

## FMD in Wildlife

**Welcome! We will begin at 14.00 CEST**

Before the webinar begins, you can check that your sound is working by selecting 'Meeting' and 'Audio Setup Wizard'.

If you have any problems, please use the chat box to ask for our help. You can also say hello to your fellow participants using this box.





## Agenda for today

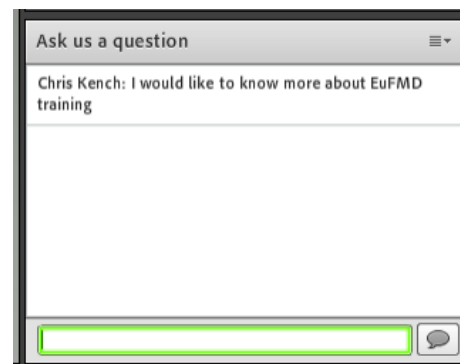
- Introductions;
- First presentation:  
FMD susceptible species in wildlife in Europe and clinical signs, Sampling methods in wildlife;  
Questions and answers session;
- Second presentation:  
Hunting and biosecurity;  
Questions and answers session.

**\*\*We will be recording the webinar\*\***



## Introduction to the webinar screen

The chat box will be here for your questions





# FMD susceptible wildlife species in Europe & Clinical signs



Tsviatko Alexandrov, Keith Sumption & Sergei Khomenko



# FMD and wildlife

- ✓ Short lived period of infectivity (hit and run agent): to circulate needs supply of naive contact groups – OR persistence in environment (e.g carcasses)
- ✓ Domestic and wild pigs easily infected by oral route and shed very large quantities of virus
- ✓ WIDE Range of wildlife species can be infected (ruminants mainly by aerosols)
- ✓ Wildlife might acquire from domestic animals /carcasses of dead wildlife (gazelle-wild boar cycle Israel)
- ✓ Even a single small outbreak in Europe is extremely damaging (100 m €+, to countries if involved in extensive trade).



# FMD susceptible European wildlife



FMD affects all wild cloven-hoof animals. The susceptible European wildlife with high importance include wild boar (*Sus scrofa*), roe deer (*Capreolus capreolus*), red deer (*Cervus elaphus*), (*Dama dama*), mouflons (*Ovis orientalis*), wild goats (*Rupicapra rupicapra*; *Rupicapra ibex*) and others.



# Population size in Europe

*Spring (post harvest) census data*

**Wild Boar – 4,500,000**

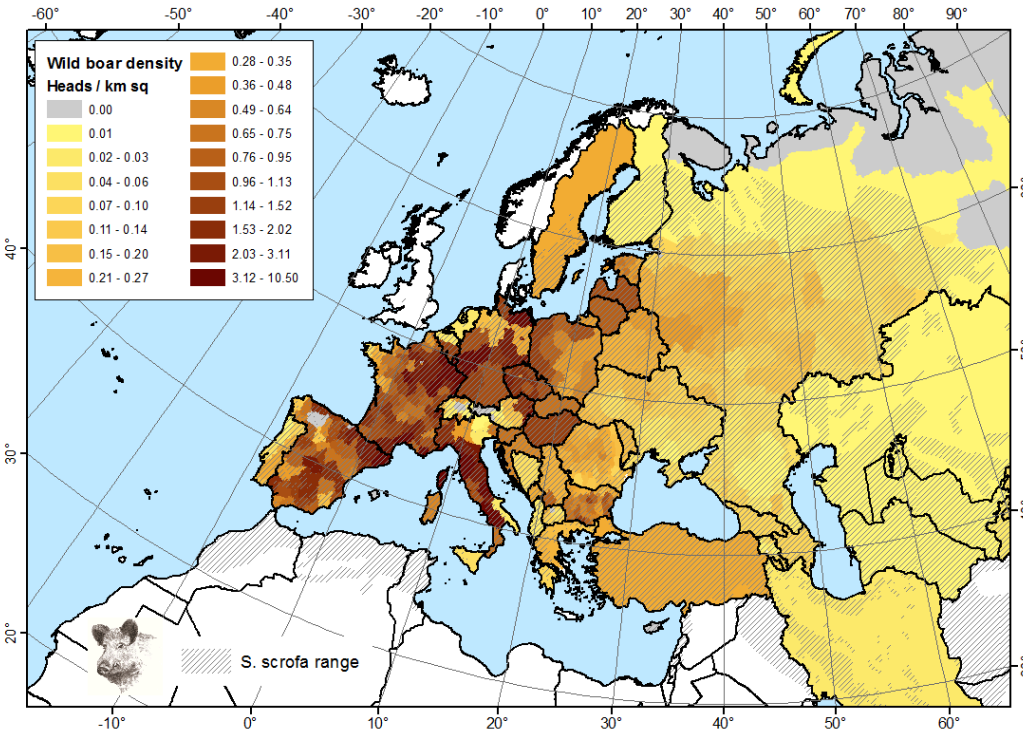
(Putman, 2011; EMPRES data);

**Roe Deer – 9,500,000**

(Burbaité & Csanyi, 2009);

**Red Deer – 1,700,000**

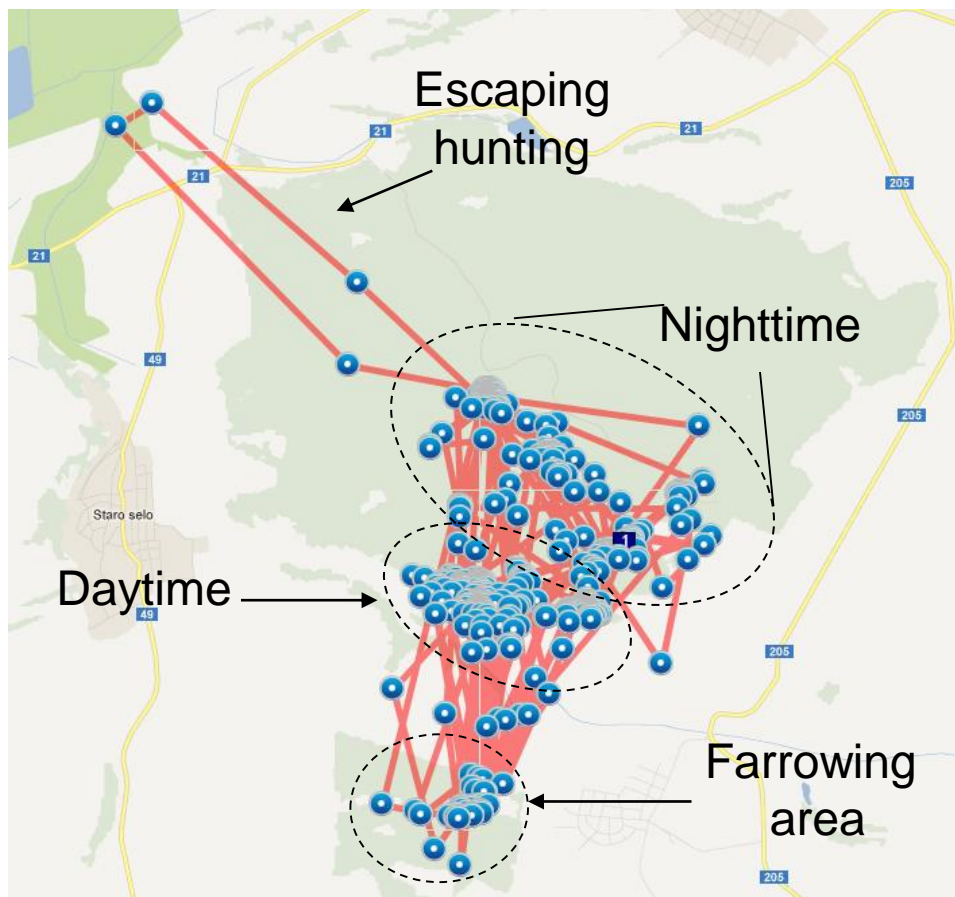
(Burbaité & Csanyi, 2010)•



# 20 – 22 million FMD susceptible ungulates after reproduction



## One hour resolution movements of a tracked wild boar sow in Bulgaria



WB normally very small home ranges (4 - 20 km<sup>2</sup>);

