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Agro - / bio -terrorism in Europe? Analysis of selected suspicious biological events (significant from the One Health perspective) after 24.02.2022

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http://interdisciplinary-research.eu/wp-content/uploads/2022/08/agro_terroryzm_robocza.pdf

http://interdisciplinary-research.eu/wp-content/uploads/2022/10/agroterrorism_2022.pdf

BioMed Panel Meeting 24 -27 October 2022, Warsaw

Agenda

- Why agroterrorism?
- Biolabs in Ukraine: Russian narration and BWC
- Empirical risk assessment of agroterrorism **after** 24.02.2022

Agroterrorism is not only a biological attack on animal breeding and plant cultivation (this dimension is included in the broadly understood bioterrorism), but it can also be an attack on transport, infrastructure, means of production and work motivation (it is another criminal or terrorist activity). In the modern era, agroterrorism can be used by various actors, so due to the possibility of acting, the following can be distinguished:

- Sensu stricte: activities of terrorist organizations;
- Sensu lato: Hybrid actions below the threshold of the BWC (Biological Weapons Convention) and the Geneva Protocols (for the protection of victims of armed conflict) by states (e.g. attacks on supply chains or the polarization of food producers) or by making it difficult for aggressors to prove an act of terrorism.

Agroterrorism





The perception of infectious diseases differs dependent on host type:

- human hosts (the highest interest among the general population);
- zoonotic agents (average interest with some peaks during local events as SARS-CoV-2 outbreaks among Minks, Rabbies or possible spillovers);
- Animal/plant host only (interest only in engaged agents).

New Lone Wolves repertoire

Agroterrorism



No risk to a potential terrorist to own health

Lack of psychosociological effects of intentional introduction

Agroterrorism



- zoonotic agents ->human medicine
- Animal production OiE used to classify up to 2018 livestock pathogens as:

A. Highest risk (the severity of the illnesses they produce and their ease of dissemination, and their high level of transmissibility): with ASFV but also FMD (Foot and Mouth Disease), CSF, Classical Swine Fever (CSF), avian influenza, etc.

B. Medium risk (moderately easy to disseminate and cause moderate diseases with low fatality rates), e. g. brucellosis, salmonella, non-living toxins (ricin and enterotoxin B). Attack on transportation, infrastructure, means of production, and motivation to work

 plant productions pathogens e.g. Xylella fastidiosa (bacterial host olive trees), Candidatus Liberibacter solanacearum (bacterial Zebra chip disease of potato), *Colletotrichum fructicola* (fungi fruit disease), Bactrocera dorsalis (oriental fruit fly)



High presence of ASF and HPAI in digital traditional media suggests that awareness campaigns have been performed, even its effectiveness can be questionable due to low reach in a general population.

Summary interest across selected terms (disease) and medium

term(topic)/summary	weekly RSV Google	daily No. article
Interest	Search (01.2020- 07.2022)	(01.2020-07.2022)
	710	220200
	715	330390
Coronavirus	1368	255620
HPAI	2.2	29857
ASF	3.3	17893

Totally different perception: almost 1000 fold higher interest in human than animal diseases (No. search weekly)

Slightly different perception almost few/dozens fold higher interest in human than animal diseases (No. articles daily)

https://www.vetmed.fu-berlin.de/en/einrichtungen/institute/we10/ISAH-2022/_downloads/Abstract-Book-ISAH2022.pdf

Microbiologists:

- Human ~17000
- Animal ~ 2000
- Plants ~ 400
- Epidemiologists:
- Human ~ 500
- Animal ~ 150
- Plants ~ 50

bottleneck?

The paradox of Poland as a country in which employment in the agri-food industry still reaches 25% and in fact the level of interest and knowledge about infectious diseases of animals or plants among city dwellers in Poland is one of the lowest in the EU.

What about Spring - Autumn 2022 in Europe?

- Intensification of actions against infrastructure and supply chain (probably less prioritize due to good harvesting season in Europe and North America)
- Polarization of food producers
- Disinformation on NATO Biolabs (probably less prioritize due to failure of BWC meeting)
- Jumps of plant/animal pathogens on disease free areas

Epidemiological / Epizootic / Epiphytic Analysis in the Context of Food Security. Chen X., Chughtai A. A., & MacIntyre C. R., Recalibration of the Grunow – Finke Assessment Tool to Improve Performance in Detecting Unnatural Epidemics, "Risk Analysis" 2019, 39(7), pp.1465-1475.

