Airborne Infection Risk Estimation software as a potential tool for „in situ" gene preservation

Ákos Maróti-Agóts,Norbert Solymosi, Zoltán Barcza

[1]Faculty of Veterinary Science, Szent István University
[2]Adaptation to Climate Change Research Group,
Hungarian Academy of Science

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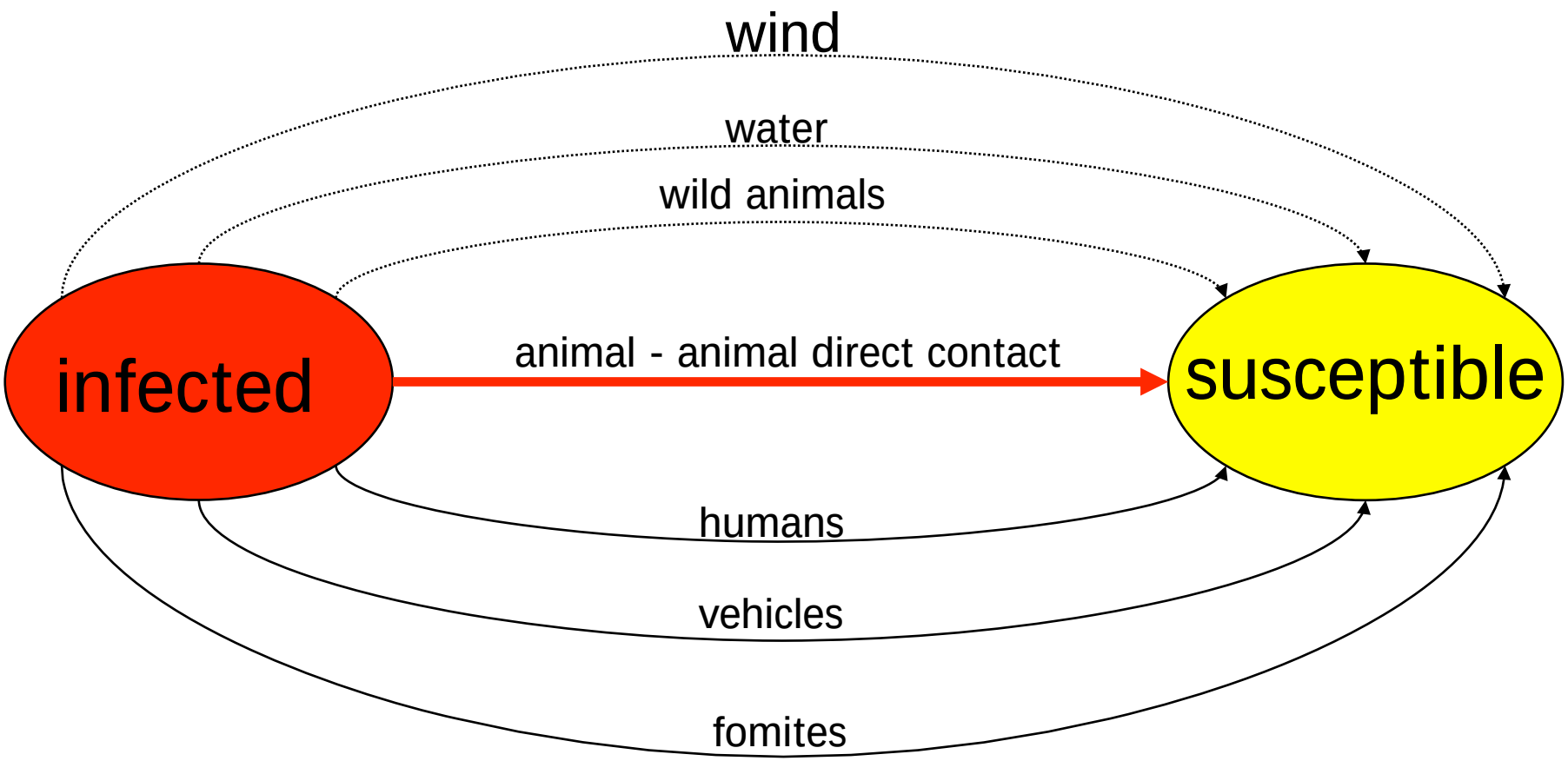
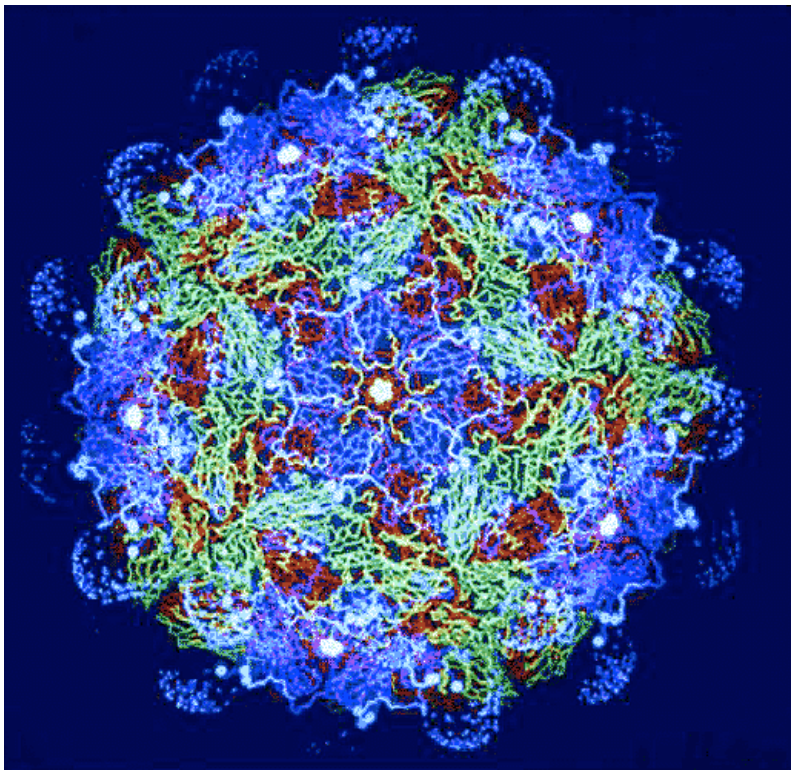
routes of the spreading



