



Royal Veterinary College  
University of London

# SARS-CoV2 causing COVID-19

Geneva Environment Dialogues | #12  
Emerging Zoonotic Diseases and  
Ecosystems Health

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# What happened?



# What is a zoonosis?

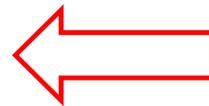
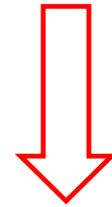
**Who definition:** zoonosis is any disease or infection that is naturally transmissible from vertebrate animals to humans. Animals thus play an **essential** role in **maintaining** zoonotic infections in nature.

**Known facts about COVID-19:** COVID-19 caused by a novel virus that transmits from human to human, with no known animal reservoir. It has been shown to infect a number of species of animal with no or limited symptoms and in some cases transmission was shown from that animal to another (cat to cat or mink to mink and mink to human). It is suspected to have arisen from a spill over of SARS CoV-2 from an animal in the food system in china or with a very similar virus that transformed into a novel human infective virus. The closest relative to this virus was found in a horse shoe bat in southern China

# Ecosystem interfaces - food systems COVID-2019



SARS-2 CoV



# Some interesting observations on the epidemiology of SARS-CoV-2

Coronaviruses are widespread within populations of a range of mammal and avian species. The human epidemic diseases (SARS, MERS, SARS – CoV 2) have their virus origins from the food system we believe.

Proximate source is domestic (dromedary camel – intensively managed) for MERS and for SARS and SARS CoV-2 proposed to be from wildlife-based food source.

Molecular analysis suggests SARS CoV -2 emerged, with potential to infect humans around November 2019, an animal reservoir was probably established whilst this virus was moving through the value chain, through to restaurants and wet markets (400 in Wuhan alone sourcing from China, Vietnam, Laos, Cambodia, Thailand..). The species carrier or amplifier is not yet known.

Virus was isolated from Wuhan Market, from most surfaces contaminated with wildlife species (blood and bodily fluids) but forensic work was not possible in the panic.

ASF outbreak which led to 100 million pig deaths drove up the pork price in China dramatically, and may well have influenced increased use and provisioning of wet markets.

The origin of the virus genome is probably *Rhinolophus sinicus* horse shoe bats – but SARS virus itself was never found just close relatives and of 500 Beta CoV isolated over 10 years in south China none were SARS CoV-2.

A survey of 1497 occupationally at risk of contact with bats showed a 0.6-2% seroprevalence specific to the Beta CoV most closely related to SARS and SARS2 - but without associated illness.

# China Wildlife Farming Industry – the proximate source? Or wildlife trade from SEA

**Employment and direct output value of wild animal industry in China, 2016 (In A 2017 report by the Chinese Academy of Engineering on the development of the wildlife farming industry)**

Industry	No. of Employment	Direct Output Value (million CNY)
Fur animals	7,600,000	398,483
Medicinal animals	210,800	5,027
Food animals	6,263,400	125,054
Exhibiting animals & pets	13,700	652
Experimental animals	2,000	400
<b>Total</b>	<b>14,089,900</b>	<b>520,616</b>

