COVID-19, caused by infection with SARS-CoV-2, is a human disease which most likely emerged from an animal source and through widespread human-to-human transmission became a pandemic. As of 31 July **2022**, around **610 million** confirmed human cases have been reported worldwide, with more than **6.5 million** human deaths[1]. The nature of this new zoonotic virus, together with its widespread distribution and the susceptibility of some animal species to infection, manifests in animal infections arising from close contact between people and animals. Conversely, there is also evidence that, for some animal species, close contact with infected animals can represent a potential source of infection in humans[2]. This report is a monthly update of the global situation of the report of SARS-CoV-2 in animals, with a special focus on the new reports submitted to WOAH in the last month.

Global situation since the beginning of the pandemic

The worldwide geographical distribution of SARS-CoV-2 outbreaks in animals reported to WOAH is shown in Figure 1. The first case of SARS-CoV-2 in animals was officially reported to WOAH by Hong-Kong (SARC) on 29 February 2021 in a dog.

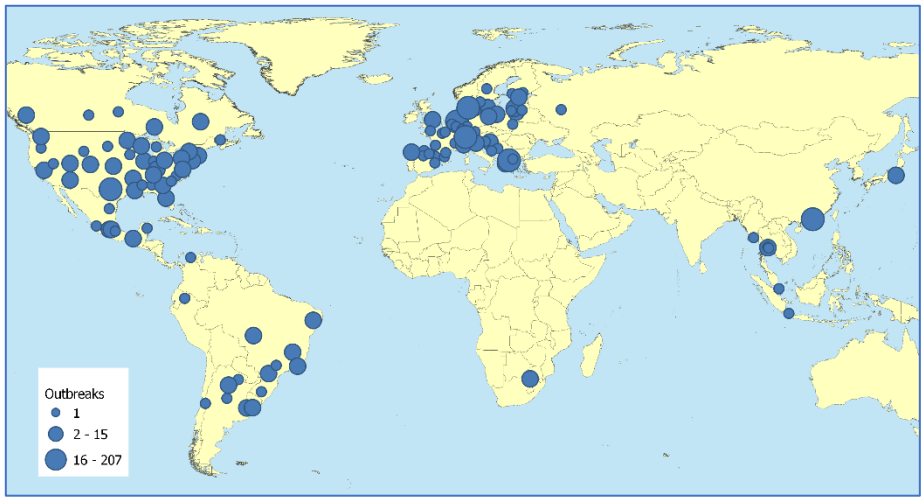

Figure 1. Worldwide distribution of SARS-CoV-2 outbreaks in twenty-three animal species reported to WOAH (as of 31 August 2022).
Note that dot size on the map is proportional to the number of outbreaks reported.

Table 1 shows the global distribution of animal infections with SARS-CoV-2. Thirty-six countries in the Americas, Africa, Asia, and Europe have reported the occurrence of the disease, in twenty-five different animal species (cats, dogs, mink, otter, pet ferrets, lions, tigers, pumas, snow leopards, gorillas, white-tailed deer, fishing cat, Binturong, South American coati, spotted hyena, Eurasian lynx, Canada lynx, hippopotamus, hamster, mule deer, giant anteater, West Indian manatee, black-tailed marmoset, common squirrel monkey, mandrill).

[1] https://coronavirus.jhu.edu/map.html
[2] https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2020.25.23.2001005#html_fulltext

Table 1. Number of outbreaks (n=692) reported worldwide, by species and region (as of 31 August 2022).

Region / Species	Africa	Americas	Asia	Europe
Cat		X	X	X
Dog		X	X	X
Mink		X		X
Otter		X		
Pet ferret		X		X
Lion	X	X	X	X
Tiger		X	X	X
Puma	X	X		
Snow leopard		X		
Gorilla		X		X
White-tailed deer		X		
Fishing cat		X		
Binturong		X		
South American coati		X		
Spotted hyena		X		
Eurasian lynx				X
Canada lynx		X		
Hippopotamus				X
Hamster			X	
Mule deer		X		
Giant anteater		X		
West Indian manatee		X		
Black-tailed marmoset		X		
Common squirrel monkey		X		
Mandrill		X		

Update during last month (01/08/2022 - 31/08/2022)

During the last month **15 outbreaks** have been reported or updated by **3 countries (Brazil, Mexico, United States of America)** in **4 animal species** (cats, dogs, mandrill, South American Coati). The recent distribution of outbreaks is reported in Figure 2.

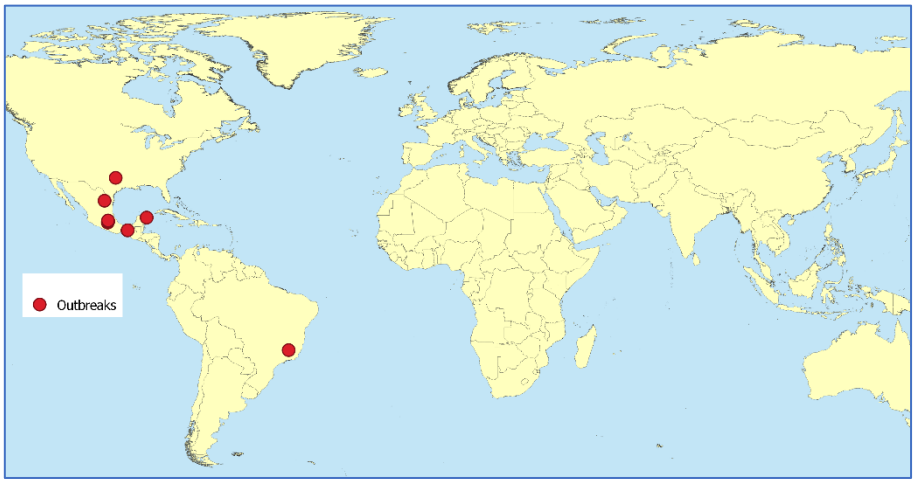

Figure 2. Worldwide recent distribution of SARS-CoV-2 outbreaks reported to WOAH (01/08/2022 - 31/08/2022).

