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Plant Health
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SARS-CoV-2 in animals

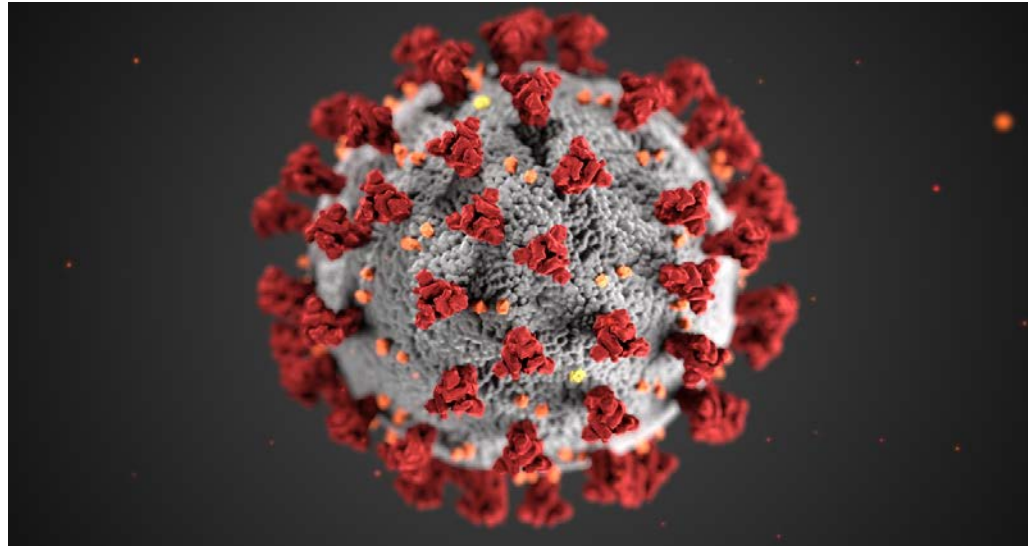
Global and UK's perspectives

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Global perspective

- Severe Acute Respiratory Syndrome Coronavirus 2= SARS-CoV-2
- COVID-19: disease in humans by SARS-CoV-2
- Initial cases and research
- Current situation
- OIE (World Organization for Animal Health) species table
- Ferrets and mink
- Conclusions



INITIAL CASES



- Cases

- February and March 2020 2 PCR positive dogs, 4 cats and a group of tiger and lions **Common link: human cases in the household/zoo. Reverse zoonosis (from people to animals)**

- [Research: Harbin Veterinary Research Institute \(China\)](#)

- Ferrets exposed to SARS-CoV-2 by inoculation in their nose can develop infection with SARS-CoV-2
- **Main conclusions: felids and mustelids are susceptible and can develop infection; livestock species (pig and poultry) are considered poor hosts**





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CURRENT SITUATION



- April to December 2020:
 - Netherlands: over 50% of their mink farms were positive to SARS-CoV-2 + transmission to people and cats.
 - Denmark: Over 25% of their mink farms were positive to SARS-CoV-2 plus
 - Evidence that the virus has jumped back to people after mutating in the mink, and has spread locally in the community
 - Cluster 5 mutation: less likely to be killed by antibodies against the human SARS-CoV-2 variant (vaccination??)
- Netherlands and Denmark culled all mink based on risk to animal and human health.
- OIE (World Organization for Animal Health)– Reportable
- UK reportable in mammals through the Zoonosis Order given the risk to human and animal health



OIE SUSCEPTIBILITY BY SPECIES

[EN Factsheet SARS-CoV-2.pdf \(oie.int\)](#)

Species	Type of infection ² [experimental (laboratory)/natural (field)]	Susceptibility to infection [none/extremely low/low/medium/high]	Clinical signs	Transmission
<i>Farmed animals</i>				
American mink (<i>Neovison vison</i>)	Natural and experimental	High	Yes (in some cases)	Yes, between minks and from mink to humans
Ferrets	Natural and experimental	High	Yes (only in few cases)	Yes, between ferrets
Raccoon dogs (<i>Nyctereutes procyonoides</i>)	Experimental	High	No	Yes, between racoon dogs
Rabbits (New Zealand White rabbits, <i>Oryctolagus cuniculus</i>)	Experimental	High	No	No
Pigs (American Yorkshire crossbred pigs, <i>Sus scrofa</i>)	Experimental	Extremely low	No	No
Cattle (<i>Bos taurus</i>)	Experimental	Extremely low	No	No
Poultry (chicken, ducks, and turkeys)	Experimental	None	No	No



