



# *USDA ARS 2-ND INTERNATIONAL BIOSAFETY AND BIOCONTAINMENT SYMPOSIUM*

## *AFRICAN SWINE FEVER*

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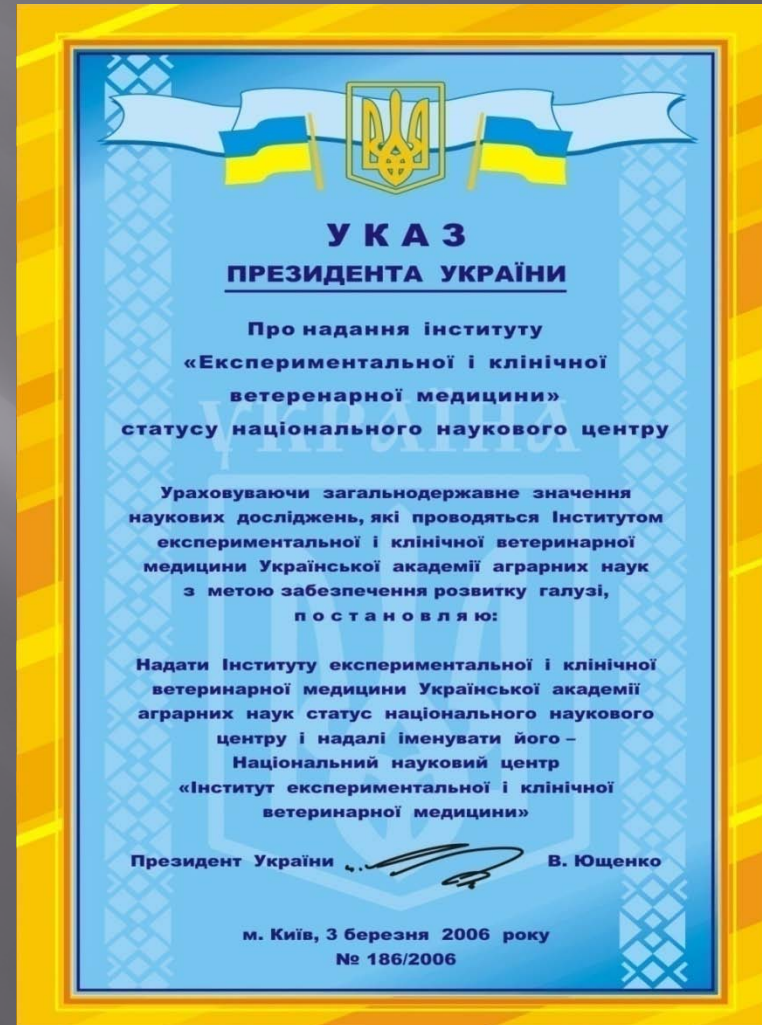
# NSC “Institute of Experimental and Clinical Veterinary Medicine”

- *The oldest in Ukraine Institute of Experimental and Clinical Veterinary medicine was founded in 1922 by special decision of the Government.*
- *Since its foundation Institute worked on such problems as malleus, anthrax, brucellosis, plague, swine fever, foot-and-mouth disease, stachyobotryotoxicosis and others.*



# Decree President of Ukraine

*Nowadays NSC "IECVM" is a leading coordinating center concerning the problems of scientific support of veterinary medicine in Ukraine.*



# NSC “IECVM” reference activities

- ▣ *Our centre staff includes 22 Dr Sc., and 66 PhD.*
- ▣ *6 scientific centres of expertise work within the framework of instituton:*
  - ▣ *for avian diseases,*
  - ▣ *cattle diseases,*
  - ▣ *TBC,*
  - ▣ *parasitology,*
  - ▣ *prionic infections*
  - ▣ *feed-stuff quality and safety*



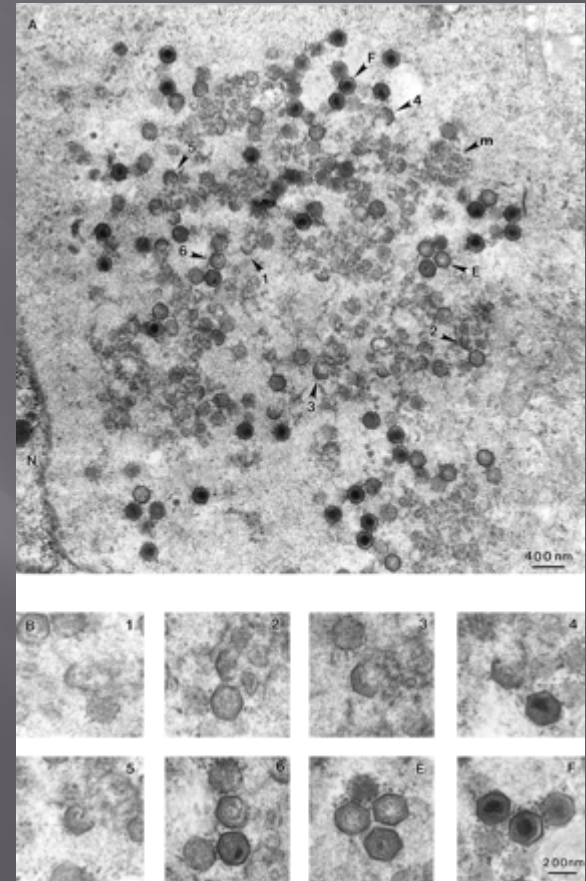
# Introduction

- ▣ *African swine fever has a history of expanding from its basic focus in Africa to Southern Europe, the Caribbean, and Brazil. Now it is take a place the expanding its range into Eastern Europe and Northwest Asia, creating new reservoirs of the virus and increasing the possibility of introduction into The United States of America.*