Criteria	Assessment Points	Weighting
		Factor
Biorisk	0,1,2,3	3
Unusual strain	0,1,2,3	3
Geographic distribution	0,1,2,3	1
Environmental concentration	0,1,2,3	3
Epidemic intensity	0,1,2,3	1
Transmission mode	0,1,2,3	1
Time	0,1,2,3	1
Unusually rapid spread	0,1,2,3	1
Population limitation	0,1,2,3	2
Clinical	0,1,2,3	1
Special insight	0,1,2,3	3

Sequeira R., Safeguarding production agriculture and natural ecosystems against biological terrorism: A U.S. department of agriculture emergency response framework, [in:] Food and Agricultural Security: guarding against natural threats and terrorist attacks affecting health, national food supplies, and agricultural economics, Ed. T. W. Frazier, New York 1999

use of non-traditional pathways	0,0.5,1
increase of the probability of survival of the pest in-transit	0,0.5,1
widespread dissemination of the disease from disparate	
foci	0,0.5,1
use of highly virulent strains,	0,0.5,1
high rates of inoculum	0,0.5,1
introduction into remote areas	0,0.5,1
targeting of susceptible production	
areas	0,0.5,1
targeting of susceptible natural environments	0,0.5,1
release of multiple species simultaneously	0,0.5,1
precise timing of releases to coincide with maximal colonization potential	0,0.5,1

Other scoring systems:

- Radosavljevic & Belojevic
- Radosavljevic
- Dembek

"For the first time in history, global consumption of poultry meat has exceeded the pork (...) the main influence of this change in consumption is the crisis caused by the African Swine Fever" 2019 FAO



ASF "is probably the most serious animal disease the world has had for a long time, if not ever" 2018 Dirk Pfeifer, world class veterinary epidemiologist

The pork shortage in China caused by African swine fever could contributed to the spillover of SARS-CoV-2 from animals to human

To acquire Infectious material

COLLECTING FROM THE ENVIRONMENT (death WB carcases)

wild boars (WB) carcases from the disease "front wave" area are infected with 15-50%, e.g. in Poland there are people who have made a source of income searching for carcasses; The best season for collecting material would be during intensive infectivity peak in late Spring or early Autumn, and in December/January (Eastern

COLLECTING FROM THE **AFFECTED FARMS (pork)**

Illegal pig slaughterhouse could sell pork from unknown source; The best season for collecting pig, pig carcases (can be stolen) is Summer.

CULTURE

Required access to the laboratory and virological knowledge (only state or statesponsored terrorism).

Europe). New portable genetic ASFV tests are needed (under development e.g. in China)

Collecting infectious material

BLOOD SAMPLE

1ml could contain around 10⁵ infectious ID50 units; up to partly decomposed carcase (up to few weeks) can be still contagious, timeframe should be considered (transport procedure up to 12h without any special needs, but for several days cold chain would be required). Few homemade/kitchen-lab technique can be applied such as low temperature pasteurisation (ASFV deactivates above 70 deg), homogenization or antibiotic use.

https://events.military-

medicine.com/media/landingpage/25/attachment-

BODY PIECES

High viral load in spleen or liver; only relatively fresh carcase (decav/ decomposition in days or weeks depending on season); less pathogens per volume and lower stability than blood and tissues, but less knowledge and technology required; storage e.g. in frozen pieces.

SELECTIVE TISSUE

Anatomy knowledge is required; Collection in advanced decayed/ decomposed tissues (up to few months after death); liquefaction of the material (for both stability and infectivity) is needed; the best microbiological stability in comparison to blood or body pieces.



smuggling in as a solutions); sanitary and veterinary services (if work appropriate) could quickly resolve propagated to other places around.

liquid feed - very high infectivity (water contamination possible).

Chen X., Chughtai A. A., & MacIntyre C. R., Recalibration of the Grunow – Finke Assessment Tool to Improve Performance in Detecting Unnatural Epidemics, "Risk Analysis" 2019, 39(7), pp.1465-1475.