MUSTELINAE: MINK AND FERRETS

- Ferrets belong to *Mustelinae* as well as mink
- UK: No mink farms since early 2000's
- Ferret:
 - Research model for respiratory diseases
 - In research studies with ferrets, the virus was shown to replicate efficiently in the upper-respiratory tract of these animals.
 - Two studies provided the experimental evidence that SARS-CoV-2 can be transmitted efficiently via direct-contact and via the air between ferrets, resulting in infection and the detection of virus in ferrets over more than one metre apart (Kim et al [Infection and Rapid Transmission of SARS-CoV-2 in ferrets](#); Kutter et al [SARS-CoV and SARS-CoV-2 are transmitted through the air between ferrets over more than one meter distance](#))
 - [natural SARS-CoV-2 infection in kept ferrets in Spain](#) : natural SARS-CoV-2 infection occur in ferrets, at least under circumstances of high viral circulation in people





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CONCLUSIONS



- SARS-CoV-2 is spread mainly from people to people. On a small number of cases, it has spread from people to animals
- SARS-CoV-2 has spread amongst mink, which in turn have been able to transmit SARS-CoV-2 to people and other animal species (cats)
- Research in ferrets show that they are susceptible to SARS-CoV-2 and transmit it directly or indirectly to other ferrets. A larger group is likely to maintain the circulation of the virus for longer periods of time.
- However, SARS-CoV-2 can mutate even in small group of animals, and in mink it has been shown to jump back to people in close contact with them.
- Knowledge gaps and continuously evolving landscape

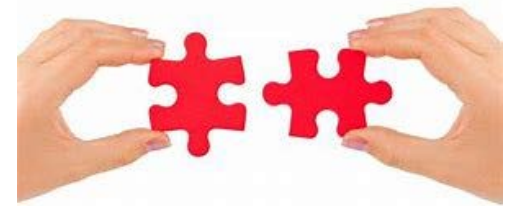


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CONCLUSIONS

Prevention: [Preventative measures regarding SARS-CoV-2 and Ferrets in the UK](#)



- Wash your hands before and after any contact with your ferret(s), their food and bedding
- The main source of SARS-CoV-2 for ferrets is transmission from people, if they are infected. This would be a very rare event (only one case reported so far)
- As ferrets are closely related to mink, there is the possibility that ferrets may potentially be able to pass SARS-CoV-2 back to uninfected people, and ferret owners need to be aware of this potential. However, the first and main important step is to minimise the transmission of SARS-CoV-2 from people to ferrets
- If you have (or think you have) COVID-19 you should minimise contact with your ferrets as much as possible.
- Disease in ferrets should usually be mild, but if your ferret falls ill, you should seek veterinary advice. Your vet can discuss with you whether testing would be recommended.
- You should isolate your ferret for 3 weeks (21 days), if you or somebody else in contact with them are self-isolating; if you have brought ferrets from a country not in the corridor list; or your ferrets has had a positive test to SARS-CoV-2. In the latest case, those should be kept separated from other animals while infected, and use of biosecurity measures is strongly advised (i.e. use of PPE, use of disinfectant gels)



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SOURCES

- [OIE technical factsheet on SARS-CoV-2 in animals](#) (updated January 2021)
- [OIE Guidelines for Working with Free-Ranging Wild Mammals in the Era of the COVID-19 Pandemic](#)
- [Animal Coronaviruses and SARS-COV-2 in Animals, What Do We Actually Know?](#)
Bonilauri, P.; Rugna, G. *Life* **2021**, 11, 123.
<https://doi.org/10.3390/life11020123>
- Articles with links in the presentation
- Guidance for Vets: [OV Briefing Note 09/21](#)

THANK YOU!