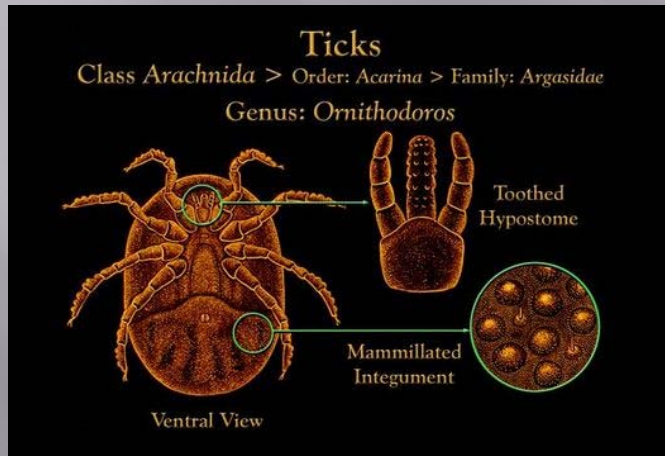


# AETIOLOGY

- ▣ African swine fever (ASF) is caused by a large, doublestranded DNA virus, African swine fever virus (ASFV), which replicates predominantly in the cytoplasm and is the only member of the Asfarviridae family, genus Asfivirus (Dixon et al. 2005).



- The natural cycle of ASF appears to be between soft ticks (family Argasidae) and any of three species of wild suids: warthog (*Phacochoerus africanus*), bushpig (*Potamochoerus larvatus*), and red river hog (*Potamochoerus porcus*).



- Both domestic pigs and the European wild pig ("sanglier," also *Sus scrofa*) suffer severe disease from ASF infection.
- The possibility of sangliers maintaining ASF in the wild could create a permanent reservoir of the virus in Europe. Similarly, feral swine in the US might be capable of maintaining a viral reservoir.

# History

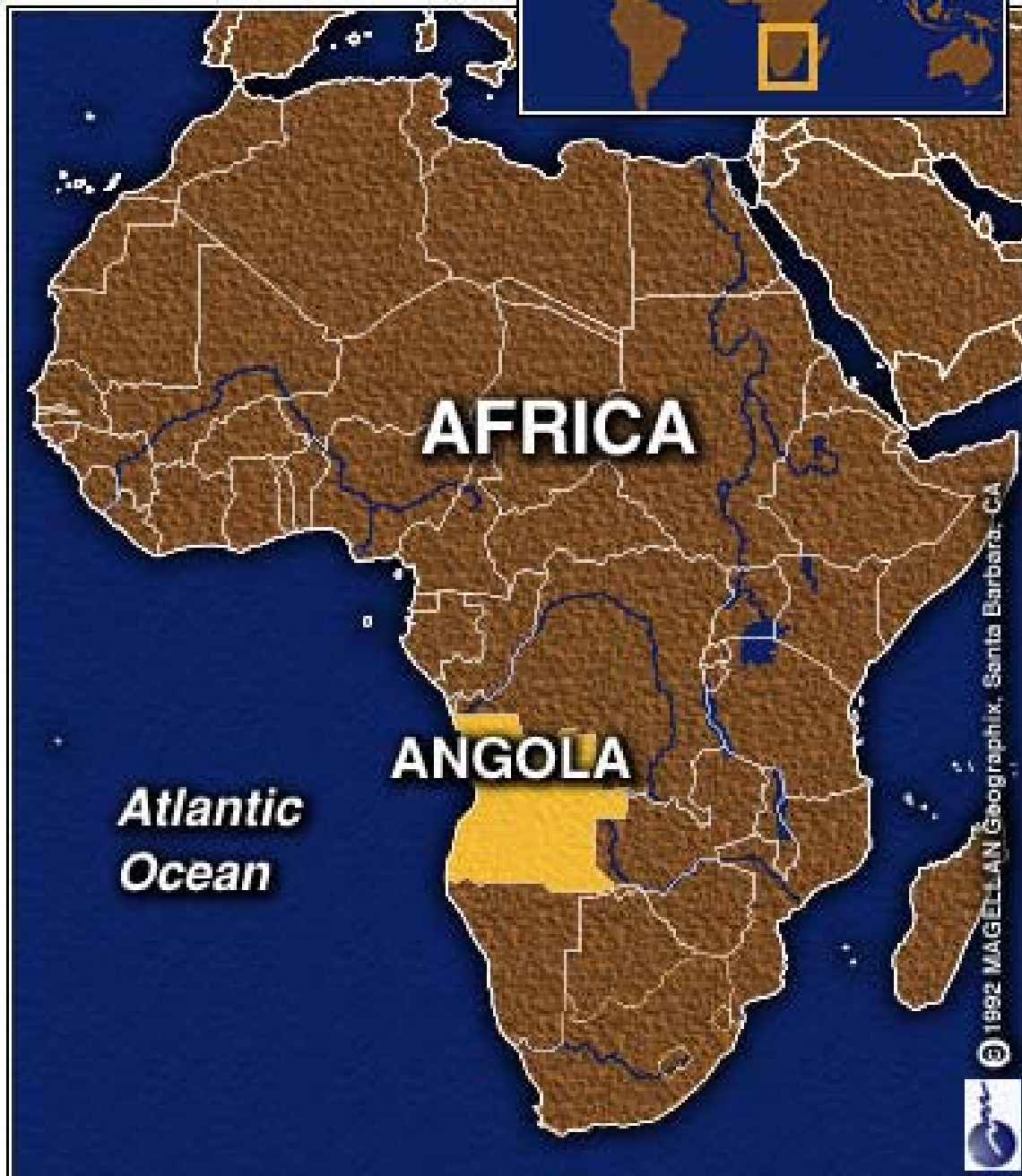
- ❑ ASF was first described in Kenya in the 1920s as an acute haemorrhagic fever which cause mortality approaching 100 per cent in domestic pigs. It was noted that disease outbreaks occurred when domestic pigs came into close contact with wildlife species, particularly warthogs (*Phacochoerus aethiopicus* and *Phacochoerus africanus*).
- ❑ Outbreaks of ASF were reported subsequently in a number of other European countries, including Malta (1978), Italy (1967, 1980), France (1964, 1967,+1977), Belgium (1985) and The Netherlands in 1986.
- ❑ In 2007, further transcontinental spread of ASF occurred with the introduction of ASF to Georgia in
- ❑ the Caucasus region. Delays in recognizing ASF resulted in its widespread distribution to neighbouring countries, including Armenia, Azerbaijan and several territories in Russia.