EPIDEMIOLOGICAL COMMENTS

Summary of the global situation and recommendations

While the main driver of community and international spread in the current pandemic is human to human transmission, animal cases of infection with SARS-CoV-2, though still only occasional occurrences, continue to rise. Currently, **692 outbreaks** in animals have been reported globally, affecting **25 species** in **36 countries**. Some countries have experienced a high prevalence of outbreaks in mink farms, and variant strains have now been identified in mustelids. As infection with SARS-CoV-2 is an emerging disease, WOAH strongly encourages Members to report through WAHIS the occurrence of any cases in animals that comply with the case definition provided in WOAH guidelines[3].

Relevant changes in disease situation during the period:

- SARS-CoV-2 was reported through **1** Follow-up report by **Brazil** in South American coati
- SARS-CoV-2 was reported through **1** Follow-up report by **Mexico** in cats and dogs
- SARS-CoV-2 was reported through **1** Follow-up report by **United States of America** in mandrill

Relevant epidemiological comments from countries:

- **Brazil (South American coati):** *There is not an official SARCOV -2 surveillance programme for animal species in Brazil, but in the context of the COVID-19 pandemic there are some research centers running projects on the study of susceptibility of domestic and wild animal species to SARS-CoV-2 infection. The Institute of Biological Sciences, at the Federal University of Minas Gerais, has a research project entitled "Prospecting and characterization of zoonotic viruses in forest remnants inserted in urban environments". In early 2021, within the scope of this project, samples from 44 South American coatis (Nasua nasua), residing in an urban park in Belo Horizonte, were collected. A total of 3 samples were positive for the presence of SARS-CoV-2 RNA, referring to two female coatis captured in february 2021. The positive swab samples were subjected to whole genome sequencing, using MinION approach. One complete genome sequence was obtained from an anal swab. Phylogenetic analyzes inferred by the Maximum Likelihood method demonstrated the expected clustering with other SARS-CoV-2 genome sequences and confirmed that the sequence clusters with the P.2 (zeta) variant of SARS-CoV-2, circulating in Brazil. The results of this study were reported to the Department of Animal Health in August 2022.*

[3] https://www.woah.org/fileadmin/Home/MM/A_Sampling_Testing_and_Reporting_of_SARS-CoV-2_in_animals_3_July_2020.pdf

- Mexico (cats and dogs): *As a result of the recommendation issued by SENASICA since April 2020, urging the country's veterinarians and pet owners to follow the series of recommendations issued, it has been possible to prevent and detect possible cases of COVID-19 in animals exposed to infected people.*
- United States of America (mandrill): *Update August 8, 2022 Texas (TX) : A mandrill at a zoo was confirmed positive for SARS-CoV-2 at the National Veterinary Services Laboratories (NVSL) based upon molecular testing (PCR and sequencing). The mandrill was likely exposed to a person with COVID-19. This animal had 3 days of mild coughing and has subsequently recovered. This report represents a new species with detection of a positive SARS-CoV-2 for the U.S., but not a new state. July 2022 Monthly SARS-CoV-2 confirmed positive animals from previously identified states and/or species: Tiger: OH (1) Total = 1 There is a single SARS-CoV-2 event occurrence in the United States of America, however, for WAHIS technical reasons, any new outbreaks in the country will be reported in this new event and not in the one first reported in April 2020. For more details about SARS-CoV-2 testing of animals in the United States, see: https://www.aphis.usda.gov/aphis/dashboards/tableau/sars-dashboard.*

Other relevant information during the period (WOAH documents, relevant news, upcoming webinar or conferences)

- WOAH Ad hoc Group on COVID-19 at the Animal-Human Interface - https://former.woah.org/fileadmin/Home/MM/14th_call_AHG_COVID-19.pdf
- Statement from the Advisory Group on SARS-CoV-2 Evolution in Animals concerning the origins of Omicron variant - WOAH - World Organisation for Animal Health
- 8th-call-advisory-group-sars-cov2-evolution-in-animals.pdf (woah.org)
- 16th call WOAH ad hoc Group on COVID-19 at the animal-human interface
- Antibodies against SARS-CoV-2 Suggestive of Single Events of Spillover to Cattle, Germany - Volume 28, Number 9—September 2022 - Emerging Infectious Diseases journal - CDC
- Why Raccoon Dogs May Have Been The Cause For The Worldwide COVID Pandemic (ibtimes.com)
- Large-scale serological survey of SARS-CoV-2 in multiple rodent species across Europe (news-medical.net)
- Structure . Structural insights into the binding of SARS-CoV-2, SARS-CoV, and hCoV-NL63 spike receptor-binding domain to horse ACE2 - FluTrackers News and Information
- Animals | Free Full-Text | No Evidence of SARS-CoV-2 Infection in Wild Mink (Mustela lutreola and Neogale vison) from Northern Spain during the First Two Years of Pandemic (mdpi.com)