Very boring schedules 😊

Disrupted by only food availability or disturbance

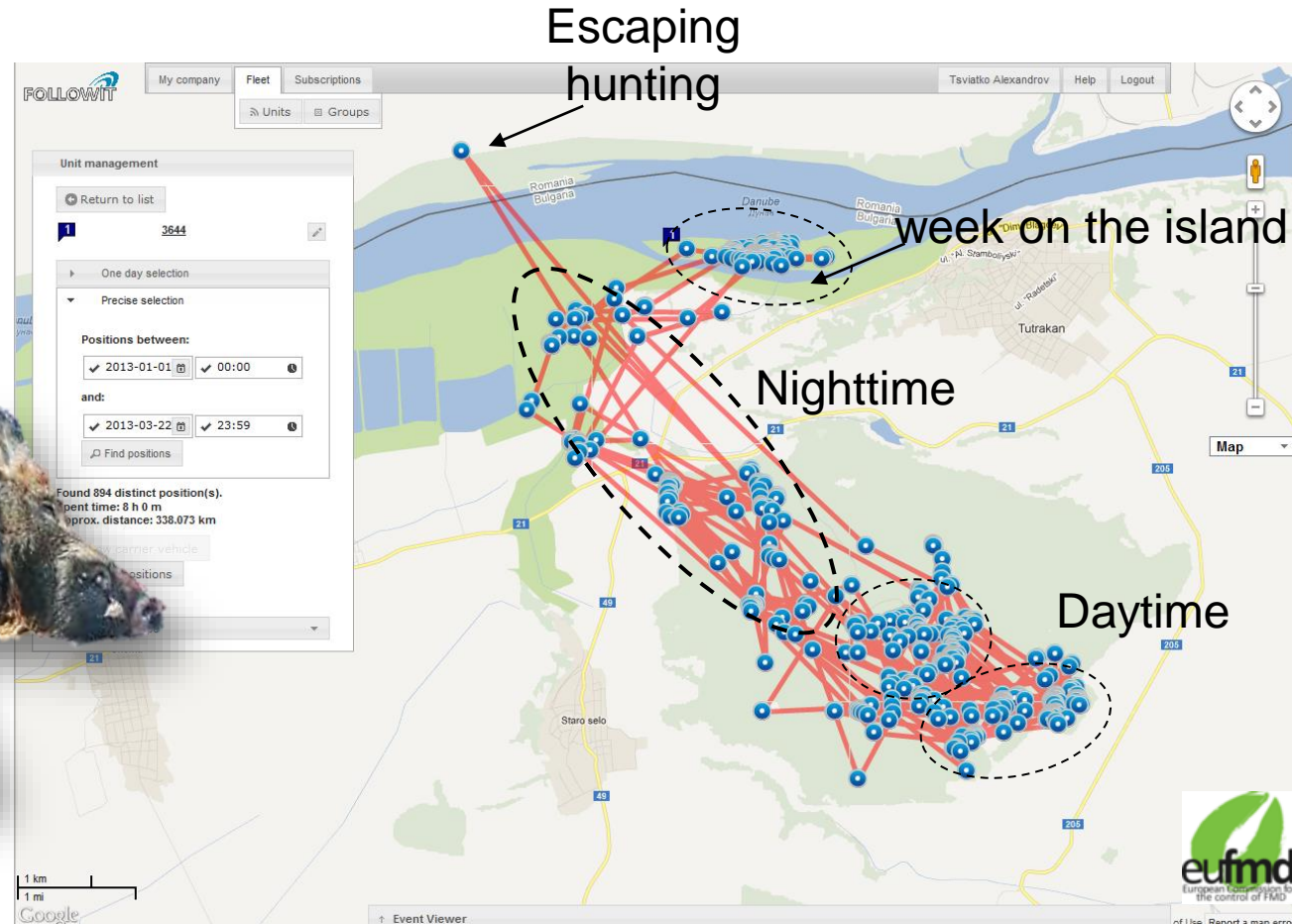


## One hour resolution movements of a tracked 4 years old wild boar male in Bulgaria

Peace time, hunting,....rivers.....

1 Jan - 22 March

- 894 positions
- a total of 338 km
- Crossed Danube into Romania one occasion



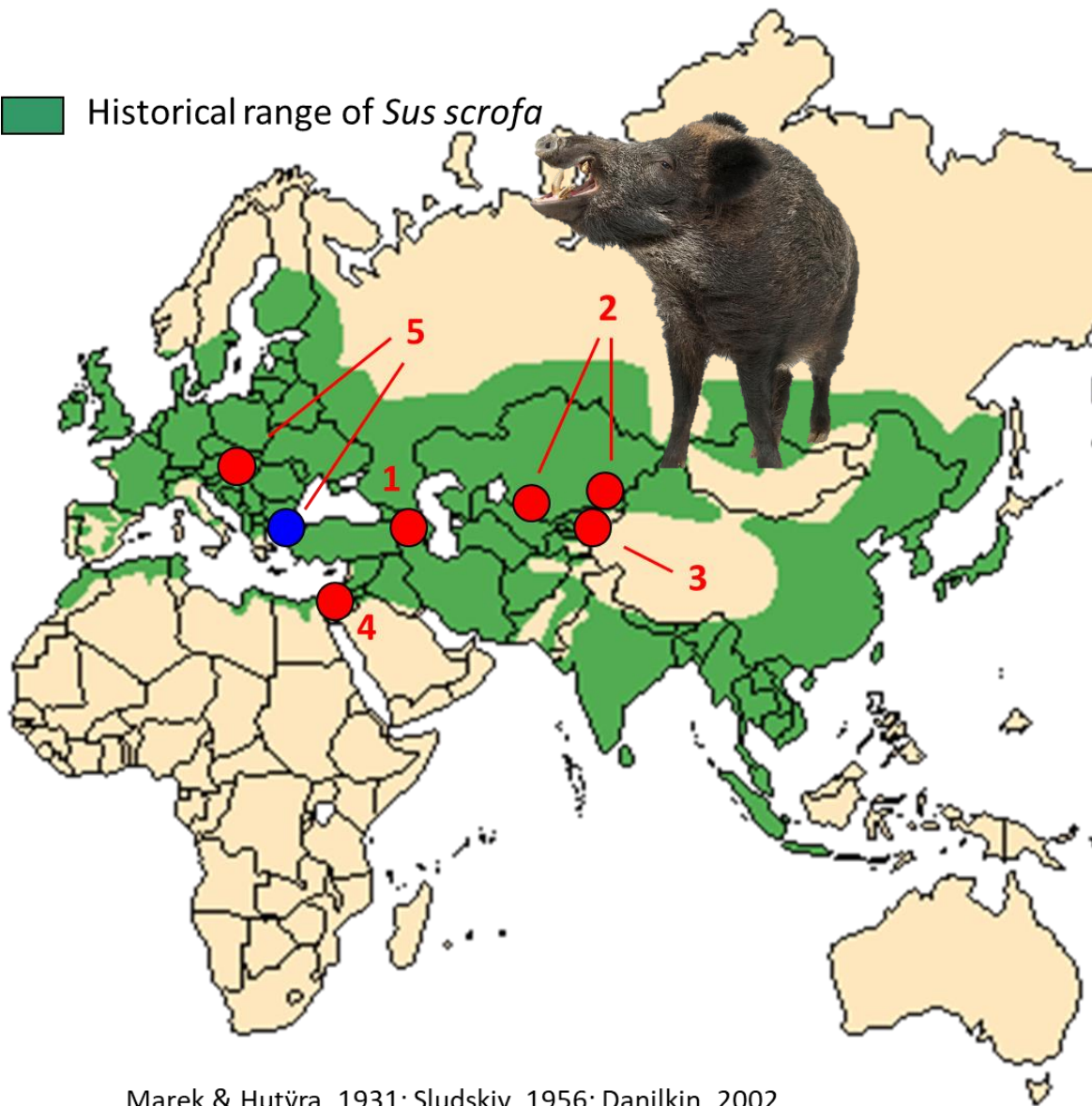


## When chased.....





Historical range of *Sus scrofa*



## FMD in wild boar:

<u>1. Caucasus</u>	1902 1908 1911 1917 1919 1925
<u>2. Kazakhstan</u>	1927 1931 1941
<u>3. Kyrgyzstan</u>	1953
<u>4. Israel</u>	1987- 1999 2007
<u>5. Europe</u>	1920s? <b>2011</b>

Marek & Hutýra, 1931; Sludskiy, 1956; Danilkin, 2002



## Foot-and-Mouth Disease epidemics in 2011 and the silence of wild boar

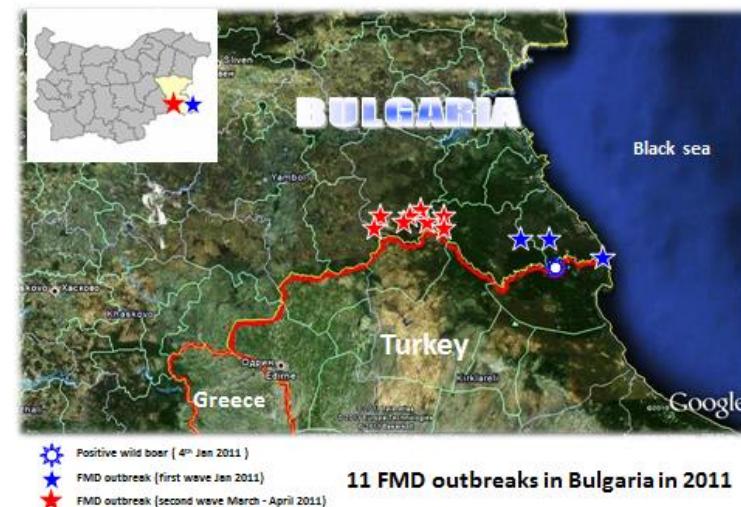
FMD - the most highly contagious disease and economically important disease in domestic and wild ruminants and pigs

Until 2011

- No evidence of wildlife involvement in the recent major epidemics in Europe 1920s-2007
- It was assumed wildlife will have limited role in domestic FMD outbreaks (spillovers of limited consequence)

### However..... !!!! FMD in Bulgaria - 2011

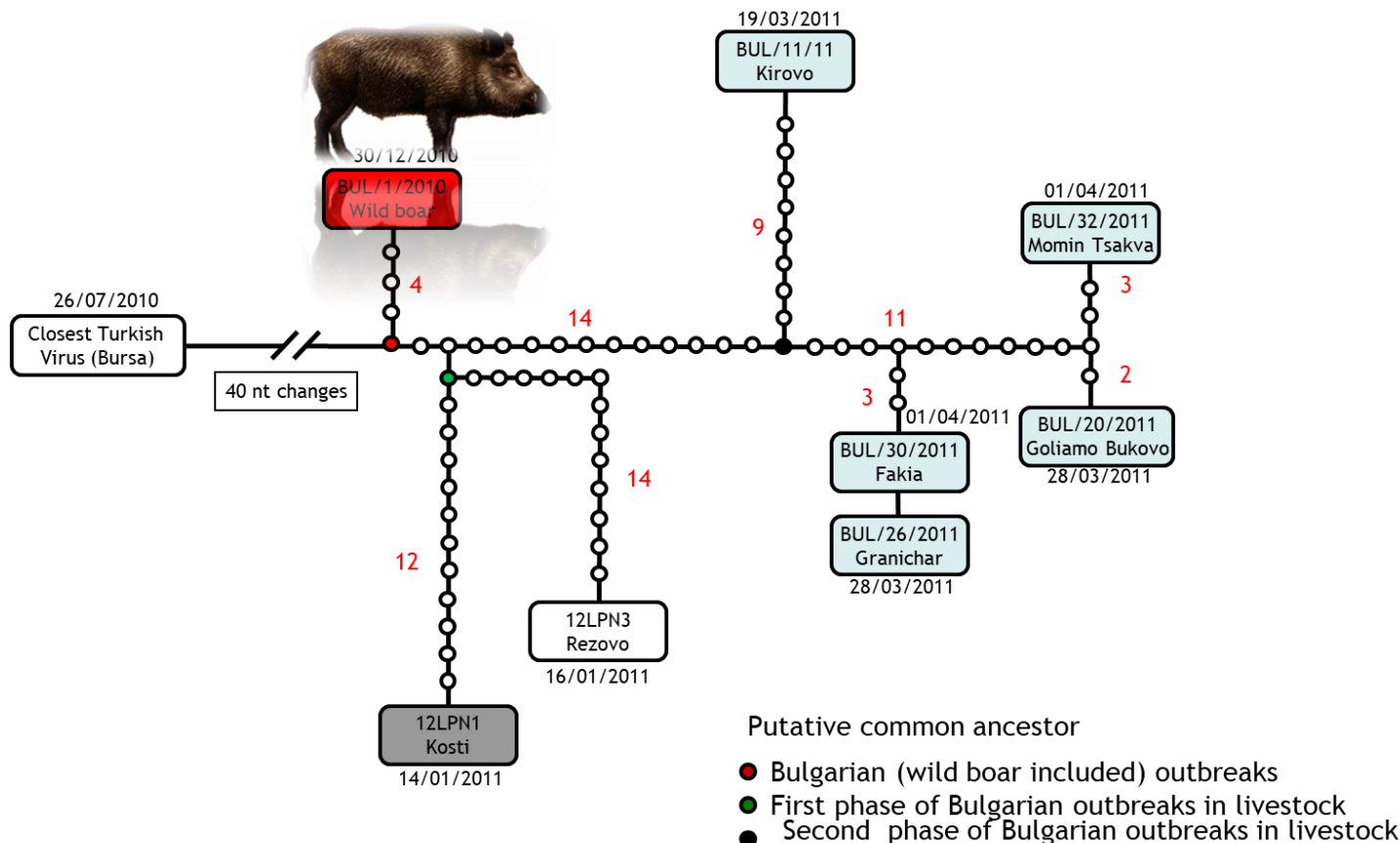
- ✓ Detected first in hunted wild boar
- ✓ Lesions in wild boar detected by hunters and reported
- ✓ **11 villages affected**
- ✓ Free status lost and ban for trade for year and a half