Importance of uncontrollable ways

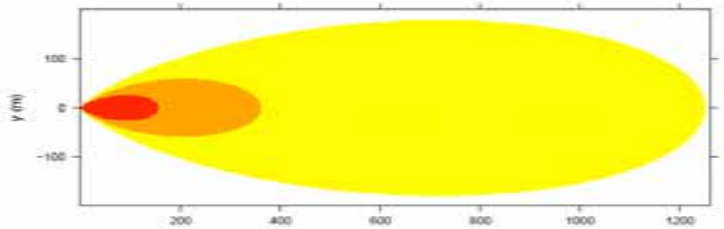
- Aujeszky disease
- Newcastle disease
- Avian influenza
- **Foot and Mouth Disease**
- Swine fever
- ...



Epidemiological parameters of the FMD disease

Minimum infectious doses of the FMD virus for different species

Species	Minimal Infectious Doses	Inhalation rate	Infectious concentration
	$TCID_{50}$/24h	m^3/24h	$TCID_{50}$ / m^3
Cattle	10	173	0.06
Sheep	400	52	1.11
Swine	10	9	7.70



Amount of the FMD virus emission of different species

Day of clinical signs	Cattle	Sheep	Swine
		$log\ TCID_{50}$/day	
-2	-	3.4	-
-1	-	4.6	-
0	3.5	5.1	4.3
1	4.5	4.0	8.6
2	5.1	3.2	8.6
3	4.7	2.7	7.1
4	4.1	2.4	5.4

modelling of airborne spreading - FMD

Modells of simulation:

Puff modells

- **Gauss**
- Top-hat

Particle modell

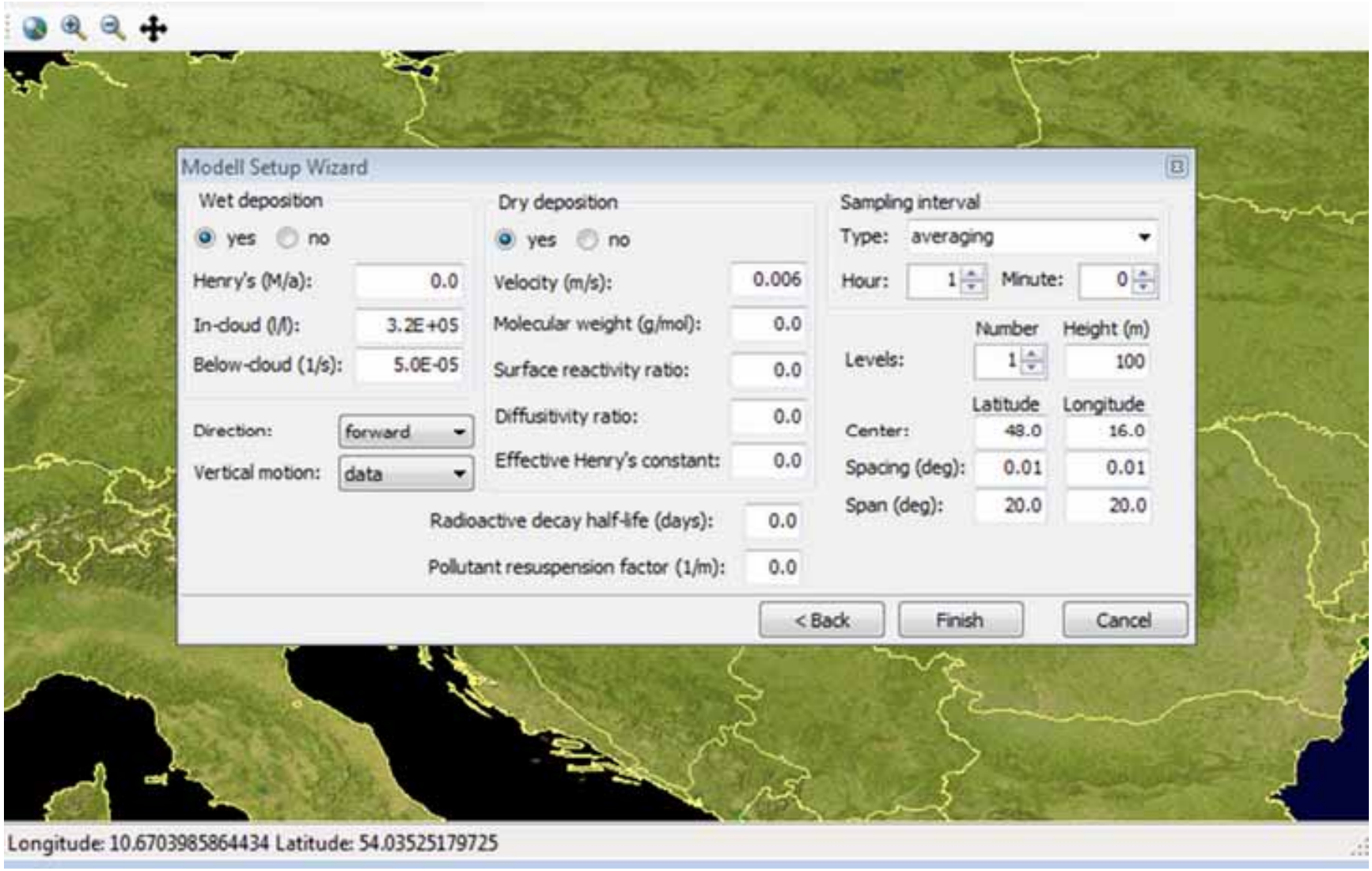
- Lagrangian particle modell

Meterological Databases

Global Data Assimilation System: 2004-, 1°lat-lon
NCEP/NCAR Global Reanalysis: 1948-2007, 2.5°lat-lon
European Centre for Medium-Range Weather Forecasts Reanalysis (ERA 40): 1957-2002, 1°, 2.5°lat-lon
ECMWF

Userfrendly GIS input and output

parametering of the modell – tayloring to the case



The goal of the AIREs project

Reverse thinking for the estimation of risk

- GPS coordinates of the stocks
- Number of animals
- Meteorological database (wind direction)