In 1958 viral transmission and wildspreading within all continents was started from Angola out the border of world natural focus of ASF.

## м. Луанда





Бережение поросенка вирусом А.Ч.С.



Таблица 8.  
Штаммы вируса А.Ч.С. имевшиеся в ИВИ на 1.05.1986г.

№№	Название штамма	Даты изоляции и последнего пассажа	Биологическая активность
1.	С.Порту	1964-1985	сохранена
2.	Бенгела	1981-1984	сохранена
3.	Диамант	1971-1982	утрачена
4.	Ф.Е.	1980	утрачена
5.	Лубенго	1981-1983	не исследован
6.	Луанда	1981-1982	не исследован
7.	Киссала	1979-1982	утрачена
8.	Шянга	1979-1981	утрачена
9.	Саксала	1980-1981	утрачена
10.	Квала	1979-1981	не исследован
11.	Бусаку	1979	не исследован
12.	Кванза Сул	1980-1982	утрачена

# Geographic Distribution

- Endemic
  - Southern Africa
  - Island of Sardinia (Italy)
- Recent outbreaks
  - The Caucasus
    - Georgia
    - Armenia
    - Russia
    - Ukraine
    - .....???

# Morbidity/Mortality

- Morbidity approaches up to 100%  
Previously unexposed herds
- Mortality varies with virulence  
of isolate  
Ranges from 0 to 100%
- May be asymptomatic in wild pigs
- No treatment or vaccine

# The risk of introduction of ASF



# Animal Transmission

- ▣ Direct contact
  - Usually oronasal
- ▣ Indirect
  - Uncooked garbage
  - Insects
  - Bite of infected ticks
  - Mechanically by biting flies
- ▣ Found in all tissues and body fluids



# Clinical Signs: Acute Disease

- ▣ Incubation period: <5 to 19 days
- ▣ Clinical signs
  - High fever
  - Moderate anorexia
  - Erythema, cyanosis
  - Recumbency
  - Bloody diarrhea
  - Abortion
  - Death



# Clinical Signs: Chronic Disease

- ▣ Multi-focal erythema
  - Ears, abdomen
  - Raised or necrotic areas
- ▣ Intermittent, low fever
- ▣ Coughing
- ▣ Painless joint swelling
- ▣ Emaciation, stunting
- ▣ Death





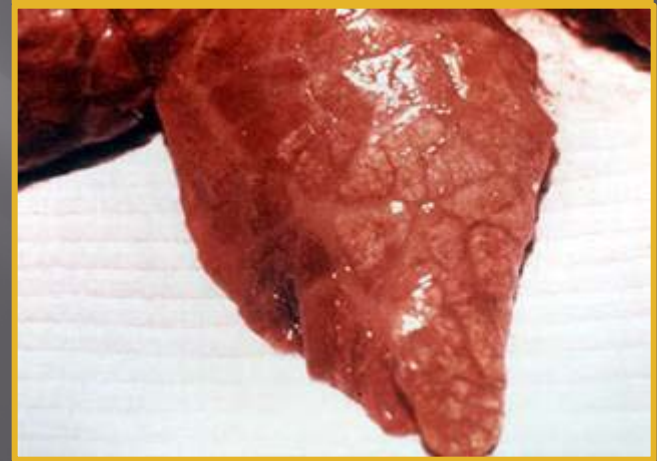
# Post Mortem Lesions: Most Common

- ▣ Hemorrhagic
  - Spleen
    - ▣ Enlarged
    - ▣ Friable
    - ▣ Dark red, black
  - Lymph nodes
  - Kidneys
  - Heart



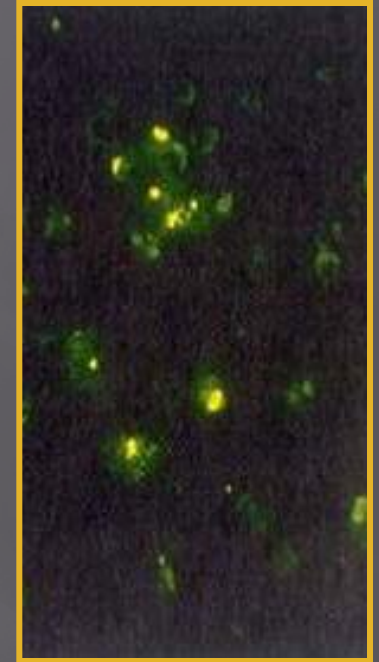
# Post Mortem Lesions: Chronic Infection

- ▣ Focal skin necrosis
- ▣ Fibrinous pericarditis
- ▣ Generalized lymphadenopathy
- ▣ Swollen joints
- ▣ Consolidated lobules in lung



# Diagnosis

- ▣ Suspect ASF in pigs with:
  - Fever
  - Characteristic post mortem signs in spleen, lymph nodes
- ▣ Laboratory tests
  - Virus isolation
  - Viral antibody detection
  - PCR



# Differential Diagnosis

- ▣ Classical swine fever (hog cholera)
- ▣ Acute PRRS
- ▣ Porcine dermatitis and nephropathy syndrome
- ▣ Erysipelas
- ▣ Salmonellosis
- ▣ Eperythrozoonosis
- ▣ Actinobacillosis
- ▣ Glasser's disease
- ▣ Aujeszky's disease (pseudorabies)
- ▣ Thrombocytopenic purpura
- ▣ Warfarin poisoning
- ▣ Heavy metal toxicity