Sequeira R., Safeguarding production agriculture and natural ecosystems against biological terrorism: A U.S. department of agriculture emergency response framework, [in:] Food and Agricultural Security: guarding against natural threats and terrorist attacks affecting health, national food supplies, and agricultural economics, Ed. T. W. Frazier, New York 1999

Introduction	calibrated Grunow–Finke	Agricultural index
	(Chen, et al., 2018)	(Sequera, 1999)
China -2018	17/60 which means around 28% of terrorism likelihood	5/10 (low to moderate likelihood of agroterrorism)
Belgium -2018	11/60 which means around 17% of terrorism likelihood	4.5/10 (low likelihood of agroterrorism)
Poland – 2017 (Warszawa)	18/60 ~30%	6,5/10 (moderate likelihood of agroterrorism)
Polska – 2019 (jump to West)	13/60 ~22%	5/10 (low to moderate likelihood of agroterrorism)
Germany– 2020 (Brandenburg)	18/60 ~30%	4/10 (low likelihood of agroterrorism)



Criteria	ASF Emmendingen, 25.05.2022,	
	Baden-Württemberg	
Biorisk	0	0
Unusual strain	1	3
Geographic distribution	0	0
Environmental concentration	0	0
Epidemic intensity	0	0
Transmission mode	2	2
Time	1	1
Unusually rapid spread	0	0
Population limitation	1	2
Clinical	0	0
Special insight	1	3
	Sum mod G-T scale	11
use of non-traditional pathways	0,5	
increase of the probability of survival of the pest in-transit	0	
widespread dissemination of the disease from disparate foci	0	
use of highly virulent strains,	0,5	
high rates of inoculum	0	
introduction into remote areas	0	
targeting of susceptible production		
areas	0,5	
targeting of susceptible natural environments	0	
release of multiple species simultaneously	0	
precise timing of releases to coincide with maximal		
colonization potential	0	
Agro index	1,5	

Criteria	ASF Emsland, 01.07.2022, Niec	dersachs
Biorisk	1	3
Unusual strain	0	C
Geographic distribution	1	1
Environmental concentration	0	C
Epidemic intensity	0	C
Transmission mode	1	1
Time	0	C
Unusually rapid spread	0	C
Population limitation	1	2
Clinical	0	C
Special insight	2	6
	Sum mod G-T scale	13
use of non-traditional pathways	0,5	
increase of the probability of survival of the pest in-transit	0	
widespread dissemination of the disease from disparate foci	0	
use of highly virulent strains,	0,5	
high rates of inoculum	0	
introduction into remote areas	0	
targeting of susceptible production		
areas	0,5	
targeting of susceptible natural environments	0	
release of multiple species simultaneously	0	
precise timing of releases to coincide with maximal		
colonization potential	0,5	
Agro Index	2	

Bactrocera dorsalis or oriental fruit fly, which is included in the alerts of the list of priority organisms by the EU, has been found in some orchards in the province of Naples, Campania. So far, these appear to be the first findings on a regional and national scale, while at a European scale, other findings have been reported at some entry points in France on imported fruit.

"We found a number of specimens of Bactrocera dorsalis in 2018 for the first time, after which we began to carry out monitoring activities in the field, placing various traps for this parasitic insect. In 2019, there were only 4 findings, while in 2020 and 2021 none.



In 2022, 90 traps were installed in Campania region. In mid-June 2022, a male B. dorsalis was caught in a trap located in a citrus garden in Palma Campania (Napoli province), in an urban area. Fruit sampling did not reveal any infested fruit in the garden and no larva were found. Additional traps were placed in the area.

In the first 15 days of September 2022, 166 adults (males) were caught in 28 traps activated with methyl eugenol and torula, all in the municipality of Palma Campania, except one, in San Gennaro Vesuviano, which is very close. The number of traps in Campania has been increased to 148 of which 64 are on the territory of Palma Campania.

Official measures have been taken (harvesting and destruction of fruits, prohibition of fruit movement from sites where catches occurred, phytosanitary treatments, intensification of survey) and a demarcated area will be established. In agreement with the National Phytosanitary Committee, the Emergency Plan and Action Plan for B. dorsalis are being updated.

The origin of these findings is not known but it is noted that a large proportion of the population in the area originates in Asia, and it is considered that findings may be related to infested fruits brought back by travellers.