Complex calculation of the risk of a possible airborne outbreak in the protection area

Impossible to save the animals in the vaccination area - Increase the **chance for surviving** in the **protective area**

Demo outbreak

Demo outbreak

Demo outbreak

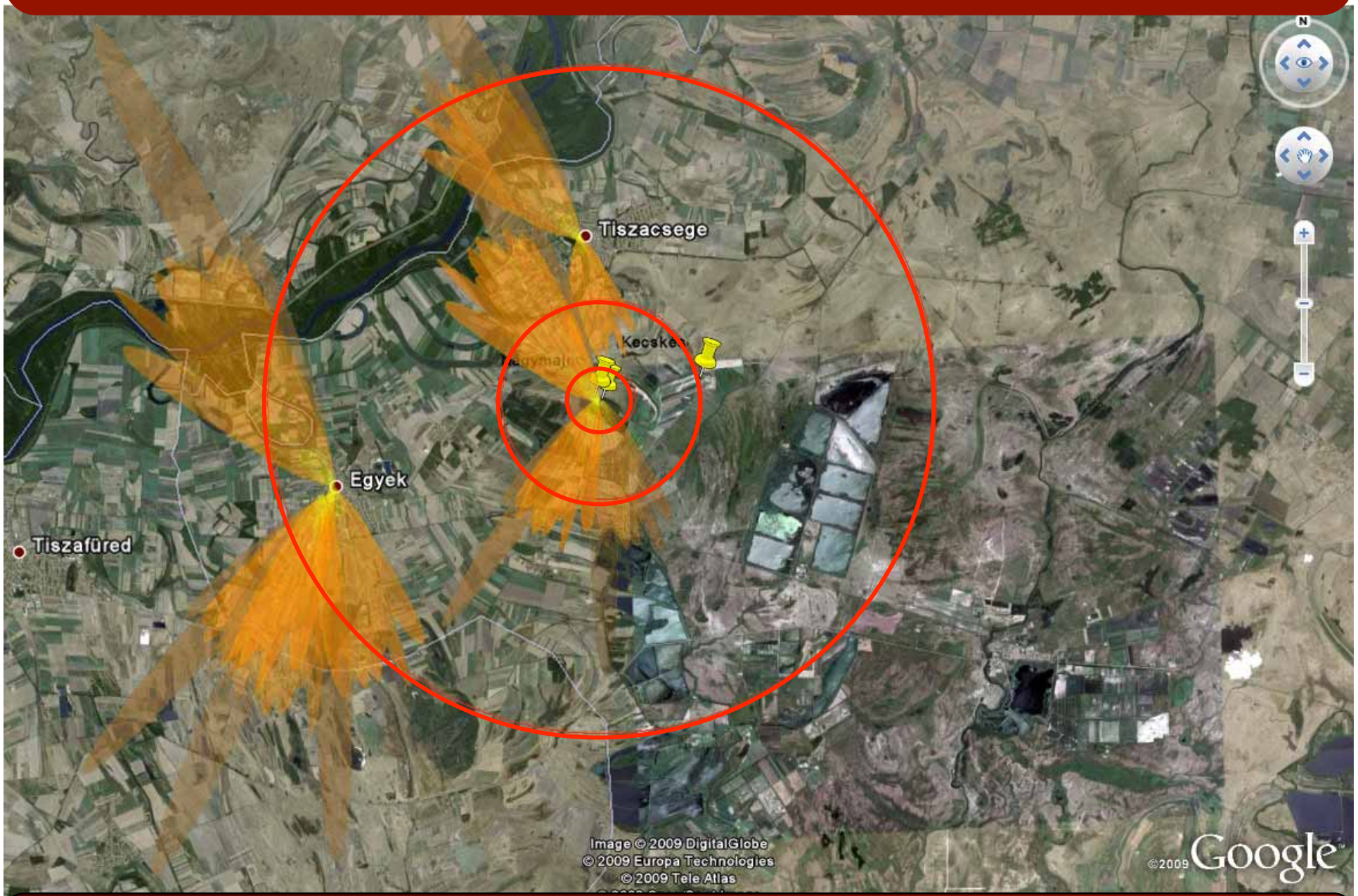
Demo outbreak