## Wild boar – victim or to be blamed?

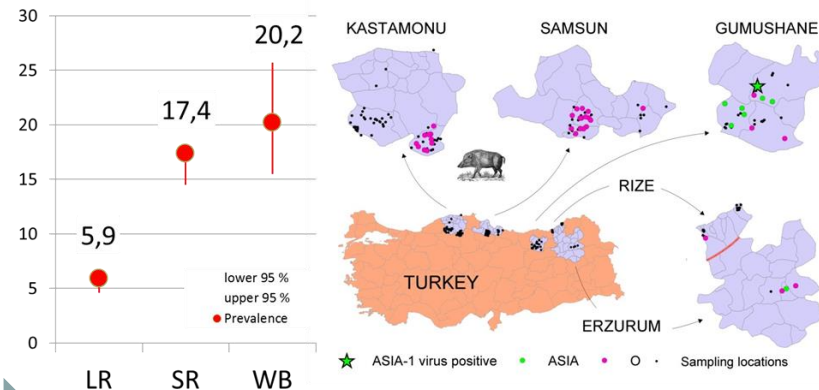
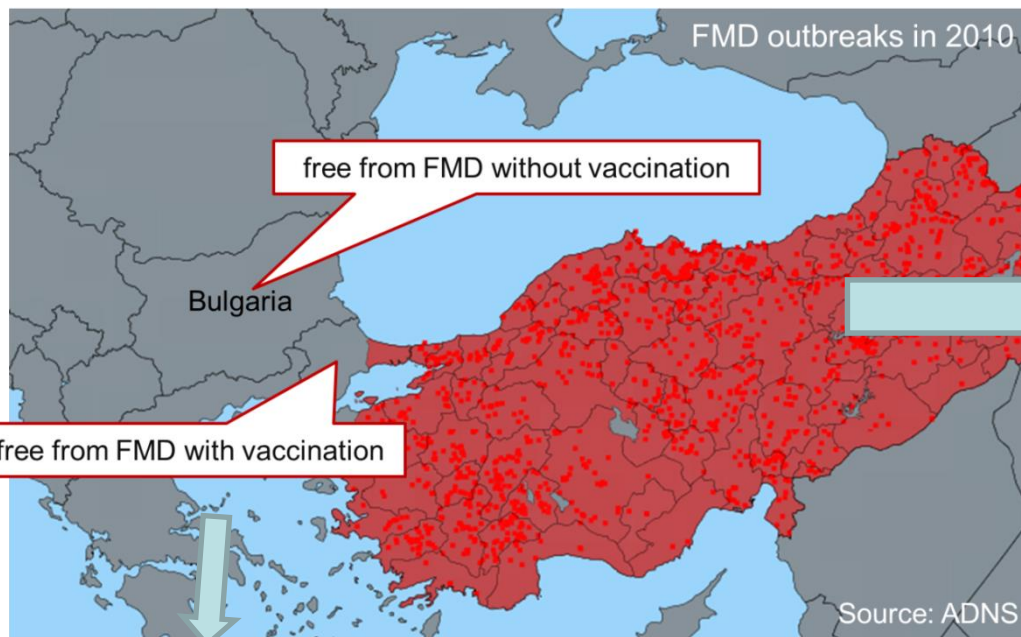
FMD virus genome sequencing: evidence for undetected transmissions – did these occur in wild life?

*Credit: Begoña Valdazo-Gonzalez, Nick J. Knowles, Donald P. King*





# Free without Vs Free with vaccination Vs Endemic



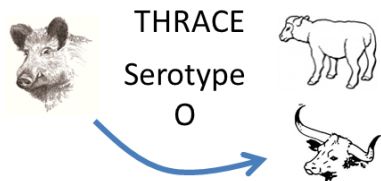
Region	n	% NSP+ (95 % CI)	% ASIA +	% O +
ERZURUM	17	<b>52.9</b> (27.8 - 77.0)	11.8	41.2
SAMSUN	73	<b>28.8</b> (18.8 - 40.6)		28.8
GÜMÜŞHANE	58	<b>17.2</b> (8.6 - 29.4)	12.1*	5.2
KASTAMONU	76	<b>13.2</b> (6.5 - 22.9)		13.2
RİZE	21	<b>4.8</b> (0.1 - 23.8)		4.8
TOTAL	252	20.2 (15.5 - 25.7)	3.6	16.7

NO SEROTYPE "A" FOUND, but "O" and "Asia-1" were found in exactly the same proportion as in livestock

Age groups	Total sampled, n	Ab positive, n	Prevalence (95 % CI), %
<b>Bulgarian Thrace (Free without vaccination):</b>			
Adults	538	51	9.5
Juveniles	257	4	1.6
Age unknown	17	1	5.9
Total	812	56	6.9
<b>Turkish Thrace (Free with vaccination):</b>			
Adults	46	11	23.9
Juveniles	52	16	30.8
Total	98	27	27.6

## Surveillance in wild boar for FMD 2011-2012

No virus detected in Thrace!



- Closely related isolates from cattle

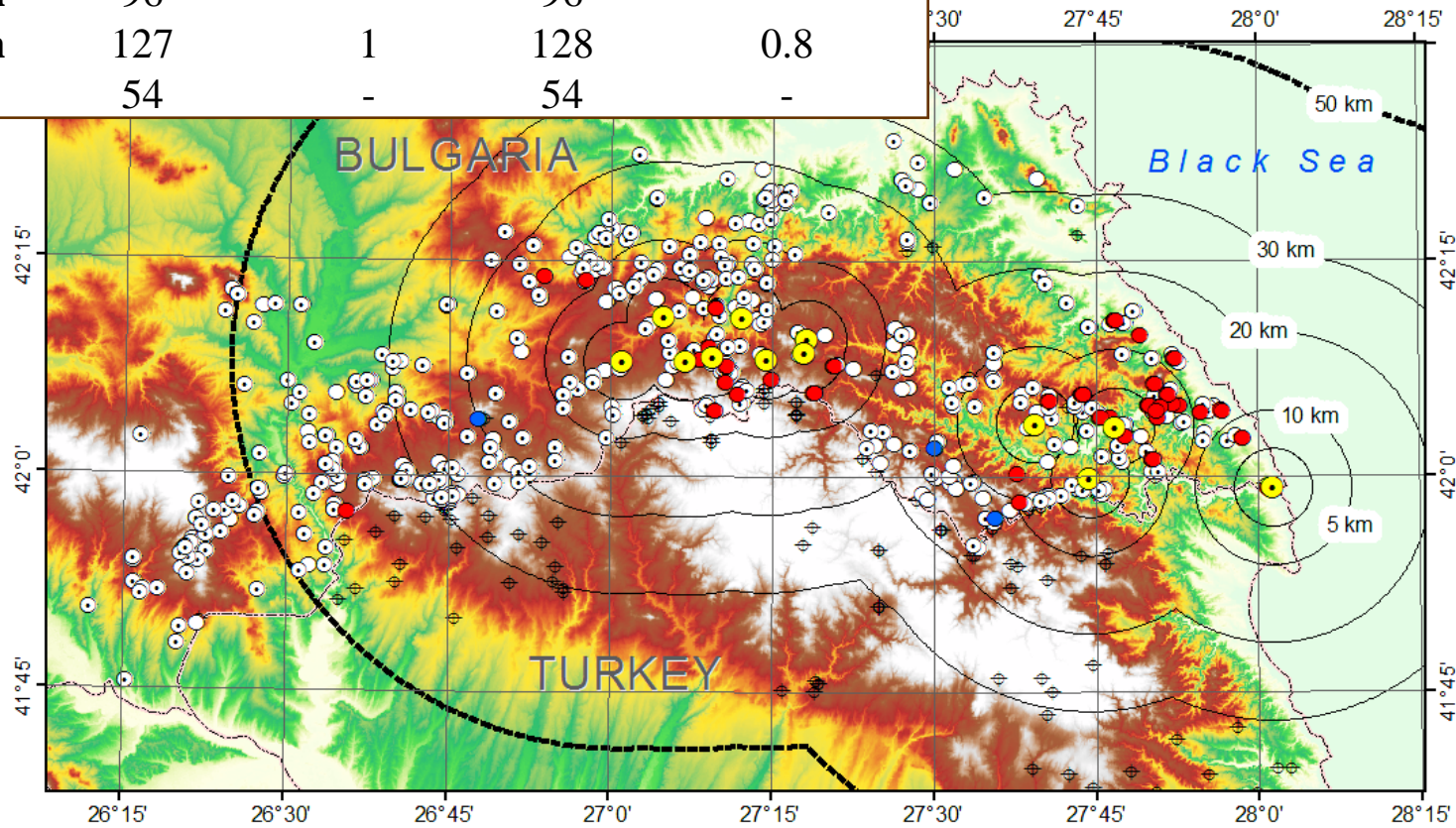
- Isolates from wild boar

- Wild boar and livestock can easily exchange FMD viruses (sharing habitats, scavenging, Kurban, hunting);
- Infection in WB correlates with disease occurrence in livestock
- Spillovers may develop into localised epidemics..... however...**even rather localised FMD spread through wild boar population has a potential to introduce the virus to a previously unaffected area and deliver it to immunologically naive domestic animals, either through direct, or indirect wildlife-livestock interactions, or by hunting infected wild animals.**