Criteria	Bactrocera dorsalis June 2022,		22,
	Campania		
Biorisk		1	3
Unusual strain		0	0
Geographic distribution		1	1
Environmental concentration		1	3
Epidemic intensity		1	1
Transmission mode		1	1
Time		0	0
Unusually rapid spread		1	1
Population limitation		2	4
Clinical		0	0
Special insight		0	0
	Sum mod G-T scale		14
use of non-traditional pathways			0,5
increase of the probability of survival of the pest in-transit			0
widespread dissemination of the disease from disparate foci			0,5
use of highly virulent strains,			0,5
high rates of inoculum			0
introduction into remote areas			0,5
targeting of susceptible production			
areas			0,5
targeting of susceptible natural environments			1
release of multiple species simultaneously			0
precise timing of releases to coincide with maximal			
colonization potential			0
	Agro Index		3,5

Oder river disaster

 Situation at Odra/Oder was caused by multiple factors, but primary reason of fish kills were toxins produced by Golden Algae. Crisis management requires international cooperation in this case. The problem appear between Opole Region Lower Silesia, then river passes large city of Wrocław, then move through Lubusz region it reaches the German (Branderburg)–Polish border, and then drains along the border through Western Pomeriana Province into Szczecin Lagoon shared between Poland and Germany (Mecklenburg-Vorpommern) which is linked with the Baltic Sea.





whole July, movement of contaminated sediment from the river bed Between 01-03.08 there was no mention of the (discussion on ecological media) appearance of the dead fishes outside angling forums (dead fishes appeared in the mainstream of the Oder in Wrocław, but not in quantities indicating an ecological disaster). O 3.08. The Wrocław Left-wing party members intervened in the public and political sphere.

Wroch

31.07 Lower Silesian regional media(including Radio Wrocław and Gazeta Wrocławska, TVP3 Wrocław) Jelenia Gora

Liberec

Wałbrzych

25-27.07 agricultural organizations urges due to extremely low water levels

31.07 a warning was issued on Silesian internet portals about a rapid increase in the state of the Oder River from Chałupki to Kędzierzyn Koźle

End of June, dead fishes and water quality on the Gliwice Canal

29-31.07 media coverage in Oława media about fish kill

Opple

27.07, the social media of Oława

city and the anglers' associations

Bytom Dąbrowa Gliwice Górnicza Katowice

http://interdisciplinary-research.eu/wp-content/uploads/2022/08/odra_wrocław.pdf

https://blogs.fu-berlin.de/infodemic-corona/2022/08/19/oder-river-disaster-in-media/

On 11.08 German regional broadcaster (rbb24) spread a rumour about contamination of water with Mercury. This rumour was officially denied by authorities on 13.08, but information become , alive in media for a while.

On 10.08 fist mentions appeared on the German regional internet (as the wave of death fishers reached the German part of the Oder river). 10.08 is further propagation on nationwide media and nationwide social media. Only now are nationwide environmental organisations getting involved

On 09.08 the mainstream media in Lubusz (Gazeta Lubuska, Radio Zachód etc.) publicise the issue (previously Lower Silesia media did it). On 09.08 nationwide media (Onet, Dziennik, TVPinfo, Interia, Wprost, SE) reported on the incident too

06-07.08, a discussion developed on the web portals and social media of Głogów.

04.08 there were reports from Głogów (about smell and single dead fishes).

06-07.08, anglers discussed the large number of dead fishes on the so-called "dead Oder" in various areas around Wrocław. Legnica

Criteria	Odra (golden algaes) 28.07.2022,	
	PI/De	
Biorisk	0	0
Unusual strain	3	9
Geographic distribution	3	3
Environmental concentration	3	9
Epidemic intensity	3	3
Transmission mode	0	0
Time	3	3
Unusually rapid spread	3	3
Population limitation	0	0
Clinical	0	0
Special insight	2	6
	Sum mod G-T scale	36
use of non-traditional pathways		1
increase of the probability of survival of the pest in-transit		0
widespread dissemination of the disease from disparate foci		1
use of highly virulent strains,		1
high rates of inoculum		0,5
introduction into remote areas		1
targeting of susceptible production		
areas		0
targeting of susceptible natural environments		1
release of multiple species simultaneously		0
precise timing of releases to coincide with maximal		
colonization potential		1
	Agro index	6,5

Farmers protests (June/July 2022)