# Vaccination

- ▣ No effective vaccine
- ▣ We all need to do our part
  - Keep our pigs healthy
  - Free of foreign animal diseases



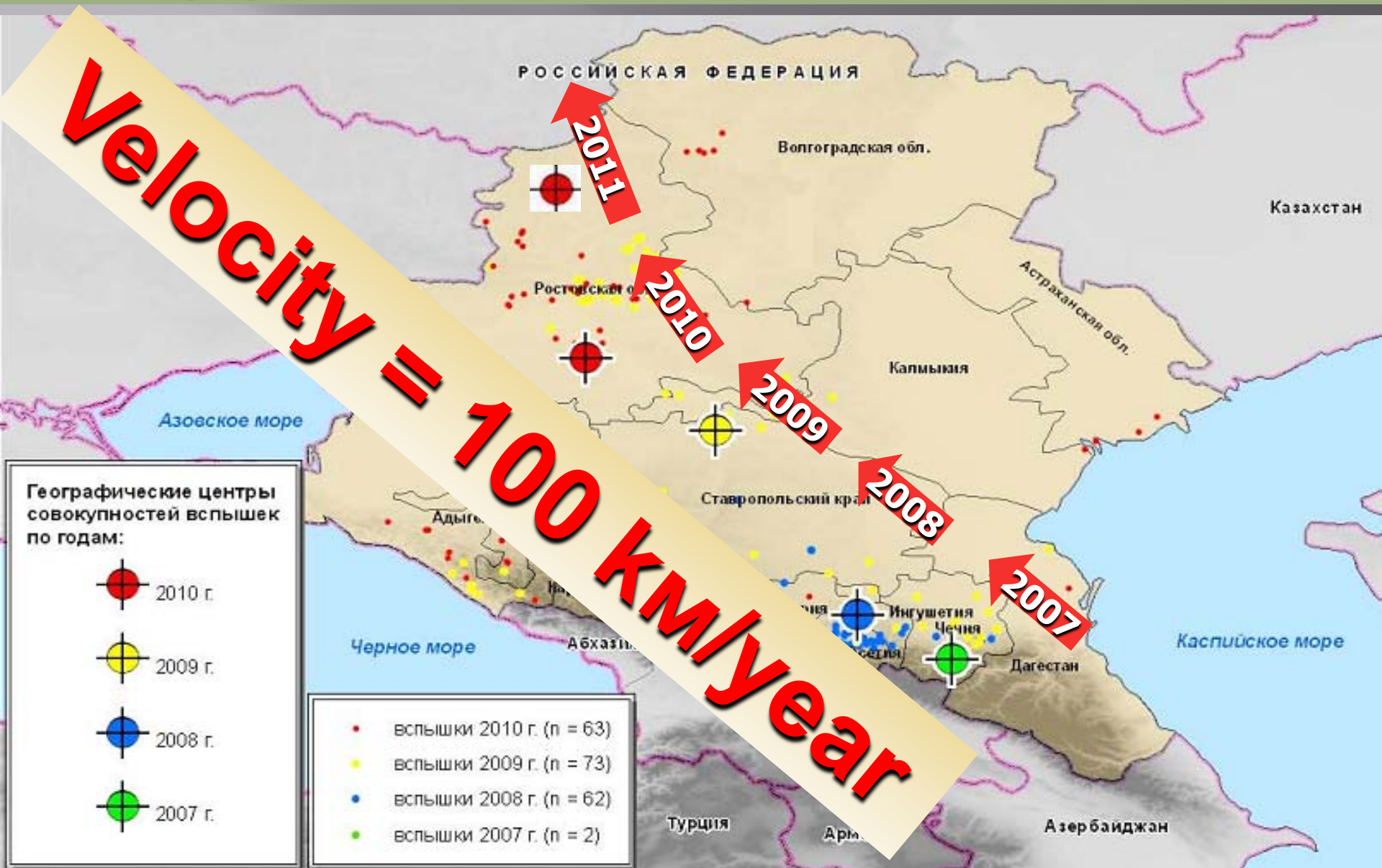
# Quarantine

- ▣ Suspicion of ASF
  - Quarantine
    - ▣ Entire herd
    - ▣ Strict enforcement
    - ▣ Authorities notified
    - ▣ Diagnosis confirmed
- ▣ Disposal of carcasses
  - Burial
  - Burning



# **Nascent Status and Trends of Metamorphoses in Eurasian Nosoareal of ASF**

# ASF "DRUCH NAH" UKRAINE-WEST FROM CAUCASE-KUBAN (in units of the geographic centers of ASF outbreaks at period of 2007-2011pp)

