



Scientific statement on public health risks from SARS-CoV-2 and the intensive rearing of mink

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Introduction

We, the undersigned scientists from the fields of virology, clinical microbiology, infectious diseases, veterinary medicine and environmental health, consider that the outbreaks of SARS-CoV-2 in mink farms in several European countries constitute a proportionate reason for the EU to urgently suspend mink farming across Europe.

The SARS-CoV-2 pandemic had, by January 27, 2021, affected over 100 million people worldwide, with nearly 2.2 million deaths reported globally (Worldometer 2021). These figures continue to rise on a daily basis. According to UN estimates the cost to the world economy in the coming two years will be at least 8.5 trillion USD. The EU needs to provide financial assistance of up to 100 billion Euros to protect the economy and avoid a major financial crisis (Halbwax 2020, 3).

In addition, biosecurity measures in mink (*Neovison vison*) farms tend to be costly and involve an impact on the public health systems in terms of veterinary and administrative personnel, costs for the sampling of biological material, costs for carrying out the tests, availability of swabs and reagents as well as the commitment of laboratories. Between August and November 2020, a total of 1.874 swabs were conducted in one single Italian mink farm at a cost of 50.000 Euro, financed by the public health budget, while the animals were later culled (IZSLER, Experimental Zooprohylactic Institute of Lombardy and Emilia Romagna, response to LAV upon request, January 8, 2021)

As we are experiencing excess mortality in the population, and with the healthcare systems under strain across Europe, together with the detrimental impact on jobs, businesses and the economy, the vaccination programmes give hope in the coming year.

However, the evidence that mink in fur farms can efficiently transmit and serve as intermediate hosts for the virus poses a considerable threat to public health and has potential implications at European level for COVID-19 diagnosis, treatment and vaccine development.

Mink farms, where thousands of mink are housed together in high density, constitute potential reservoirs for SARS-CoV-2 as well as for associated mutations (Dansk Veterinær Konsortium 2020, 12; Koopmans 2021, 19; Oude Munnink 2021, 177; Sharun et al. 2020, 3). It points to the risks associated with the intensive rearing of mink also with regard to future epidemics.

The infection of SARS-CoV-2 in mink farms exposes the risks associated with the intensive rearing of mink also for future epidemics.

A suspension of mink farming across the EU would be an appropriate, precautionary and proportionate measure based on public health concerns. The three following main risks are inextricably linked to mink farming:

1. Public health risks from the high transmission and mutation rates in mink fur farms

The rapid animal to animal transmission of SARS-CoV-2 in mink fur farms shows that once the virus has been introduced, the transmission may be difficult to stop. In spite of strengthened biosecurity measures, surveillance and culling of animals in affected farms, transmission between mink fur farms still occurred (Hobbs and Reid 2020, 11; Koopmans 2021, 19; Oude Munnink et al. 2021, 172). In addition to mink, studies indicate that raccoon dogs (*Nyctereutes procyonoides*), also farmed for fur, are susceptible to the virus, can transmit it, and may also serve as an intermediate host and potential reservoir for SARS-CoV-2 (Freuling et al. 2020, 1; Mahdy, Younis and Ewaida 2020, 4).

There are indications that the virus was already rapidly spreading in mink fur farms before it was detected. While the high and unnatural population density of animals in mink farms may in itself promote rapid transmission, the generation interval for the development of new mutations in mink could also be shorter than in humans (Koopmans 2021, 19; Oude Munnink et al. 2021, 177; Sharun et al. 2020, 5). **The role played by mink fur farms is significant in accelerating the evolution of the virus, as well as in the development of new variants that may not respond to current vaccines, and may establish the virus permanently** (Callaway 2020, 177; Sharun, et al. 2020, 9).

It cannot be assumed that the development of different virus variants in mink will reduce the adaptability of the virus in humans. Although the probability of transmission from mink to the general human population is low, compared to human-to-human transmission, the consequences of the establishment of reservoirs of virus are unforeseeable and may constitute a permanent pandemic threat with repeated spillover (Hobbs and Reid 2020, 11; Koopmans 2021, 19; Oude Munnink 2021, 177; Sharun 2020, 9).

2. Public health risks from intensively reared mink

Although several species show high susceptibility to SARS-CoV-2, this is not the only factor that determines infection. Important factors in host species can be underlying health conditions, behavior, number of contacts, age, atmospheric temperature, population density, airflow, ventilation and humidity. The amount of virus can be high also in asymptomatic individuals (Praharaj et al. 2020, 11). The intensive rearing of mink, under conditions of unnaturally high density of animals which in nature are solitary, means that these conditions already create an underlying stress situation for the animals.