# Is this really serious?

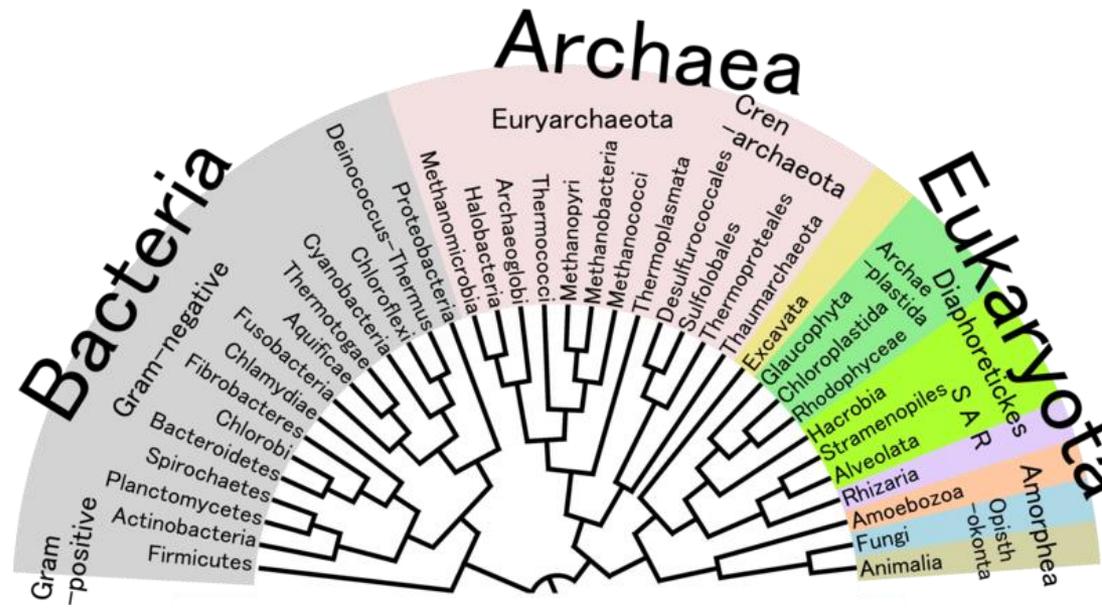
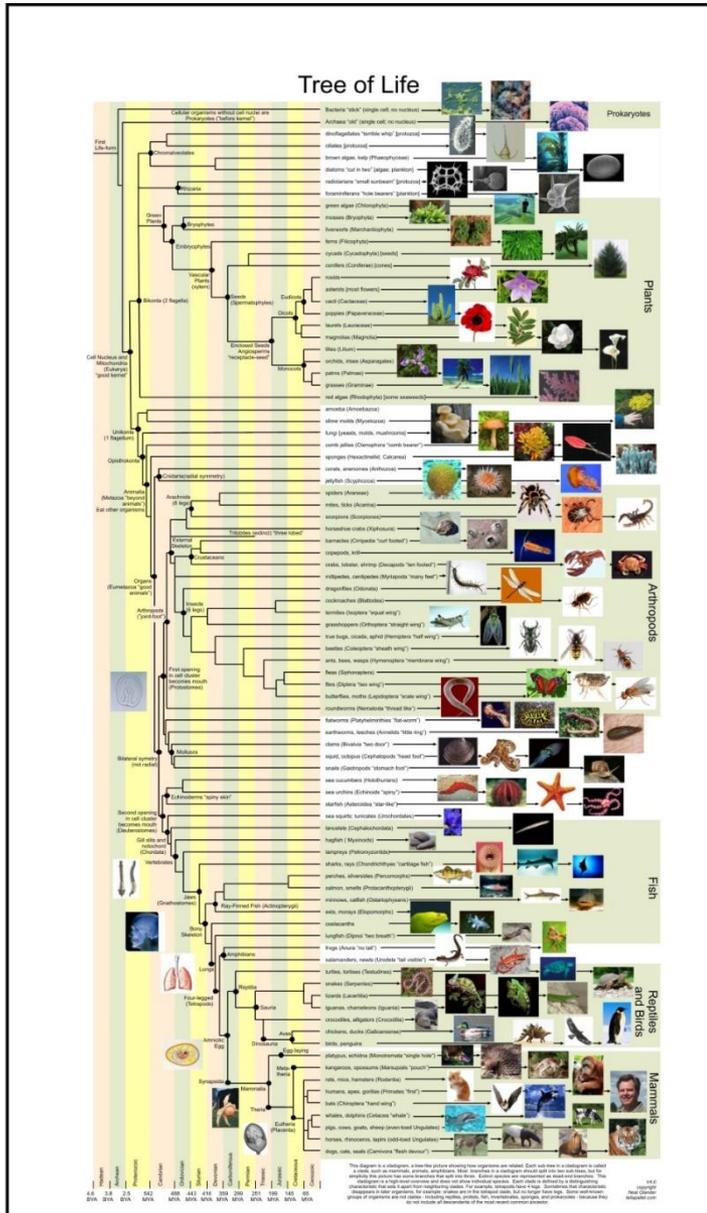
**First infodemic** – impacts are way beyond the impact of the virus itself so whether it is in truth a mild disease by virus standards, if you like it or not, it is serious!

A global recession has serious social and political consequences of which conflict is perhaps the most worrying.

**What has driven this event is the BIG question?**

- 1) Landscape change underpins this event
- 2) Human and domestic animal pressure on ecosystems and wild species creating optimal conditions for virus emergence
- 3) Spill over opportunity from exploitation of wildlife species of animals in huge numbers in China for food and fur bringing virus to millions of people through globalised world.

# Biodiversity



# Role of Biodiversity

Nature holds the genetic codes of billions of viruses, bacteria etc.

There are only 1500 pathogens of humans.

New pathogens will come from nature – where else?

Ecosystemic stability and natural ecosystems do not generate pathogens. Quite the opposite

Human systems provide opportunity for pathogen evolution.

Thank you for listening