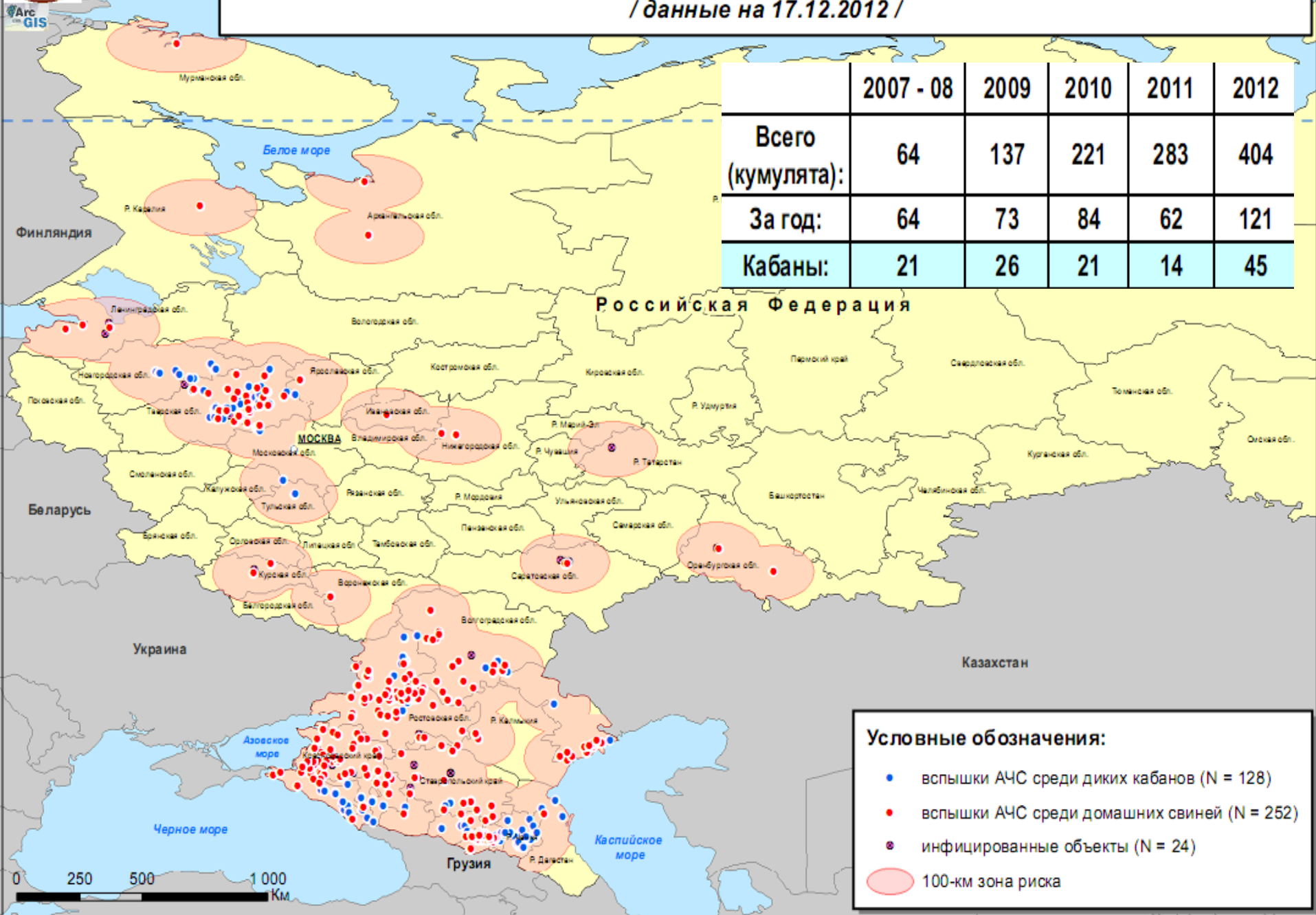






# Распространение АЧС по территории Российской Федерации (N = 404)

/ данные на 17.12.2012 /



# Dynamics of enzootic focuses formation of ASF in Rostov region (Russia) (September 2009 - August 2010)



# Effects of Climate Change on Ticks and Tick-Borne Diseases in Europe

We haven't guaranties that new ticks species will not introduce on Ukraine and Ornithodoros area in Ukraine amplified