## Surveillance in wild boar for FMD in Bulgaria, 2011-2012

ZONE	Negative, n	Positive, n	Total, n	Prevalence, %
0 – 5 km	149	16	165	9.7
6 – 10 km	134	27	161	16.8
11 – 20 km	195	12	208	5.8
21 – 30 km	96	-	96	-
31 – 50 km	127	1	128	0.8
> 50 km	54	-	54	-



**Wild boar**  
**ELISA by age group**

- Negative, JUVENILE
- Positive, ADULT
- ⊙ Negative, ADULT
- Positive, JUVENILE

- Negative, JUVENILE
- Positive, ADULT
- Positive, JUVENILE

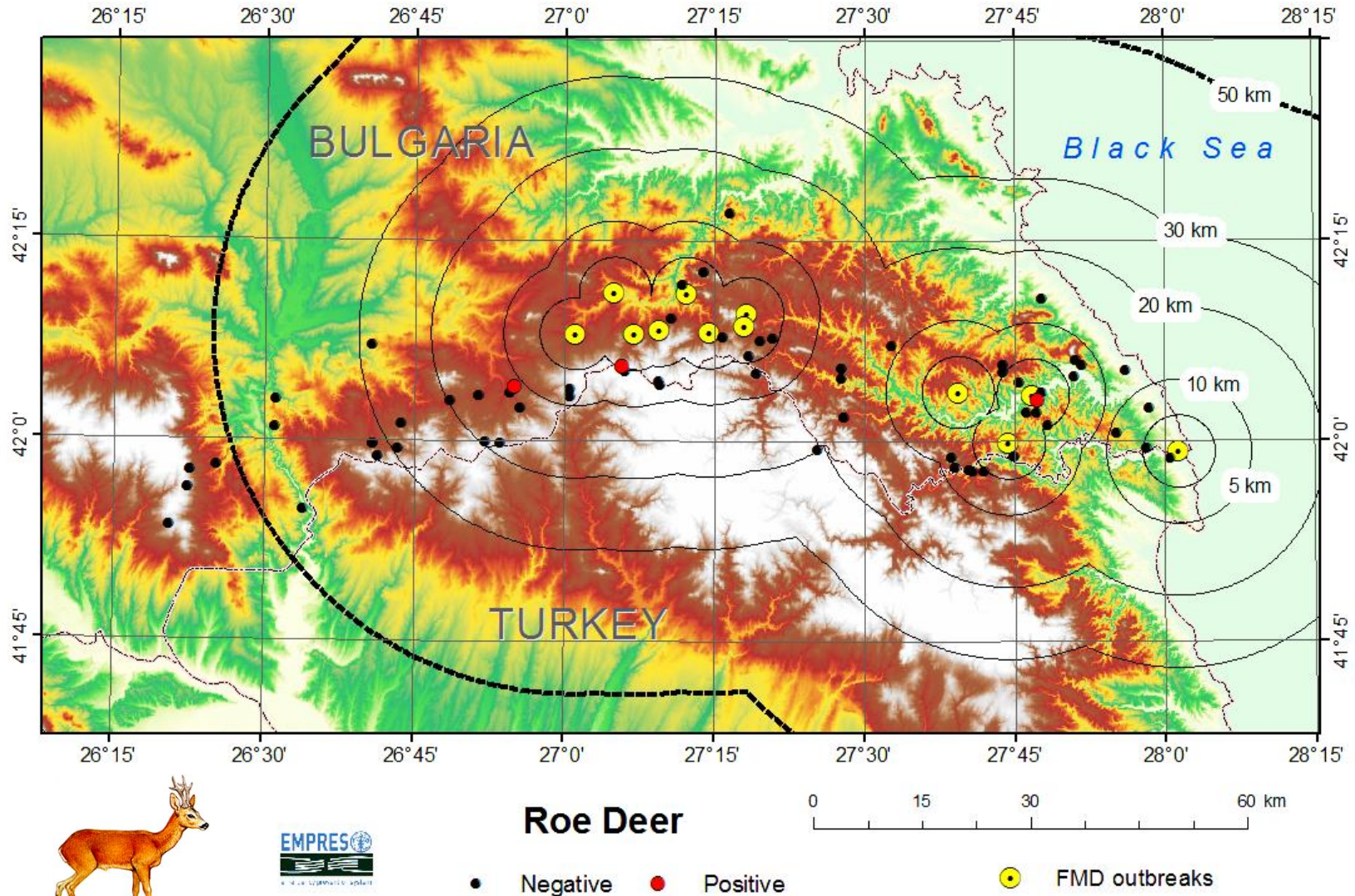


- ⊙ Wild boar in Turkey (ND)
- FMD outbreaks





## FMD surveillance in wild ruminants (Feb 2011 –Jan 2012)



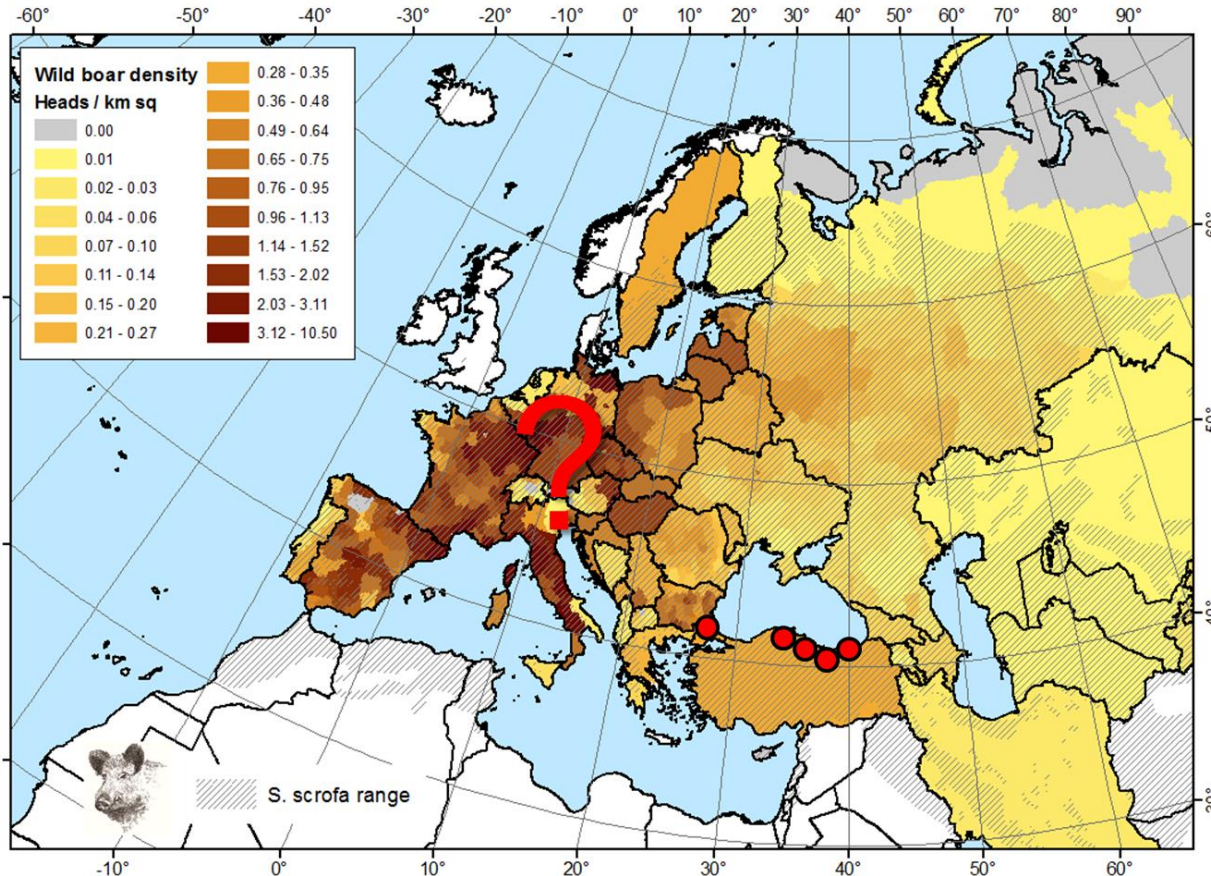
All sero-positive roe deer (n = 3) were adults shot in June near the FMD outbreaks in livestock (~ 5-12 km).