- Pre-existing social conflicting matters of animal production. Such a structural configuration facilitates mobilisation of own groups of interest and ends up with conflict between animal breeders, farright, agricultural parties, Christian organisations as well as opposing, government opposition and ecological organisations and far-link. COVID-19 crisis and pressures on farmers related to economic and climate challenges cause more and more farmers to escape from animal production. Moreover, special operation in Ukraine during 2022 threatens supplies for fertilizers and some crops, causing increases in animal feed prices as well as high energy prices (high level of energy consumption in animal products)
- changing and ending livestock production as well as deanimalization processes speed up. The European Green Deal is projected to affect livestock production by decline between 5% and 15%, with the animal breeders income being the hardest hit among all farmers in the perspective of the next 10 years

Criteria		
	Farmer Protests Summer 2	022, NI
Biorisk	2	6
Unusual strain	1	3
Geographic distribution	1	1
Environmental concentration	3	9
Epidemic intensity	1	1
Transmission mode	1	1
Time	0	0
Unusually rapid spread	2	2
Population limitation	2	4
Clinical	1	1
Special insight	2	6
	Sum mod G-T scale	34
use of non-traditional pathways	1	
increase of the probability of survival of the pest in-transit	0,5	
widespread dissemination of the disease from disparate foci	0,5	
use of highly virulent strains,	1	
high rates of inoculum	0,5	
introduction into remote areas	0,5	
targeting of susceptible production		
areas	0,5	
targeting of susceptible natural environments	0	
release of multiple species simultaneously	0,5	
precise timing of releases to coincide with maximal		
colonization potential	0	
Agro index	5	

Biological weapons have a huge potential for socio-political influence, as the Russians recently showed when the topic of alleged secret American laboratories...

Narration around "secret biolabs" in Ukraine as INFOOPS and PSYOPS internally (in Russia) and externally (in Poland)

- Biological weapons have a huge potential for media coverage and disinformation campaigns, as the Russian Ministry of Defence recently showed when the topic of alleged secret US/German/Polish sponsored laboratories in Ukraine began a series of public slots by the with a series of presentations in 2022 (10.03, 17.03, 14.04, 27.05, 17.06, 07.07, 04.08, 03.09-during BWC, 19.09)
- Formal Consultative Meeting of Biological Weapons Convention (BWC) took place 5-9.09.2022 regarding outstanding questions by the Russian Federation about operation of biological laboratories in Ukraine.
- It should be emphasized that in each of these presentations there is a constant threat of infectious diseases of animals, mainly concerning ASF and avian influenza. The commander of the radiological, chemical and biological defense forces of Russia Igor Kirillov repeatedly emphasizes that the Russians "obtained" evidence of biological experiments on humans, but also on pigs, wild boar and birds, or with insects. Additionally, at the session of the UN Security Council on March 11, 2022, the arguments between the US and Russia were confronted

Narration around "secret biolabs" in Ukraine as INFOOPS and PSYOPS internally (in Russia) and externally (in Poland)

Unofficial narration and propaganda:

- Multiple multimedia materials from war zones

 Mainly internal role, but also to influence fear in other countries (i.e. Poland) Official narration: - Mainly internal role, but also to rise some concerns in the public (Ukraine, USA, Germany, Poland, etc.) and allies - There were an enormous amount of biological errors disqualifying any kind of scientific discussions

BWC meeting documents:

- multiple arguments, but main focus on only 4 main groups of documents
- Concentration on US and Ukraine only
- More rigorous, but still shown as a discreditation of the Russian Federation

Briefing by the Chief of nuclear, biologic and chemical protection troops of Russian Armed Forces Lieutenant General Igor Kirillov Biolabs in Ukraine

Mainly zoonotic disease, but also accuse of using XDR TB against Dombas states, or use of Cholera



Narration around "secret biolabs" in Ukraine as INFOOPS and PSYOPS internally (in Russia) and externally (in Poland)

Content analysis: I have analysed the content of produced media releases in context of their biological integrity and agenda setting (in context of Poland).

In internal Russian narrative theme of the development of biological weapons by Poland has long been present in the media form pseudo-scientific studies, there are:

- historical anecdotes from the Polish-Moscow wars,
- accumulation of charges is based on the "mythical" Polish biological program in the interwar period, developed during and after the Polish-Bolshevik war,
- the activity of the Polish Underground State.