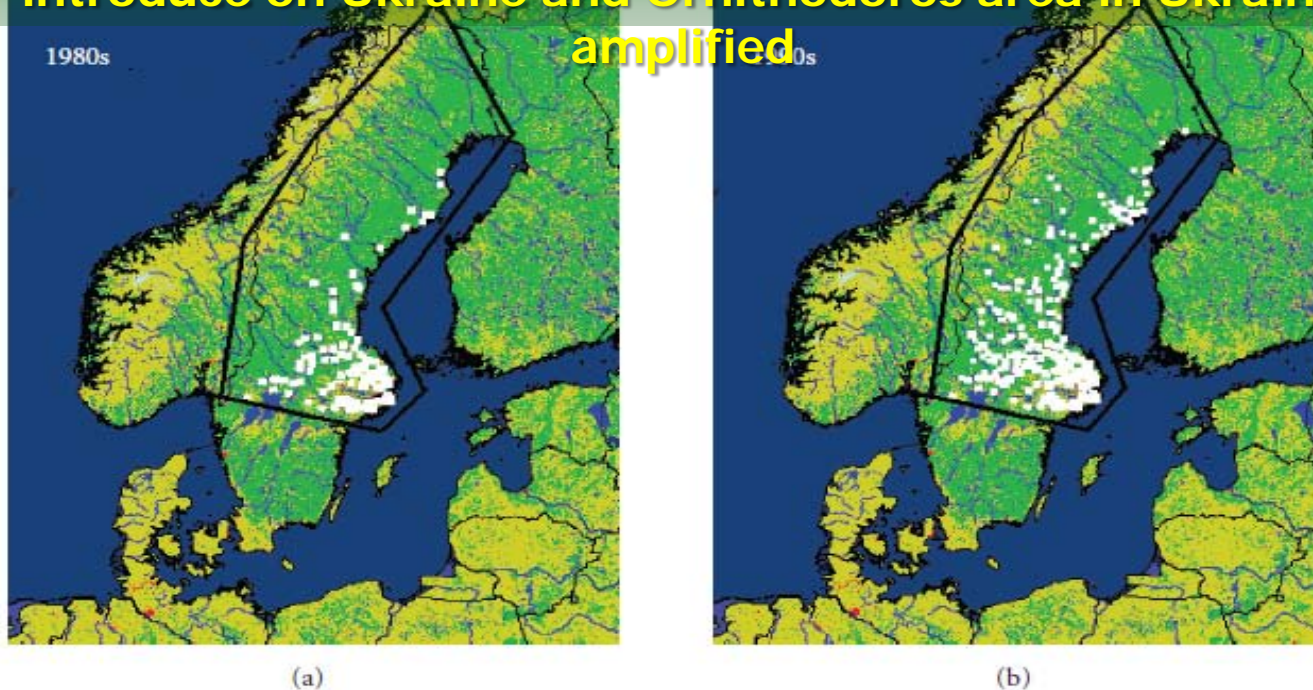
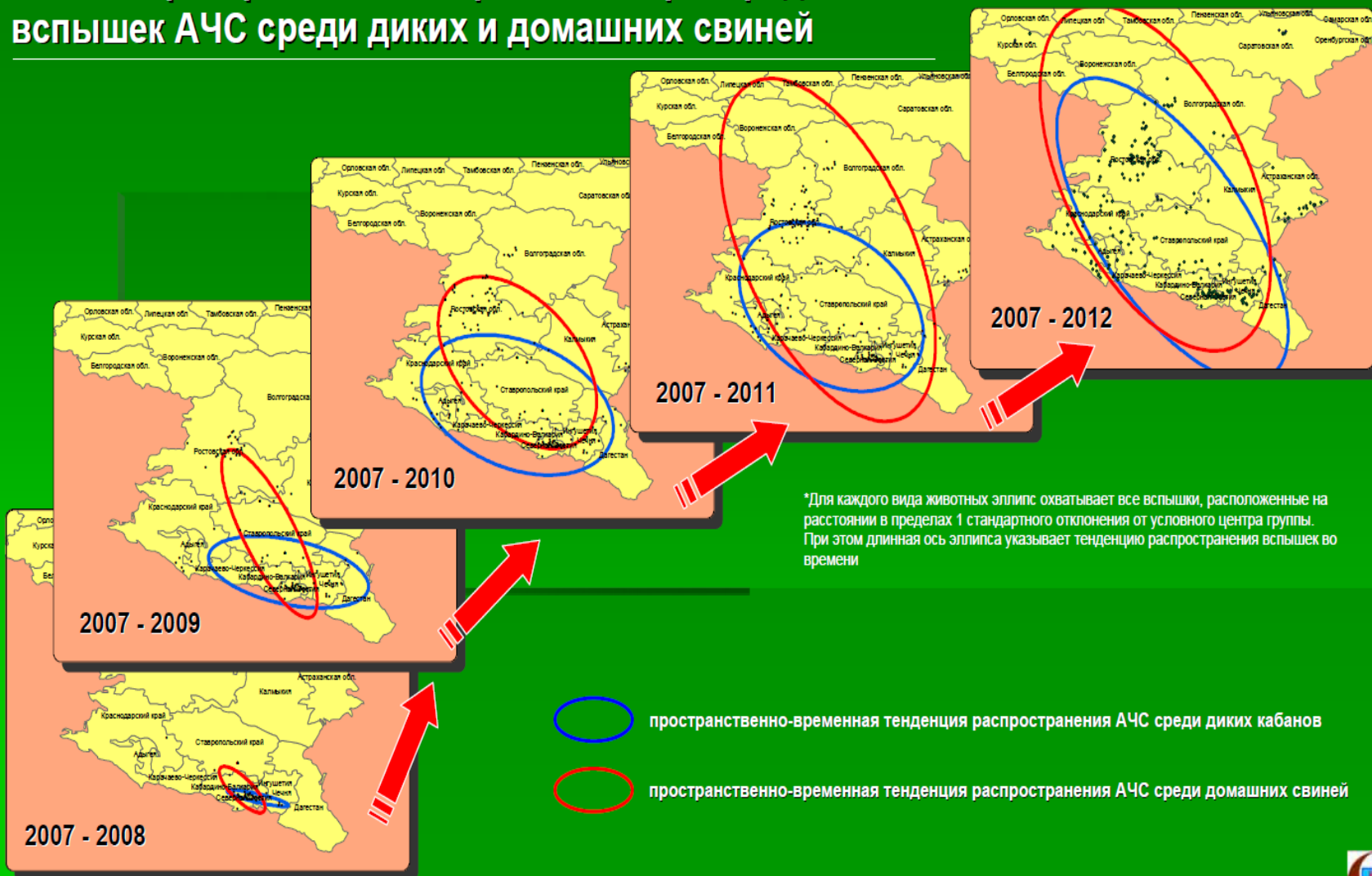


FIGURE 1: Changes in tick distribution in northern and central Sweden. White dots illustrate districts in Sweden where ticks were reported to be present before 1980 (a) and in 1994-1995 (b). The study region is within the black line (Lindgren et al. 2000, [12] with permission from *Environmental Health Perspectives*).