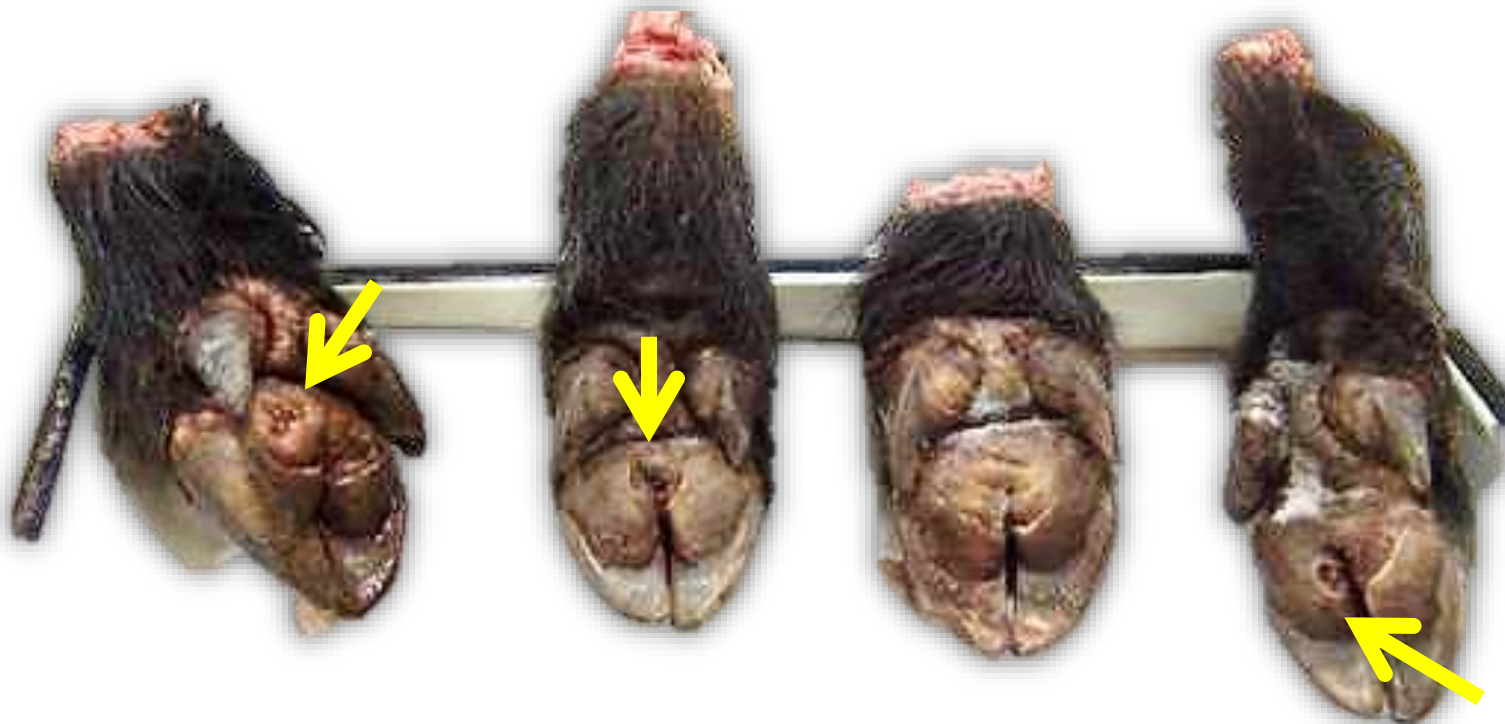
In the case of Bulgaria the FMD spread in wild boar:

- was just in a limited ecosystem, with good control on the BG side and full vaccination on the Turkish side
- had died away in approx. half a year ...

## However:

- Reinstatement of the free status of Bulgaria - one year and five months after the last outbreak
- Would it be the same scenario if FMDV gets elsewhere in area with much higher population density?
- What would be the consequences...?
- (ASF, CSF in wild boar affect trade with live pigs and products thereof)
- FMD in wild boar affects trade with live ruminants and pigs and products thereof)

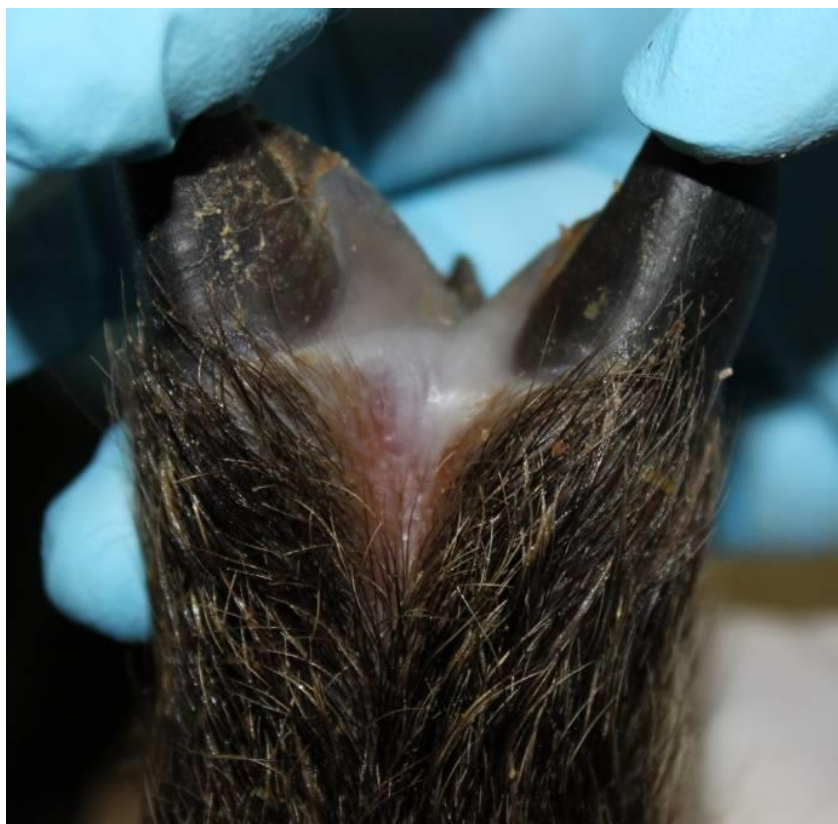




Can we recognize FMD in wildlife?



Breithaupt, A., et al., Experimental infection of wild boar and domestic pigs with a Foot and mouth disease virus strain detected in the southeast of Bulgaria in December of 2010. *Vet. Microbiol.* (2012), doi:10.1016/j.vetmic.2012.03.021





## 5 DPI

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**FLI**

Bundesforschungsinstitut für Tiergesundheit  
Federal Research Institute for Animal Health



# 8 DPI





## 8 DPI







10 - 14 DPI



28 DPI









- The FMD surveillance, prevention, control and eradication measures (Contingency plans) have to account for possible wild boar involvement and its likely contribution to FMD transmission cycle and spread.
- Such sylvatic FMD epidemics should be of particular concern on the borders between countries or regions with different FMD status or control strategies (e.g. FMD free, free with vaccination, vaccination applied, FMD endemic) **but also in areas with high density of susceptible wildlife.**
- In order to anticipate future risks of FMD introductions in such areas regular seasonal surveillance in wildlife populations is recommended aiming early detection and/or confidence of disease freedom.
- Disease control strategies should also target **strong awareness** and **biosecurity** during hunting practices.



# Sampling methods in wildlife for testing for FMD

Tsviatko Alexandrov, Keith Sumption & Sergei Khomenko



# Hunting for disease surveillance in wildlife

## Quality samples

Excellent examination of the carcass and internal organs for lesions of infectious diseases

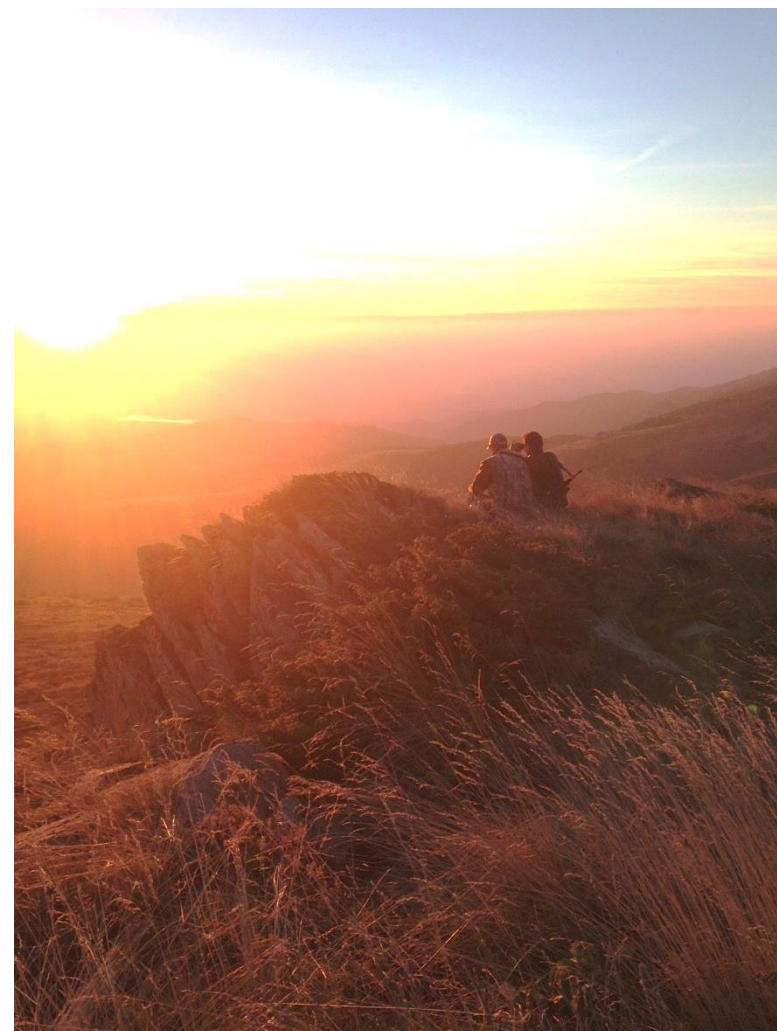
## However

time consuming

needs human and financial resources

hunting pressure may lead to spread of infection

hunters and biosecurity.....





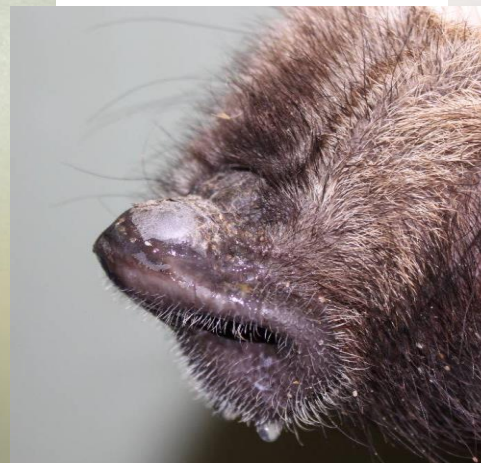
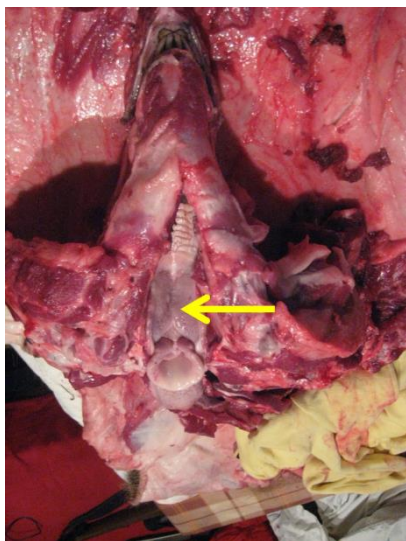


# Samples from hunted or found dead wild animals

*“Once you pull the trigger, the fun stops and the work begins”*

Samples should be taken after instruction from the competent veterinary authority.  
Appropriate samples for FMD are **blood**, all kind of **vesicles** and their fluid, lesions as well as tonsils.

Samples should be identified and properly packaged (crucial to avoid any contamination of the environment during transportation to laboratory).