They could be already immune-compromised and more susceptible to diseases (Humane Society Veterinary Medical Association n.d). Apart from the fatal respiratory distress and suffering of the infected mink, **the close proximity of thousands of mink provides ideal conditions for the rapid and sustained between-animal transmission and subsequent spillover of SARS-CoV-2 to humans and other animals** (Hobbs and Reid 2020, 11; Mahdy, Younis and Ewaida 2020, 4).

3. Risk of spillover into wild animals

The high mutation rates of RNA viruses, like SARS-CoV-2, make it possible for the virus to adapt to a variety of hosts (Mahdy et al. 2020, 2) and gives it the potential to turn into a panzootic disease. Spillover from intensively reared mink into susceptible wild animals can lead to the parallel circulation of viruses which can keep causing outbreaks among humans (Gollakner and Capua 2020, 11; Manes, Gollakner and Capua 2020, 65; Sharun 2020, 5-6).

The first case of the virus in a wild mink was found in Utah, USA (Briggs, 2020). As mustelids have proven to be susceptible to the virus, a spillover of SARS-CoV-2 into escaped or wild mink and other mustelids, such as otters and badgers, has the worrying potential to threaten vulnerable wildlife species. **Due to repeated spillover between wildlife and humans, wild animals can become a permanent viral reservoir of infection that can compromise efforts to control the virus.** The consequences of such an establishment of SARS-CoV-2 in wild animal populations could be severely damaging (Hobbs and Reid 2020, 13; Koopmans 2021, 19; Mahdy et al. 2020, 4; Manes, Gollakner and Capua 2020, 65).

Conclusion

The infection of SARS-CoV-2 in mink farms exposes the risks associated with the intensive rearing of mink also with regard to future epidemics. While many EU Member States have closed their mink farms in recent years, and others have already suspended mink farming to protect public health, mink fur farms in Europe represent a risk for maintaining reservoirs of SARS-CoV-2 and mutated strains within human society. Thereby, future spillover between animals and humans can thwart the efforts to eliminate, or even control, the disease. EU mink farms must not become a reservoir for future spillback of SARS-CoV-2 from animals to humans (Oude Munnink 2021, 177).

Given the consequences of the risks identified above, and the substantial impact the pandemic has had so far on human lives, jobs and the European economy, we urge the European Commission to take a precautionary approach to the severity of the crisis and suspend mink farming across the EU. This would be a proportionate answer to the risk.

Signatories

Juan Bárcena del Riego

Senior Scientist OPIS
Center for Animal Health Research (CISA-INIA)

Juan Miguel Barros Dios, Ph.D.

Professor of Preventive Medicine and Public Health, Director of the Radon Laboratory of Galicia.
Center for Biomedical Research in Epidemiology and Public Health Network (CIBERESP)

Marc Bekoff, Ph.D.

Professor emeritus of Ecology and Evolutionary Biology
University of Colorado

Bo Algers

Professor emeritus of Veterinary Medicine
Swedish University of Agricultural Sciences

Andrea Crisanti

Professor of Microbiology
University of Padova

Nicola Decaro

Professor of Infectious Diseases of Animals
University of Bari
President of the Italian Association of Veterinary Infectious Diseases

Prof. Isabella Eckerle, MD, DTM&H

Geneva Centre for Emerging Viral Diseases
University Hospital of Geneva and University of Geneva

Magnus Gisslén

Professor of Infectious Diseases
Sahlgrenska Academy at University of Gothenburg

Aris Katzourakis

Professor of Evolution and Genomics
University of Oxford

Constantinos S. Kyriakis

Assistant Professor of Virology and Animal Diseases
College of Veterinary Medicine at Auburn University and the Center for Vaccines and Immunology at the University of Georgia

Signatories

Hans Jørn Kolmos

Professor of Clinical Microbiology
University of Southern Denmark

Doz. Dr. Hanns Moshhammer

Head of Department for Environmental Health
Medical University of Vienna

Björn Olsen

Professor of Infectious Diseases
Uppsala University

Fabrizio Pregliasco

Virologist, Researcher of the Department of Biomedical Sciences for Health
University of Milan
Medical Director of the Galeazzi Institute, Milan

Abel Viejo-Borbolla

Professor in Experimental Virology, Molecular Biology and Biochemistry
specialist
Hannover Medical School

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Cover Image: caged mink © Dyrenes Beskyttelse



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