**CLIMATE CHANGES INFLUENCES ON UKRAINIAN TICKS SPECIES IS UNKNOW**

# Анализ пространственно-временного распределения\* вспышек АЧС среди диких и домашних свиней



УКРАЇНА

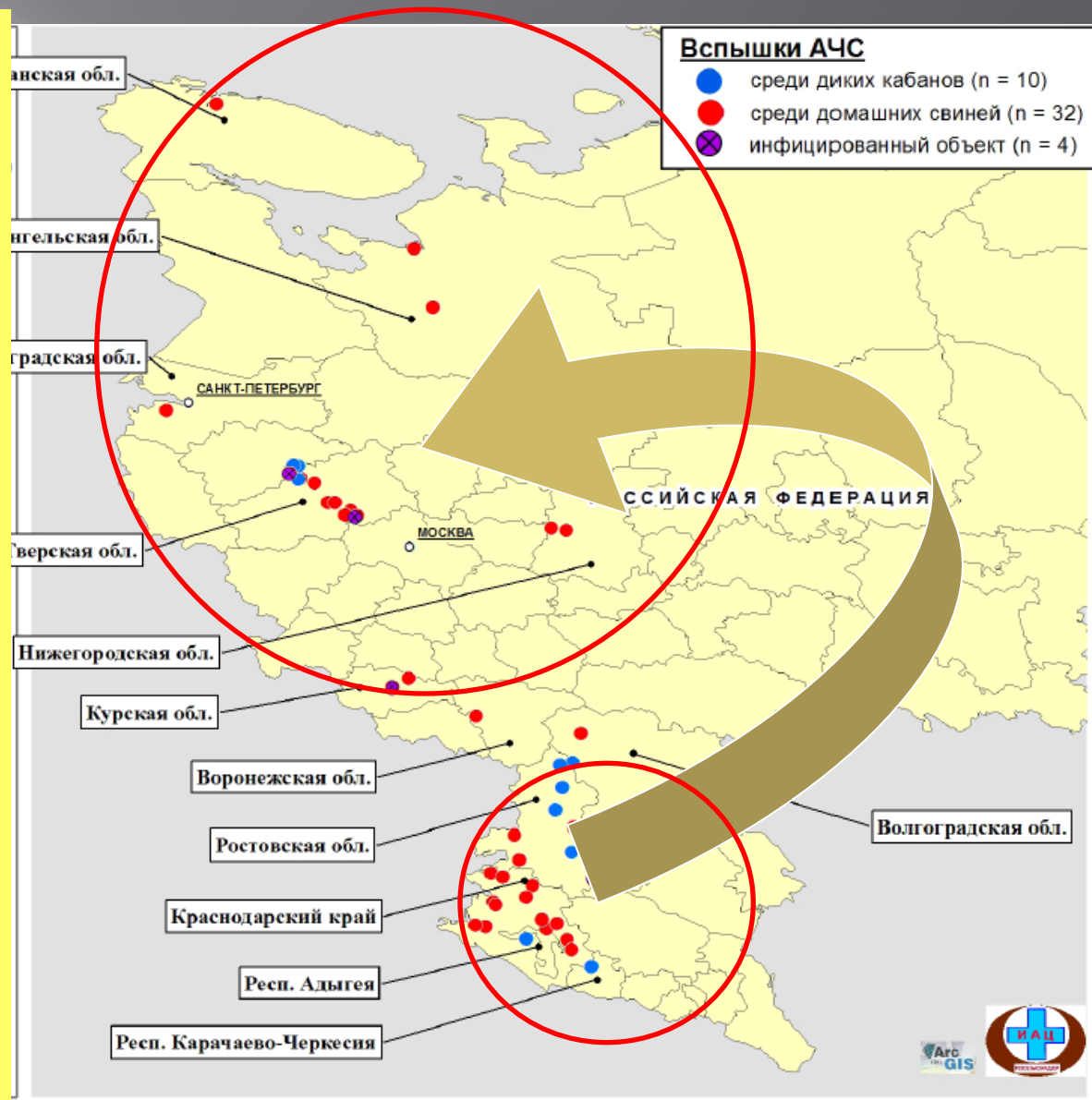
~150 км

~500 км



▲ АЧС серед свійських свиней  
▲ АЧС серед диких кабанів





**In 2010/2011 ASF' epizooty recourse to "jump-liking" northward widespread because ASF agent fused in food chains and begin wide spreading among wild boars on territories which was contaminated by back-yard piggeries wastes**



# Russian scientists (from Vladimir Research Institute, 2011) predicate the total wide spreading of ASF on Russia Federation in 2011-2013