**10 individuals**



A salt lick >

<< Wild boar  
feeding sites

A red deer  
feeding site



**26 individuals**



**17 individuals**





**Due to advances in diagnostic methods  
pathogens can be detected in oral fluids;  
Tested on farmed pigs (ropes) and wild boar;  
Saliva can be collected without catching or  
killing of animals.**

- 1. Early pathogen detection rather than prevalence study;**
  - 2. Repeated frequent sampling possible;**
  - 3. Applicable where/when hunting is not possible/eligible;**
  - 4. Easy to incorporate into existing wildlife management practices;**
  - 5. Multi-species coverage (ruminants);**
  - 6. Cost effective and logistically simple.**





- ❖ Clinical signs on the 4 DPI (domestic 2 DPI) – e.g. incubation 4 days;
- ❖ Most severe and evident lesions – 7 DPI;
- ❖ Viraemia: 1 DPI through at least 9 DPI;
- ❖ NSP antibodies detected 7-8 DPI;
- ❖ RNA in saliva normally found up to 14 DPI and up to DPI 24 DPI intermittently.

(a–e) Lesions after FMDV type O infection of wild boar. Vesicles on the dorsum of the snout (a) and the interdigital space (b), 4 DPI. Ruptured vesicles on the heel 8 DPI (c) and 28 DPI (d). Serofibrinous infilling in the interdigital space, 8 DPI (e). Claw deformation after coronary band lesions, 28 DPI (f).

Breithaupt, A., et al., Experimental infection of wild boar and domestic pigs with a Foot and mouth disease virus strain detected in the southeast of Bulgaria in December of 2010. *Vet. Microbiol.* (2012), doi:10.1016/j.vetmic.2012.03.021





## Non-invasive surveillance

**Aims at detecting virus in saliva by PCR; Targets epi-unit (all animals attending a feeding site);  
As frequent as needed;**



Chichikin et al, 2012

# Bait designs tested



1. Maize cobs with  
6 swabs (5)

2. CSF vaccine bait  
with swabs inside (3)

3. CSF vaccine bait  
inside plastic tubes  
wrapped in cotton rope  
(1)

4. CSF vaccine bait  
wrapped in cotton  
material (2)

5-6. Swabs drilled  
into a block of salt

<http://www.youtube.com/watch?v=oLkgePZfReg>

Khomenko, et al, 2013



## Bait performance

Saliva contaminated swabs



Bait types	Exposed, bait/nights	Bait uptake		Bait uptake by target species		Baits recovered with swabs	
		n	%	n	%	n	%
1. Maize cobs	125	62	<b>49.6</b>	56	<b>44.8</b>	47	<b>37.6</b>
2. Vaccine bait	77	52	<b>67.5</b>	25	<b>32.5</b>	16	<b>20.8</b>
3. Salt licks	8	1	<b>12.5</b>	1	<b>12.5</b>	1	<b>12.5</b>
<b>Total</b>	<b>210</b>	<b>115</b>	<b>55</b>	<b>82</b>	<b>39</b>	<b>64</b>	<b>31</b>



## PCR tests of swabs in maize cobs, consumed by domestic pigs (Experiment performed in Nepal by Vesna Milicevic)

1	Pan 1	7 days sick, 5 pigs, all ill, AgELISA pos	Pos
2		Saliva from piglet with lesions, AgELISA pos	Pos
3	Pan 2	5 days old lesions, 1 sow, 40°C	Neg
4	Pan 3	20 days old lesions, NSP positive, 1 SOW	Pos
5	Pan 4	5 days old lesions, 7 PIGS	Pos
6			Pos
7	Pan 5	2 days old lesions, 1 pig, swabs rolling on the floor, AgELISA pos	Pos
8	Pan 6	Young sow, no symptoms	Neg
9	Pan 7	Healthy pigs	Neg
10			Neg
11	Swab baby piglet	CSF confirmed	Pos







04/07/2013 20:12:02  
10 Sec



04/01/2013 08:11:23  
10 Sec





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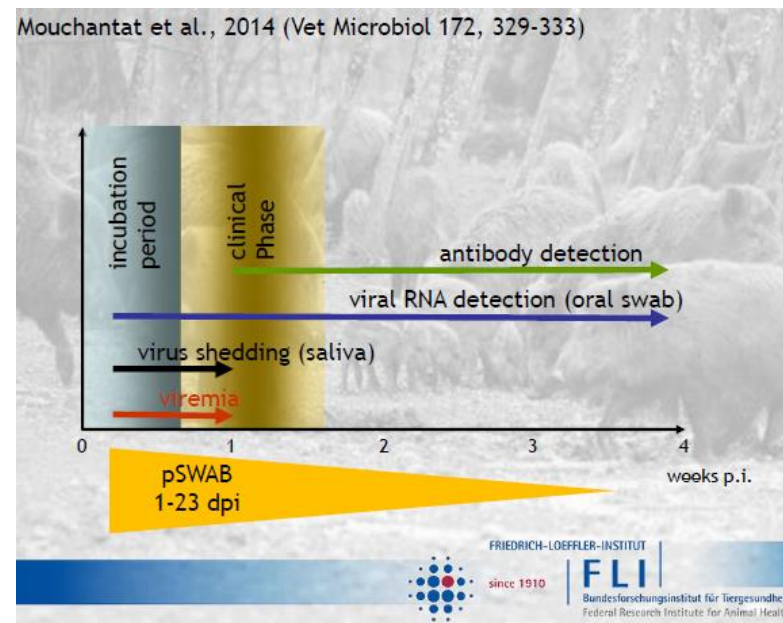
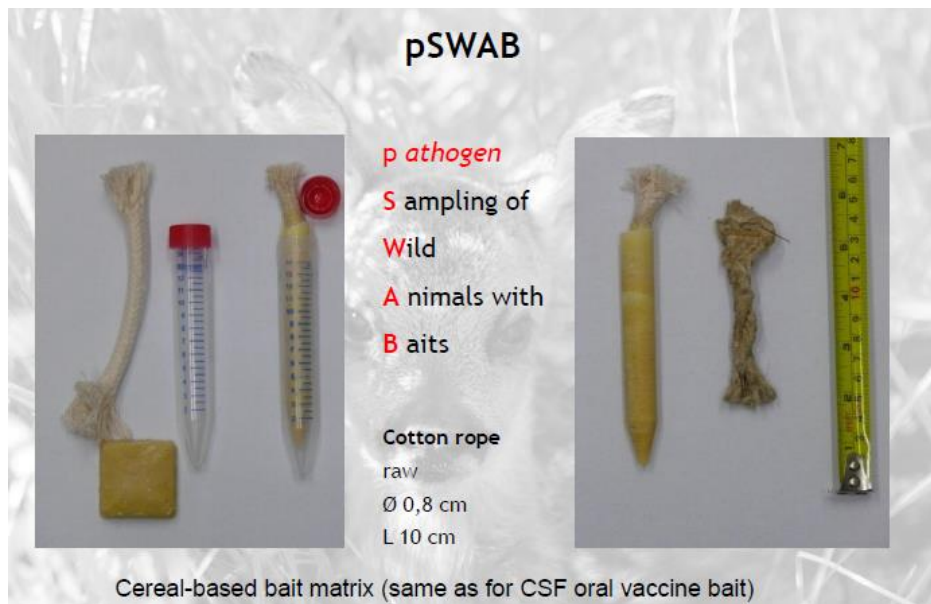


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## Non-invasive sampling for FMD - method optimisation

- ✓ Optimised tests for virus (PCR)
- ✓ Comparison of bait (pSWAB) and Q-Tips in maize cobs
- ✓ Comparable sensitivities
- ✓ Detection of FMDV days 1 to 9 (experimental infection pigs)
- ✓ Promising stability (for field use)

*Studies commissioned by EuFMD at FLI, Insel Riems, 2014:*

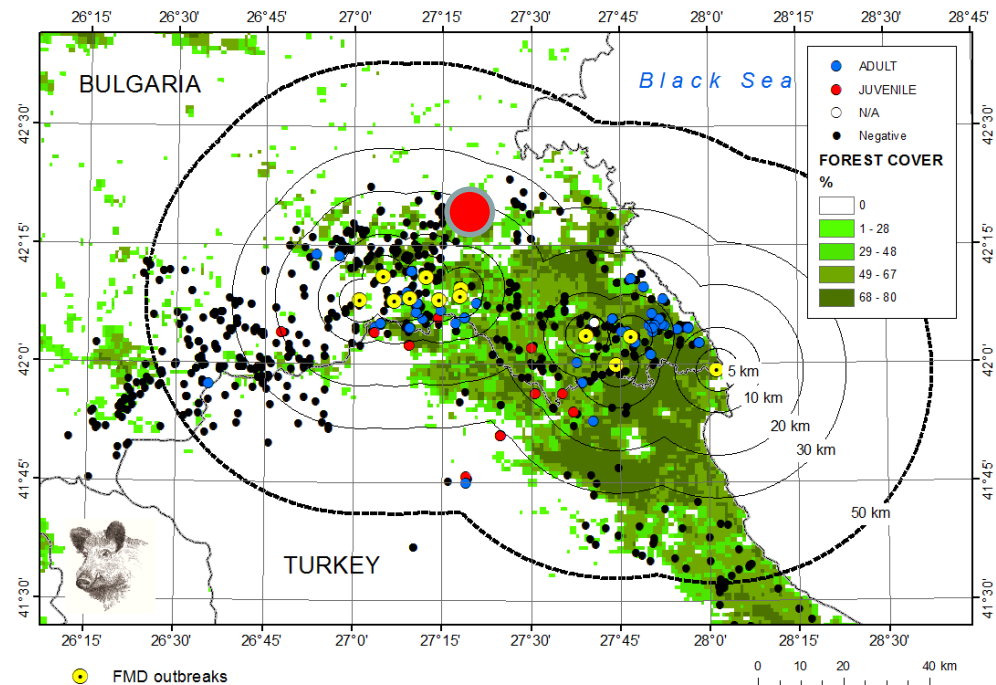


# Putting it together: new options for surveillance and control of FMD epidemics in wildlife

Use risk based, non- invasive methods for DETECTING spread into wildlife

Risk based, where spill over or incursion expected

May require feeding wild boar - prelude to NI sampling in risk locations





4 different groups of wild boar overlapping.....particularly at feeding sites



# Put this into Contingency Plans - use of feeding sites and non-invasive measures if infection detected

## Consider:

- Integrated approach
- Use of feeding programmes to encourage bait use and avoid dispersion
- Use of feeding sites to accelerate natural process of infection and recovery (natural immunity, shorter duration epidemic)
- Risks
- Advantages- active use of options for non-invasive surveillance to monitor impact of controls



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**Thank you for your kind attention!**





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# Questions and Answers





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# Hunting and biosecurity. To hunt or not to hunt?

