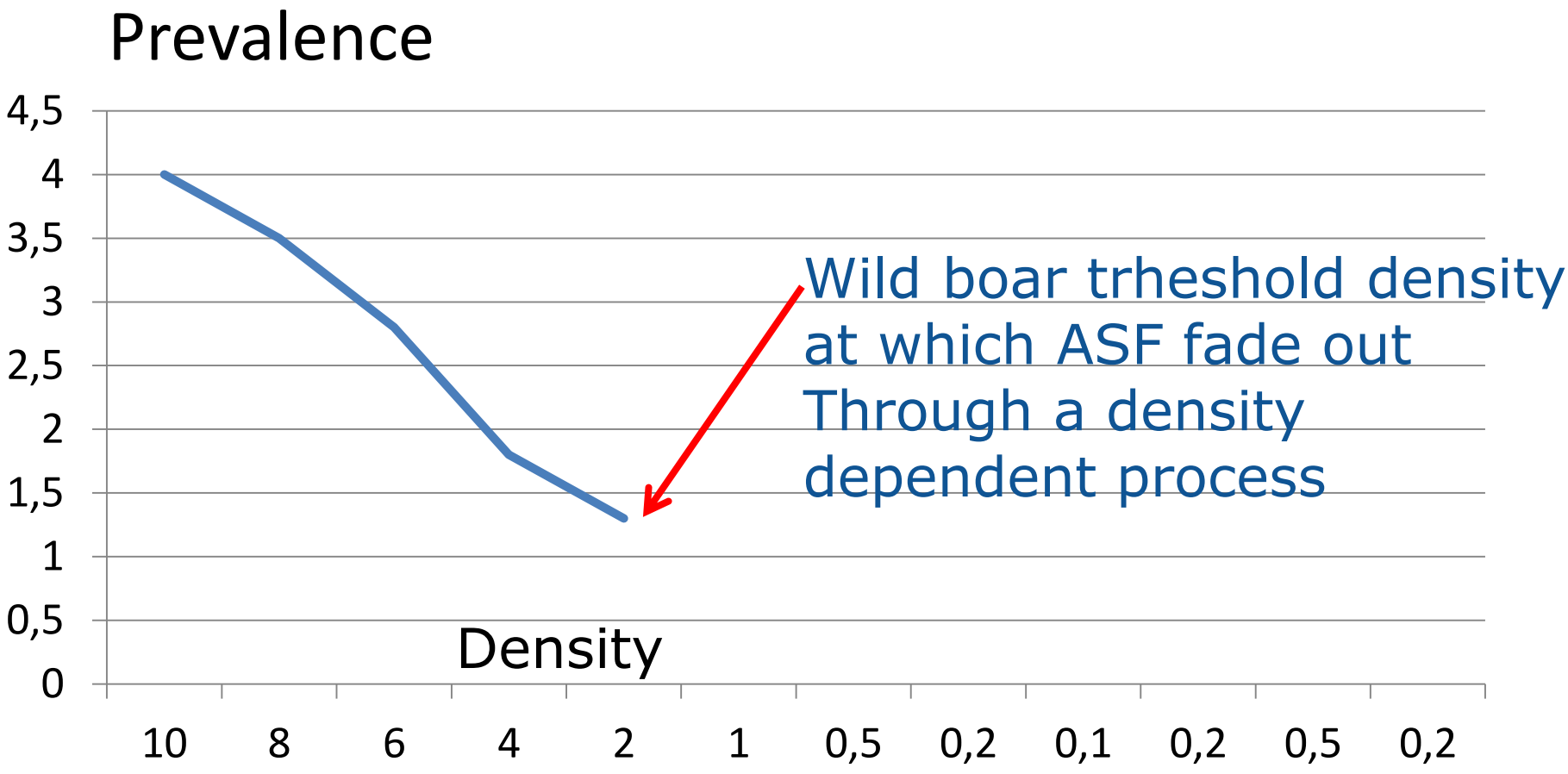
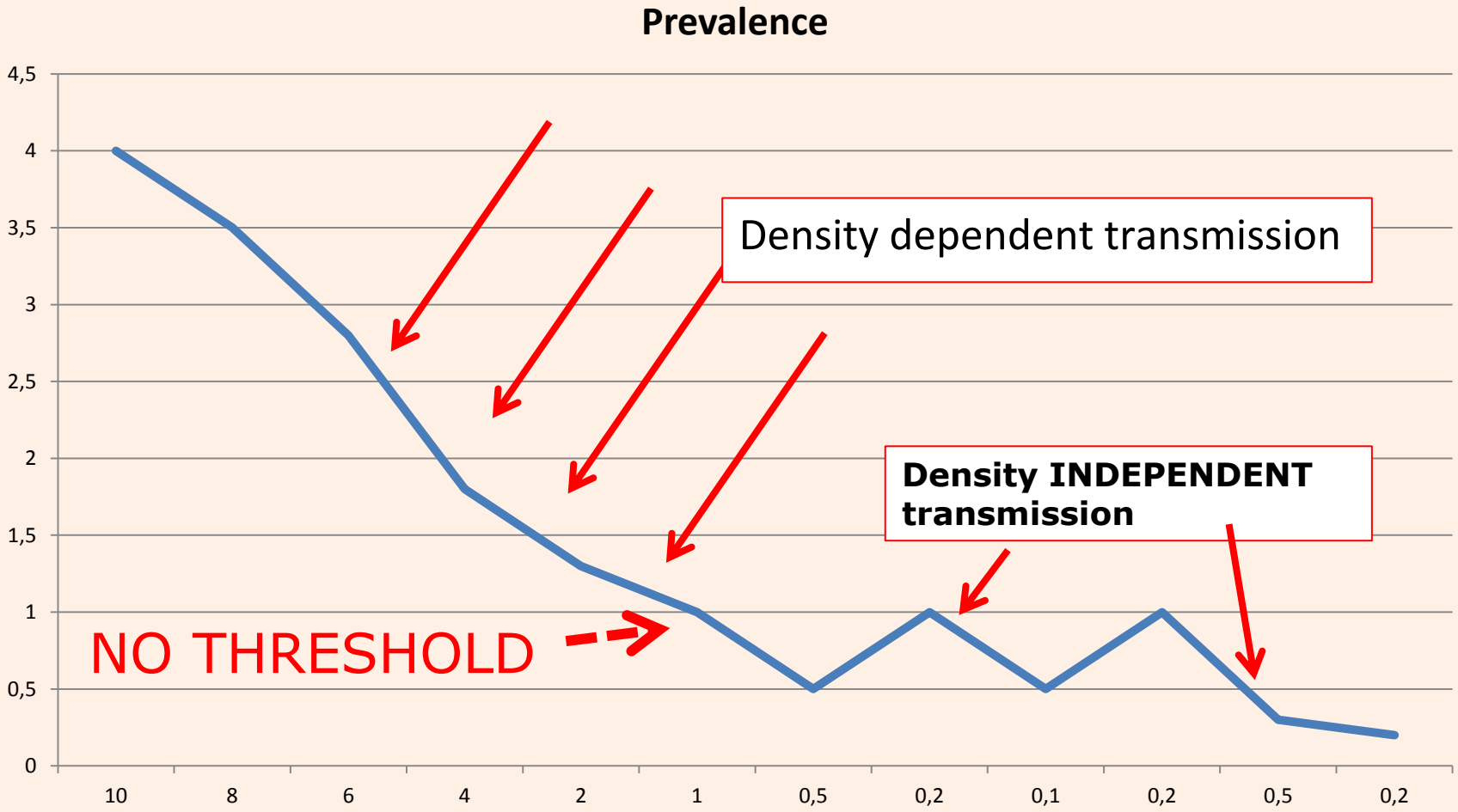
An ASF virus will overwinter in a infected carcass……3-4 months…and the virus will appear again during the late spring in alive susceptible individuals

CSF: a density dependent disease



ASF in 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.

European Commission

Thanks for the attention

Questions, comments?

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Food safety