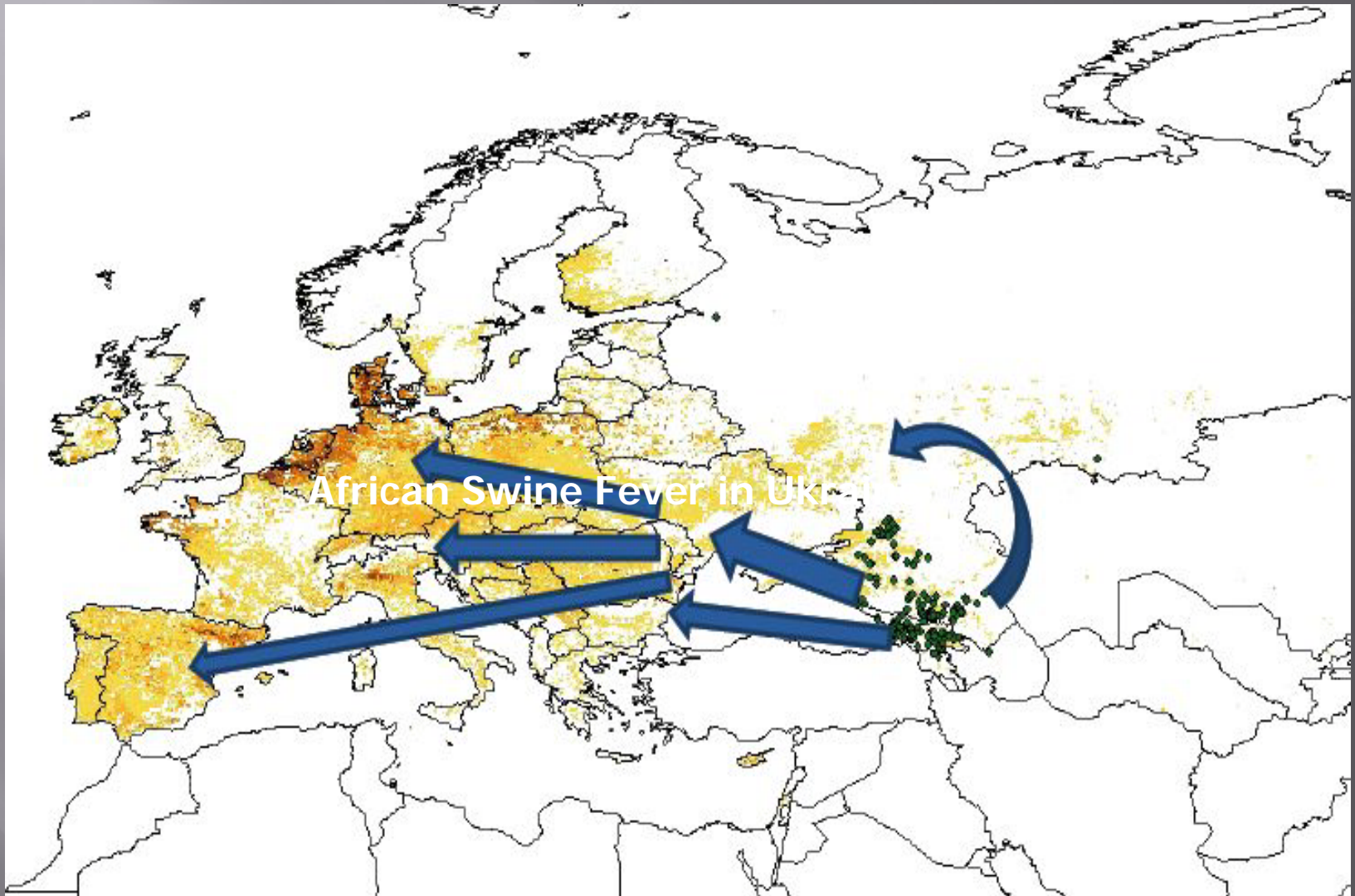
**Risqué level**

	Low
	Medium
	High
	Very high

# Возможное распространение АЧС





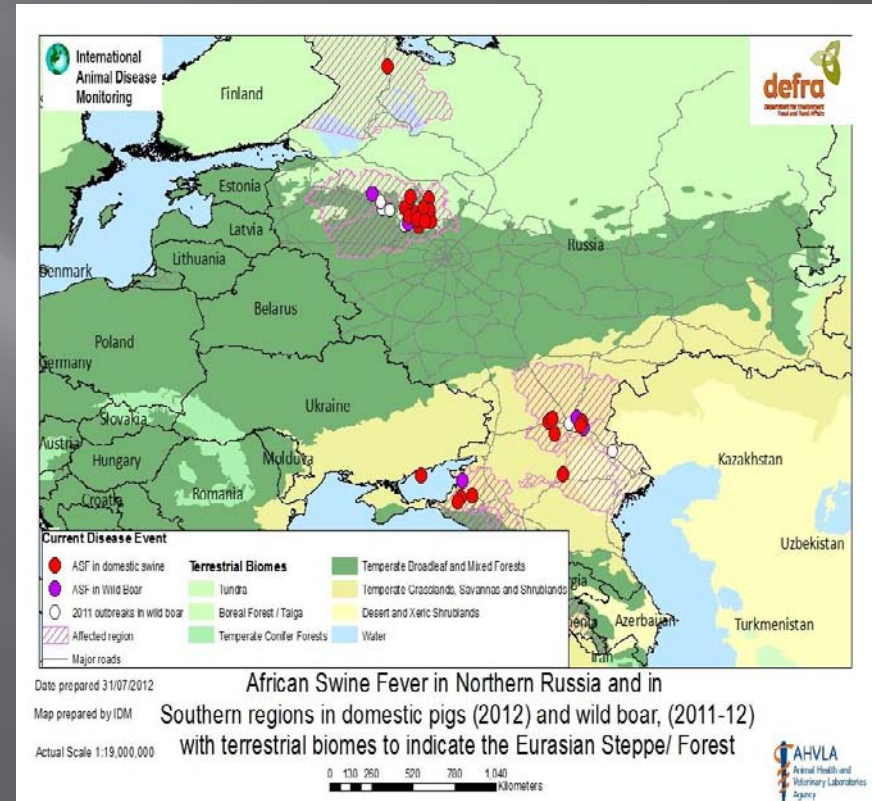


**European Union prognosis (by Prof. José M. Sánchez-Vizcaíno, 2011) is more pessimistic ...**



# African Swine Fever in Ukraine

- In the 2nd August 2012, Ukraine Veterinary committee have reported to the OIE an outbreak of African Swine Fever in backyard pigs in Zaporozhye region. This is the first time ASF has been reported in the Ukraine. According to the disease report, of the five pigs on the premises, three had non-specific clinical signs including fever, and died quickly. Samples were tested positive by PCR and the other two pigs were also destroyed. Disease control measures are in place.



# African Swine Fever in Ukraine Situation Assessment

- This latest outbreak in the Ukraine is a concern for several reasons. It has occurred 170 km from the Russian border and therefore suggests a large jump, rather than gradual spread, and therefore may be associated with movement of pigs, products or vehicles.
- African Swine fever continues to cause a problem in Eastern Europe. The disease is continually causing outbreaks in wild boar and back yard pigs in the Caucasus region and appears to have become entrenched in the pig and wild boar population of the Tver region (Empres, 2012). This suggests that wild boar in the area may be acting as reservoirs for disease, although the large “jumps” observed are frequently associated with the movement of live pigs, pig products or infected transport vehicles. This puts countries in Eastern Europe at risk. Particularly along the areas of the Eurasian forest where undetected spread may occur in wild boar.

# Conclusion

- The veterinary service of Ukraine was able to respond fast and adequately to the ASF threat posed by the endemic situation in the Russian Federation.
- A vertical chain of command from the centre down to the village ensures a fast implementation of the control measures. A closed-meshed veterinary service enables a fast monitoring and surveillance system based on clinical examination... (**Mission of EU 8/9 Sept 2012**)

# Additional Resources

- ▣ *World Organization for Animal Health (OIE)*
  - *www.oie.int*
- ▣ *U.S. Department of Agriculture (USDA)*
  - *www.aphis.usda.gov*
- ▣ *Center for Food Security and Public Health*
  - *www.cfsph.iastate.edu*
- ▣ *USAHA Foreign Animal Diseases*  
*("The Gray Book")*
  - *Center for Food Security and Public Health, Iowa State University, 2011*
  - *www.cfsph.iastate.edu/DiseaseInfo/ppt/AfricanSwineFever.r.pp*



*"I love Africa"*

*Thank you for attention!*