Marius Masiulis

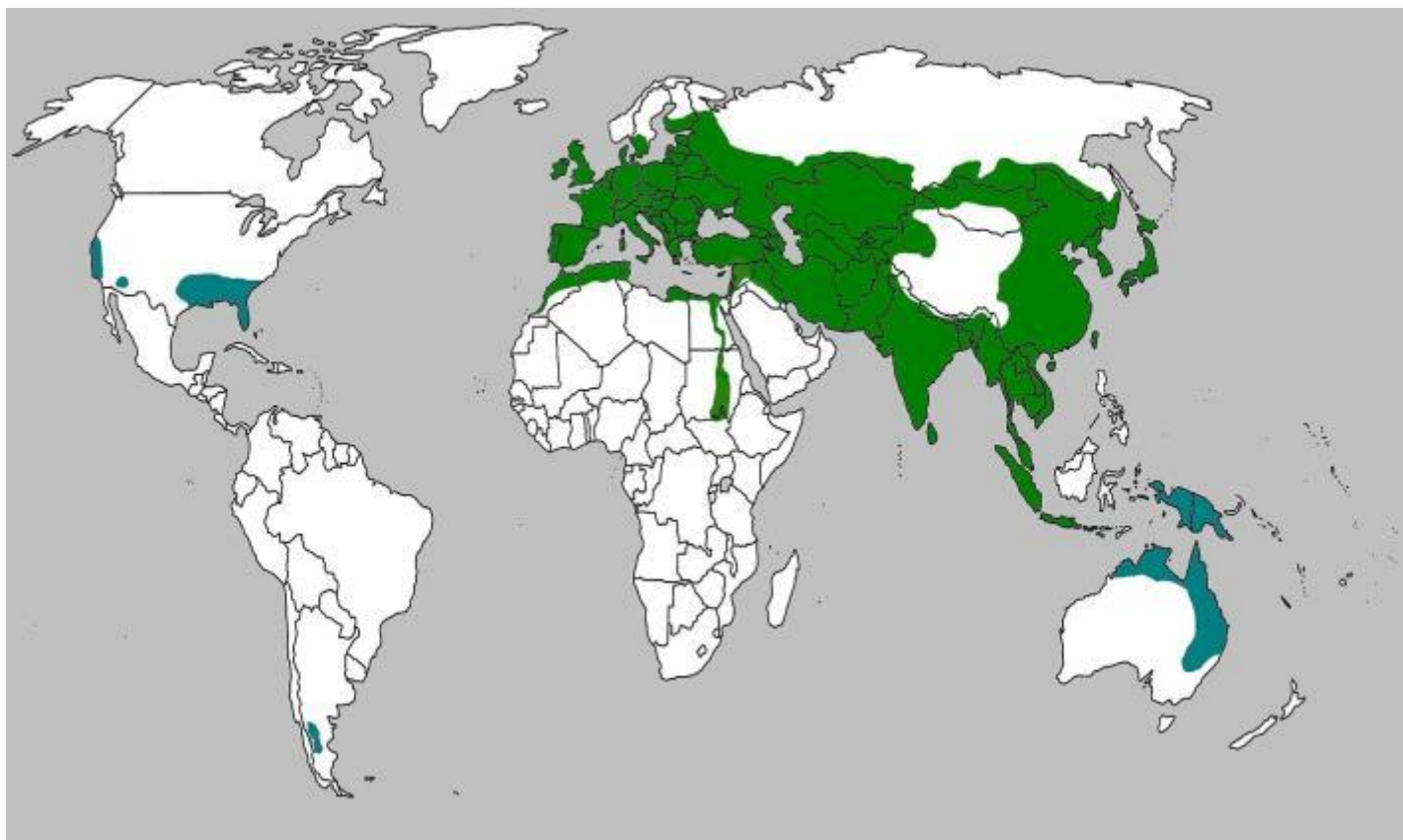


- ‘wild animal’ means an animal of a susceptible species living outside holdings;
- ‘primary case of foot-and-mouth disease in wild animals’ means any case of foot-and-mouth disease which is detected in a wild animal in an area in which no measures are in place;

**Immediately after** the competent authority has information that **wild animals are suspected of being infected** with foot-and-mouth disease, **it shall take all appropriate measures to confirm or rule out the presence of the disease** by investigations of all wild animals of susceptible species shot or found dead, including laboratory testing.

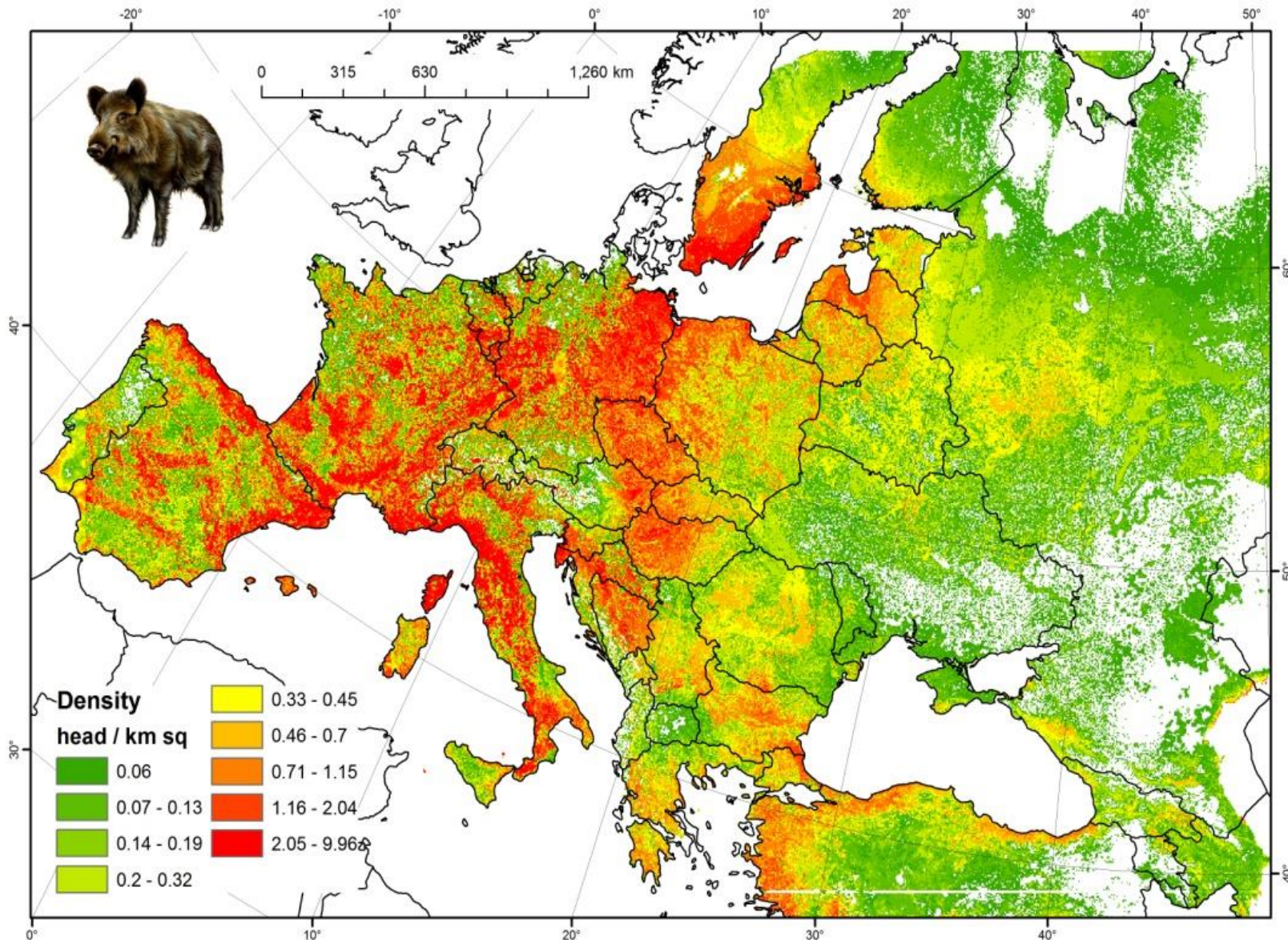


# Just a wild boar...





# Wild boar density





## **Role of hunters: wild animal population management and hunting**

- To hunt or not to hunt, when the disease is detected?
- Feeding ban – how realistic?
- Reduction of the population – who else?
- Increased hunting – motivation is needed?
- Selective hunting – would that work?
- Hunting ban – can it work?
- Restricted driven hunting?
- Collection and disposal of dead wild animal carcasses – who else?



## **Risk of spread after introduction of the virus in to the sensitive wild animal population**

- **Delayed diagnosis;**
- **Wild animal population size and density;**
- **Forest connectivity;**
- **Inappropriate hunting methodologies;**
- **Lack of biosecurity measures applied during hunting;**
- **Uncontrolled hunt and poaching...**



## The challenge for a country

- Provide trainings for hunters;
- Explain the epidemiological role played by wild animals;
- Explain the major risk linked with hunting activities;
- **Unfortunately:** it should be explained that they have no advantages in declaring the presence of the infection in their hunting grounds...





## The challenge for a country

**The procedures should be in place on:**

- how to take samples;**
- how to keep the hunted wild animal or the carcass (with / without the skin and organs separately);**
- how to dispose of offal's;**
- how to dispose of entire carcass in a positive case;**
- how to dispose the found dead wild animal;**
- how to clean and disinfect the dressing area.**



# Biosecurity

## Definition:

**“The implementation of measures that reduce the risk of the introduction and spread of disease agents;**

**it requires the adoption of a set of attitudes and behaviors by people to reduce risk in all activities involving domestic, captive/exotic and wild animals and their products”...**



# Biosecurity must be ensured during and after hunting





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## Dressing area

- To be used in order to minimize the risk of ASF viral contamination of the environment;
- Open air or closed facilities;
- Designated exclusively for animal dressing;
- Authorized by Competent Authority;
- Recognized by hunters;
- Equipment used for dressing should not be used in any other places or moved to the animal keeping places;
- Authorized disinfectants should be used (!)