Impact analysis: Moreover, I have attempted to measure the influence of Russian allegations using Buzzsumo, Brand24, Twitter API, or Google trends content monitors, related to the variations of the keyword biolab / biological weapon **on Polish infosphere between 24.02-01.08.2022** in order to measure effectiveness of external Russian propaganda (mainly through Polish-language propaganda channels or channels resonating with Russian propaganda) on causing anxiety and fear in Polish society. The peak of activity in Polish traditional and social-content media took place between **March 9-24**, **2022** (which is only 9% of the entire time period), when as many as 72% of Google queries, 49% of articles and multimedia on internet portals and 43% of Tweets has been poste with multi-million reach. It suggests that the Kremlin's influence on Polish society was effective in the sense that it sparked a wave of interest.



Признаки занятия чёрной магией обнаружены в штабе украинских минометчиков на окраине села Трехизбенка в ЛНР: они пытались "освятить" оружие и делали пометки кровью.

Культуролог Екатерина Дайс объяснила РИА Новости, что этот символ "является магической печатью темных сил, сочетающим в себе идеи анархии, оружия и фашистской символики".

В самом штабе нашли релиз украинских силовиков с рассказом о потерях на Донбассе. На нем есть полосы от крови, притом что в других местах подобных следов нет.

"Black magic"

CBRNE(M)

Legal acts

Biological Weapons Convention (1972)

Art 1. "never in any circumstances to develop, produce, stockpile or otherwise acquire or retain: (1) microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective or other peaceful purposes"

Biological Weapons Convention States Parties were notified on 08.07.2022 that Russia has triggered Article V and called for a formal consultative meeting (this is the second time in history after the case of Cuba vs. USA in 1997).

https://meetings.unoda.org/section/bwc-fcm-2022-documents/

Main Questions:

- Ukraine failed to ensure an adequate level of biological protection in organizations and institutions that work with particularly dangerous pathogens?
- How was the US assistance, as implemented, supposed to ensure the sanitary and epidemiological well-being of the population of Ukraine?
- Why veterinary not human diseases were object of US-Ukraine collaboration?

Arguments:

International projects dissemination and legal documents. Internal reports of stockpiling and on security

After war documents:

"unmanned aerial vehicles equipped with containers and equipment which can be used to spray bioagents in Kakhovka and Cherson"

Lack of arguments:

- From Sanitary-Epidemiological station in Mariupol
- Order to destroy germs
- Other documents missing why?

- Biolab narration is purely a product of propaganda offices or PR agencies without any kind of attention to biological integrity (which sounds very strange as Russian microbiology and epidemiology scientific level is very high).
- Therefore, Biolabs can be treated purely the INFOOPS (information operations) and PSYOPS (psychological operations) dimensions.
- Low level preparedness by Russian delegates is surprising, errors in documents, almost no evidence after 24.02 neither from intelligence or captured areas
- Why "decree of the Ministry of Healthcare of Ukraine (February 24, 2022) for emergency destruction of pathogen collections has reinforced our concerns about possible violation of the articles I and IV within the BTWC requirements" was not include in BWC argumentation, but was used for official narration?
- Passive orientation of Russia allies as China (targeting only US biological program in general)
- Ninth Review Conference will be used to continue allegation towards US
- After BWC meeting no more new biological official allegation were stated, and no massive propaganda operation with biology as threat was observed (since September Nuclear threat was "turn on")

Briefing by the Chief of **nuclear**, biologic and chemical protection troops of Russian Armed Forces Lieutenant General Igor Kirillov since September are about:





Remarks

• Deliberate introduction of animal / plant pathogens to a disease-free area was relatively simple, and now it is even simpler;

• The threat of agroterrorism is currently greatest since the signing of the BWC due to the food crisis and the war in Ukraine;

• Poland, the Nordic countries, the Baltic states and Great Britain seem to be the most exposed to the Kremlin's actions, but Germany or France through ISIS (thus other introduction scenarios may come into play);

• Food producers, veterinarians and plant protection specialists should be alerted to potential threats of agroterrorism in the 2022/2023 season;

• It is worth carrying out exercises and simulations based on probable introduction scenarios (e.g. introduction of ASF in the Netherlands, FMD in Wielkopolska, or apple pests in the Lublin region);

• A system of traditional and social media monitoring should be developed in order to detect in real-time the potential impact of Kremlin propaganda and actors resonating with it;

• A system for monitoring the risk of radicalization in veterinary and agricultural professions and in the new category of post-pandemic professionals should be developed;

• The use of calibrated tools for the epidemiological assessment of Grunow & Finke or the Agricultural Index should be popularized, which should be applied to selected biological and agricultural events that took place in Europe after the Russian invasion on Ukraine.