Demo outbreak

Demo outbreak

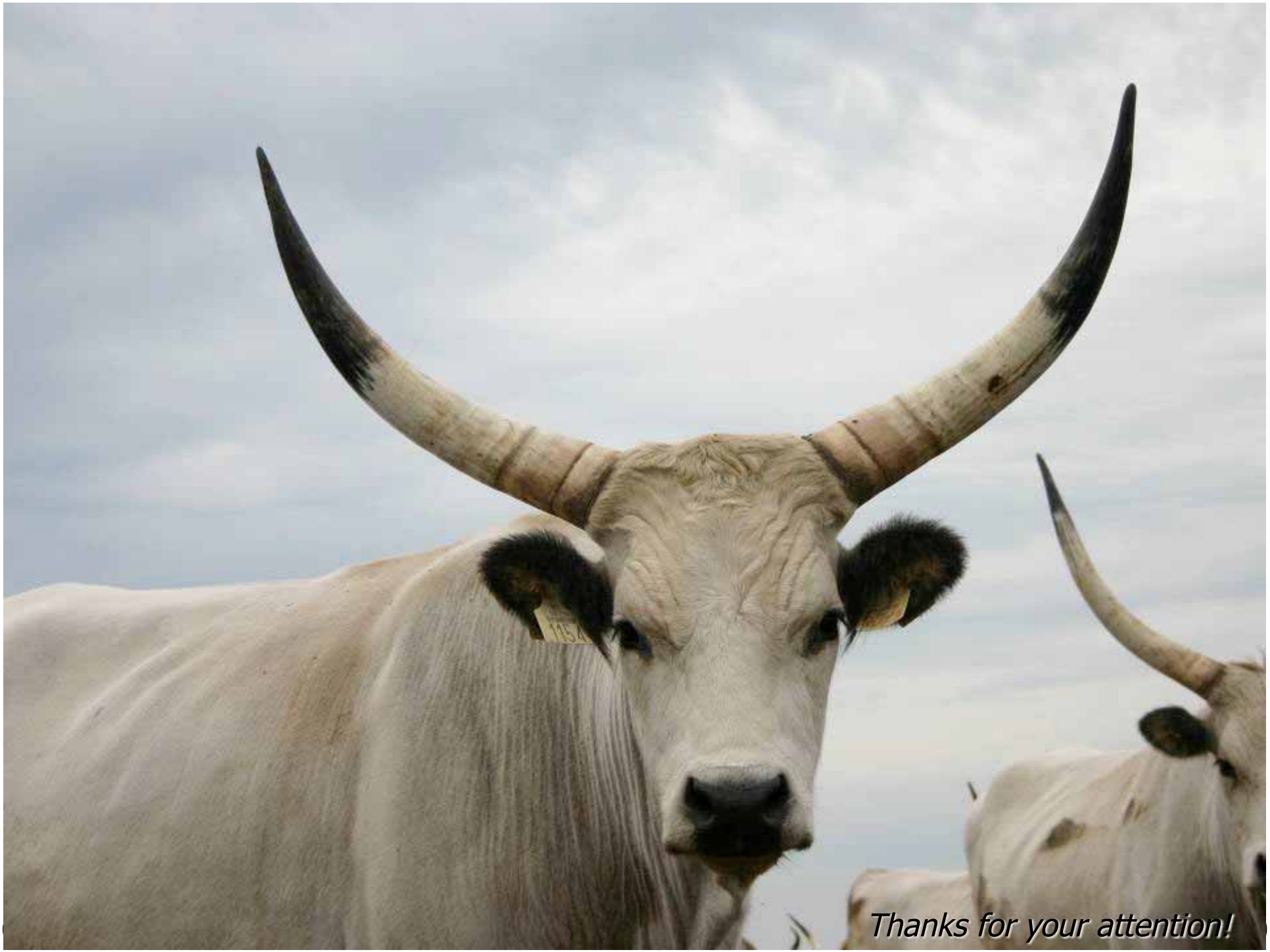
Demo outbreak

Demo outbreak



Future tasks

- computational capacity
- partners for cooperation
- integration into the outbreak plans
- environmental models for other uncontrollable spreading ways


Thanks for your attention!