## Awareness campaign

- should be carried out using all possible forms and sources of dissemination of information (face to face meetings, mass media, posters, leaflets, articles, radio and TV shows)
- different actors should be involved including municipalities, governmental, non-governmental organisation, official veterinarians and practitioners, the hunters' association and clubs in order to increase the likelihood of receiving information on passive surveillance.

# Awareness strategy

Continuous awareness campaigns should be foreseen for hunters for informing about the wild animal disease control strategy, hunting management and the intended goals so to encourage the participation of hunters in the strategy.

**NETAPKITE AFRIKINIO KIAULIŲ MARO (AKM) PLATINTOJU!**

**MEŽIORKLĖS ATMINTINĖ**





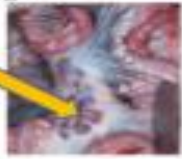
- Medžiotojai, kurie patys pristo mėginus AKM ir tikrinantis taip, kad nešterėtų šepetėlius ir rankas, kurie nešė mėginus, turintys dokumentus.
- Rada šerno pašieną, šer jėkū būda, netieskite, o nedelsdami veiktis! **VMVT** (pašieną) numeris 8 800 40 403 arba kreipkitės į artimiausią **VMVT** teritorinį padalinį.
- Sumedžiotus šernus gabenti ir jį maitinti ar kitas apsauktus, kad nešėktų skyčiai.
- Šerose šernus, jį dorojimo vieta, aikštelės ir teritoriją aplinių gyvūnų medžiogams, veikiantis AKM ir klasikinio kiaulių maro sukėlėjus.
- Iškart išimkite šernus, kurie buvo užšėdę šeriu.
- Šeriu atliekas, iššėrus trofėjus, sudėkite, gyvūninių atliekų duobe, kurioje mažesne kaip 2 m lėtas vanduo. Prieš duobe 1,5 m arsi užkardę.
- Šeriu atliekas, iššėrus šeriu, sudėkite, gyvūninių atliekų duobe, kurioje mažesne kaip 2 m lėtas vanduo. Prieš duobe 1,5 m arsi užkardę.
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**STOP AKM**

Afrikinio kiaulių maro virusas atsparus aplinkos veiksniams: karščiui ir šaltiui. Infekciniai rūšių mėginiai išgyvena iki 30 dienų, šerno pašienoje – nuo 2 iki 6 mėnesių.

Daugiau informacijos apie AKM: [www.vmt.lt](http://www.vmt.lt)  
Valstybinė maisto ir veterinarijos tarnyba

**KAIP TEISINGAI PAIMTI ORGANŲ MĖGINIUS SUMEDŽIOTAM ŠERNUI**

- Mėginys turi būti pašalinamas iškart po šėrimo.
- Afrikiniam ir klasikiniam kiaulių marui diagnozuoti reikalingi organai:
  - Inkstai:**


  - Blužnis:**

  - Limfiniai mazgai:**



→ kraujas mėginiai turi būti pašalinami | sandarius mėgintuvėlius ar indelius;

→ organų mėginiai turi būti sušęti | šerius plastikinė maišeliuose ir paspažėdinti | kitų plastikinė maišeliuose ar korpėse, kad nebūtų išplatintas AKM ir klasikinio kiaulių maro virusas.





## Awareness is the key issue

- Regular training of hunters and forest rangers on clinical signs and contingency plan
- Ensure they know their role in the system
- Readiness – knowledge and equipment
- Awareness campaigns (regular and repeated)
- Regular communication .....



# Different tools could be used to reach hunters

## Leaflets/posters

## Mass media



- Medžioklė
- Medžioklės istorija
- Teisė
- Medžiotojai Lietuvoje
- Medžiojami fauna
- Medžioklės kultūra ir tradicijos
- Kinologija
- Medžioklės trofėjai
- AFRIKINIS KIAULIŲ MARAS
- Literatūra/skaitiniai

LMŽD Naujienos Kontaktai Fotogalerija Nuorodos Medžiotojas ir Meškeriojas

### Naujienos

**2018-03-19 Afrikinio kiaulių maro kontrolė Europos Sąjungoje. Medžiotojų vaidmens svarba**

Bulgarijoje, Sofijos mieste buvo surengtas aukščiausio lygio tarptautinis seminaras Laukinės gamtos vaidmuo gyvūnų sveikatai. Šį renginį organizavo Europos Komisija, TAIEX (Techninės pagalbos ir informacijos keitimosi programa) ir šiuo metu Europos Sąjungai pirmininkaujanti Bulgarija.  
plačiau...

**2018-03-08 Medžioklės trofėjų apžiūrų grafikas**

Aplinkos ministras įsakymu Nr. D1-174 patvirtino 2017-2018 metų medžioklės sezono medžioklės trofėjų apžiūrų grafiką.  
plačiau...

**2018-02-23 Informacija apie stambiųjų plėšrūnų apskaitas**

Valstybinė saugomų teritorijų tarnyba (VSTT) parengė informacija

Mėgėjų žvejyba

- Istorija
- Teisė
- Vandens telkiniai
- Žvejai Lietuvoje
- Žuvis
- Žvejybos įrankiai ir būdai
- Žvejybos trofėjai
- Literatūra/skaitiniai

**GTC IR LMŽD PROJEKTAS**  
**"STAMBIŲJŲ**



# Plans for the eradication of foot-and-mouth disease in wild animals

- the measures adopted to reduce spread of disease due to movements of wild animals and/or contact between groups of wild animals; these measures may include a prohibition of hunting;
- the measures adopted to reduce the population of wild animals and in particular young animals of susceptible species in the wild animal population;
- **the requirements to be complied with by hunters** in order to avoid any spread of the disease;



**EUFMD**

EUROPEAN COMMISSION FOR THE CONTROL OF FOOT-AND-MOUTH DISEASE



**eofmd**  
e-Learning

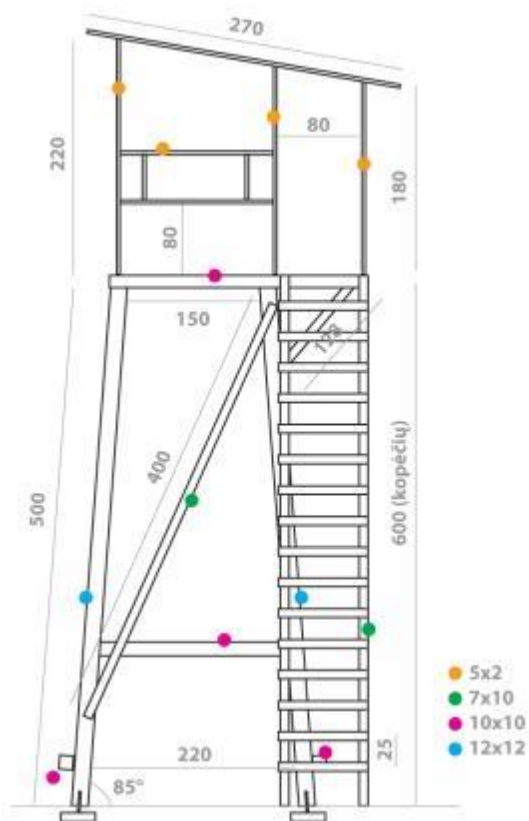


**III**  
3 PILLARS of  
the EuFMD



# Hunting methods

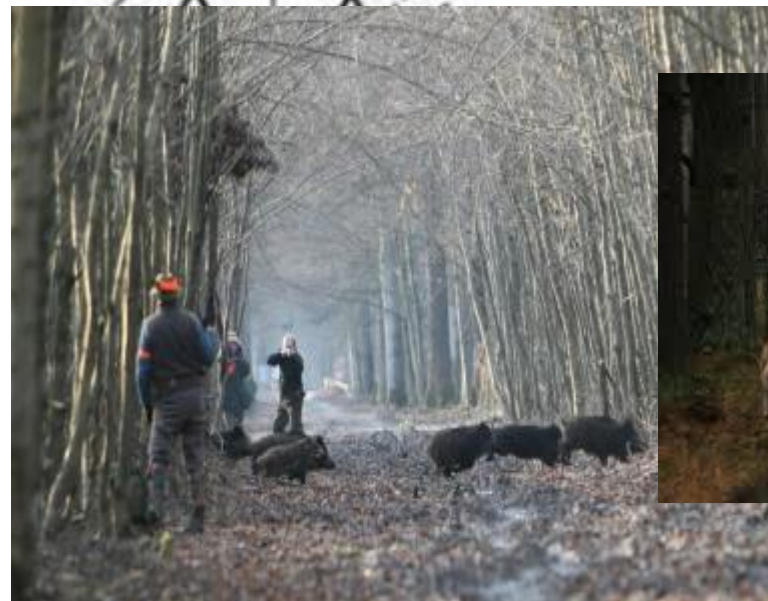
## Solo hunt





## Hunting methods

### Driven hunt





## To hunt or not to hunt?

Hunting could appear a simple and direct way to manage the number of susceptible animals in order to facilitate the control and the eradication of animal diseases (CSF, ASF, FMD).

However, hunting pressure may be counterproductive, since it may increase the size of the home-range of wild life meta populations, facilitating contacts between meta-populations, and promoting long distance movements of individual animals.





# To hunt or not to hunt?

Hunting may pose some additional risks, namely those related to the handling of infected carcasses and possible dispersal of virus in the environment by hunters.

However, hunting may be necessary for sampling purposes...







## Hunting in the infected area

- Targeted hunting (applicable mainly for wild boars) (mainly young animals under one year of age) is assumed to temporarily decrease the number of susceptible animals and thus it should facilitate the fading out of the infection...?
- However, harvesting juveniles may leave enough breeding females to maintain a high birth rate, yielding susceptible animals that enable the disease to persist...





*Education*  
IS IMPORTANT  
BUT  
**HUNTING**  
IS  
*Importanter*



© RLY?

# Questions and Answers



# Short Term Placements needed!

The EuFMD Commission has an opening for individuals to join the team in Rome under the **Short Term Placement (STP)** program

**APPLY**

**for 2019 by 28 June**

**VISIT**

<http://www.fao.org/ag/againfo/commissions/eufmd/commissions/eufmd-home/about/work-with-us/en/>

**EMAIL**

[eufmd@fao.org](mailto:eufmd@fao.org) for details

# Thank you for your attention!

